# Real and Illusory Reports of Posttraumatic Growth and their correlation with Well-being: An empirical Examination with special Focus on Defence Mechanisms

Michaela Börner

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**Abstract**

Reports of posttraumatic growth can sometimes be illusory. Several researchers have argued that reports of posttraumatic growth may incorporate two separate phenomena, namely real posttraumatic growth and illusory posttraumatic growth. However, it is not often made explicit which kinds of illusions indicate illusory posttraumatic growth. An explicit conceptualisation of illusory posttraumatic growth is, however, necessary in order to investigate the research questions within this thesis, namely (a) whether reports of posttraumatic growth are correlated with illusions and (b) whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with well-being.

Within the thesis, it was, therefore, primarily suggested that defensiveness could be responsible for illusory posttraumatic growth. The assumption was that high levels of maladaptive defensiveness may be used when distress cannot be endured. Internal and external experiences could then be pushed away. This case could potentially indicate illusory posttraumatic growth. In contrast, people who use low levels of maladaptive defences or high levels of mature defences may be able to endure the distress following a trauma or adversity. Internal and external experiences may be processed and accommodated. This case could potentially indicate real posttraumatic growth.

The assumptions about illusions were tested within the thesis. It was investigated which kind of illusions could be adaptive psychological operations and which illusions could be maladaptive psychological operations. The results supported the assumptions within this thesis concerning adaptive versus maladaptive illusions.

Within three studies, self-reported posttraumatic growth was significantly correlated with a neurotic defence style. It was concluded that this correlation could indicate that sometimes reports of posttraumatic growth are not real. However, other interpretations were also discussed.

Four studies investigated whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with well-being. Within chapter 5, real posttraumatic growth, indicated by low levels of a neurotic or an immature defence style, was correlated positively with negative change following adversity (non-significant). In contrast, illusory posttraumatic

growth, indicated by high levels of a neurotic or an immature defence style, was not correlated with negative change following adversity. Although the difference between illusory posttraumatic growth and real posttraumatic growth concerning negative change following adversity had a meaningful effect size, it was not significant.

Within chapter 7.3, real posttraumatic growth, indicated by extremely low levels of neurotic defensiveness, was correlated significantly with posttraumatic stress. In contrast, illusory posttraumatic growth, indicated by extremely high levels of neurotic defensiveness, was not correlated with posttraumatic stress. The difference between real posttraumatic growth and illusory posttraumatic growth was significant.

Within chapter 8, real posttraumatic growth (high levels of mature defensiveness) was correlated with decreases in hedonic well-being measured by positive and negative affect. In contrast, illusory posttraumatic growth (low levels of mature defensiveness) was correlated with increased levels of hedonic well-being. The difference between real posttraumatic growth and illusory posttraumatic growth was significant.

In total, reports of posttraumatic growth may, in fact, sometimes be correlated with defensiveness. However, real posttraumatic growth and illusory posttraumatic growth do only slightly differ concerning their correlation with well-being.

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**List of Abbreviations**

| | |
|---|---|
| BIDR | Balanced Inventory of Desirable Responding |
| CiOQ | Changes in Outlook Questionnaire |
| CiOQ-N | Changes in Outlook Questionnaire – Negative Change Scale |
| CiOQ-P | Changes in Outlook Questionnaire- Positive Change Scale |
| DERS | Difficulties in Emotion Regulation Scale |
| DSQ-40 | Defense Style Questionnaire-40 |
| ESRC | Economic and Social Research Council |
| HSQ | Humor Style Questionnaire |
| IES | Impact of Event Scale |
| NGO | Non-governmental Organisation |
| PANAS | Positive and Negative Affect Schedule |
| PBS | Perceived Benefits Scale |
| PTG | Posttraumatic Growth |
| PTGI | Posttraumatic Growth Inventory |
| PTSD | Posttraumatic Stress Disorder |
| PWB | Psychological Well-being |
| RPWB | Ryff's Psychological Well-being Scales |
| SPSS | Statistical Package for the Social Sciences |
| SRGS | Stress-related Growth Scale |
| SWB | Subjective Well-being |

# Real and Illusory Reports of Posttraumatic Growth and their correlation with Well-being: An empirical Examination with special Focus on Defence Mechanisms

The world has changed in summer. The drab grey has turned into blue skies and green grasslands. The world is suddenly full of life. Colourful butterflies are almost dancing in the air. But before such a butterfly emerges, it has to go through a process of complete transformation and metamorphosis. Born as an often unimpressive caterpillar, it transforms to an almost immobile pupa. In this motionless stage, the caterpillar develops wings, feelers and even different organs. This process of transformation takes many weeks and sometimes even years. But after the transformation, a full-grown butterfly comes into the world.

Such stories of transformation could serve as a metaphor for how people have changed for the better because of an adverse life experience or trauma. But are these metaphors more than wishful thinking?

People are often highly challenged by adversities and traumas. They often struggle with the consequences life puts on them and are sometimes incapable of sustaining a hopeful outlook. But even though many people can sustain a hopeful outlook, trauma itself has the potential to change them negatively in some domains forever. The potentially destructive nature of trauma may be a major factor motivating its broad scientific examination. Trauma has the potential to cause intense negative cognitions and emotions (e.g. Horowitz, Markman, Stinson, Fridhandler, and Ghannam, 1995; Janoff-Bulman, 1992; Joseph, Murphy, and Regel, 2012; Joseph, 2011; Joseph and Linley, 2006b; Rachman, 2001; van der Kolk and McFarlane, 2007; Bessel and van der Kolk, 2007). Trauma also has the potential to threaten our understanding of self and the world (Janoff-Bulman, 2009).

However, trauma may not only have the potential to destroy. Rather it could be a chance to gain new perspectives and to set different priorities in life (e.g. Calhoun and Tedeschi, 2013; Janoff-Bulman, 2009; Joseph, 2011). Trauma survivors often report that they have positively changed because of their struggle with adverse experiences (e.g. Janoff-Bulman, 2009; Joseph, 2011; Joseph and Butler, 2010; Solomon and Dekel, 2007; Tedeschi and Calhoun, 2004). Positive psychological changes are reported in various areas.

For example, some survivors report a heightened sense of empathy (Calhoun and Tedeschi, 2013; Calhoun and Tedeschi, 2009; Smith, Joseph, and DasNair, 2011), sensitivity and compassion towards other people (Calhoun and Tedeschi, 2013; Smith et al., 2011; Tedeschi and Calhoun, 2004). Other survivors may be more willing to speak their mind or to communicate in an open way (cf. Yalom, 1980) while others may be more inclined to take responsibility for their own life (Joseph, 2011). Those positive psychological changes are termed by Tedeschi and Calhoun as posttraumatic growth (Tedeschi and Calhoun, 2004; Tedeschi and Calhoun, 2004b). Because posttraumatic growth is now the term most widely used (e.g. Frazier, Tennen, Gavian, Park, Tomich and Tashiro, 2009) to describe the concept of positive psychological change following adversity, it will be used throughout this thesis.

Of those who have experienced a trauma, 30% to 70% report experiencing some degree of posttraumatic growth (Joseph and Butler, 2010). Although such reports of posttraumatic growth are interesting in themselves (Jayawickreme and Blackie, 2014), it is not entirely understood what they mean with respect to the well-being and the lived experience of an individual. Moreover, reports of posttraumatic growth and respective measurements could lack validity, making the broad scientific examination of posttraumatic growth complicated and ambiguous.

Within the subsequent thesis, potential validity issues concerning reports of posttraumatic growth are reviewed and discussed. Because of these validity issues, it will be suggested to differentiate between reports of posttraumatic growth and the theoretical concept of posttraumatic growth within research. In other words, a theory around a construct cannot be tested as long as the measurements and their foundations (self-reports) are not sufficiently valid (cf. Diekmann, 2002). Within this thesis, it is hypothesised that the validity issues of reports of posttraumatic growth are caused by illusions. As already suggested by, for example, Frazier and colleagues (2009), Hobfoll, Hall, Canetti-Nisim, Galea, Johnson and Palmieri (2007) and Maercker and Zoellner (2004) it will be assumed that reports of posttraumatic growth could include two different psychological phenomena, namely real transformational

posttraumatic growth and illusory posttraumatic growth[1]. If this were the case, it could be that real transformational posttraumatic growth and illusory posttraumatic growth differ in their correlation with well-being as suggested, for example, by Frazier and colleagues (2009), Gunty, Frazier, Tennen, Tomich, Tashiro and Park (2011) and Hall, Hobfoll, Canetti, Johnson, and Galea (2009). However, studies about the difference between real transformational posttraumatic growth and illusory posttraumatic growth are still rare.

Within the subsequent thesis two questions will be examined.

1. Are reports of posttraumatic growth correlated with illusions?
2. Do real posttraumatic growth and illusory posttraumatic growth differ in their correlation with well-being?

In order to examine those questions, illusions will be conceptualised. Within this thesis, assumptions about illusions are made in order to determine what could indicate illusory posttraumatic growth and what could reflect real transformational posttraumatic growth. Here, the concept of illusions is made up of a combination of several theories on illusions. In general, illusions will be defined in two ways. First, in accordance with Taylor (1989/1983), illusions will be conceptualised in a positive way. Positive illusions are assumed to allow a person to see and utilise a threatening experience although they may change their perspective towards a brighter outlook (Taylor, 1989). Positive illusions will be conceptualised as self-enhancing strategies, benign or positive humour and as a mature defence style. Moreover, a mature defence style is assumed to constitute a special case of positive illusions, in so far as it may allow for accommodation processes and, hence, for real posttraumatic growth.

Second, in contrast to Taylor (1989/1983), some illusions will be conceptualised as having potentially injurious long-term implications.

[1] The construct of illusions and its potential association with reports of posttraumatic growth are discussed and defined in more detail within section 1.3. These definitions and theoretical constructions are helpful in order to follow the rationale of some interpretations/conclusions concerning the results within the empirical part of the thesis.

Although this should not be understood in way that is too rigid, these illusions may be able to ward off internal and external experiences (cf. Taylor, 1989; Horowitz et al., 1995; Vaillant, 1995). If this is the case, they may have the potential to impede trauma processing and consequently the development of real transformational posttraumatic growth. These potential injurious or negative illusions will be conceptualised by a neurotic and immature defence style as well by injurious (negative) humour styles. Low levels of mature defences may also indicate illusory reports of posttraumatic growth.

In total, this thesis combines two ways on how illusions are understood. First, in accordance with Taylor (1989/1983) some illusions are understood as positive and helpful ways to cope with life stress. Positive illusions initiated by a mature defence style could even facilitate accommodation processes and, therefore, real transformational posttraumatic growth. It will be assumed that high levels of mature defensiveness could be an indicator for real posttraumatic growth. Whereas low levels of mature defensiveness could indicate illusory reports of posttraumatic growth.

In contrast to mature defences, neurotic and immature defences will be conceptualised as illusions that could have potentially long-term, injurious implications. Hence, high levels of neurotic or immature defensiveness could indicate illusory reports of posttraumatic growth. In contrast, low levels of neurotic or immature defensiveness could indicate that real transformational posttraumatic growth has taken place. People who use low levels of neurotic or immature defences may have the tendency to be able to endure the distress following a trauma or adversity. Internal and external experiences may be processed and accommodated.

The construct of illusions and its potential association with reports of posttraumatic growth are discussed and conceptualised in more detail in section 1.3. Moderation analyses will be used to separate real posttraumatic growth from illusory posttraumatic growth and to investigate whether those two differ in their correlation with well-being. The focus of this thesis will be primarily on the illusions of defensiveness. This focus has been chosen because high levels of maladaptive defensive operations could be used especially when distress cannot be endured.

Following the theoretical conceptualisation of the thesis, the literature will be systematically reviewed concerning research on illusory posttraumatic growth. Here, the focus will be on illusory posttraumatic growth indicated by defence mechanisms. This focus was used because the thesis primarily examines illusory posttraumatic growth from this angle. The aim of such a systematic review is to place the research undertaken within this thesis into a broader context. Through the review, existing knowledge about the correlation between reports of posttraumatic growth and defence mechanisms will be summarised. In sum, the review will explicitly show what research gaps still exist, and how the thesis contributes to gain new knowledge. After having identified a gap in the prevailing research, and having placed the research into a broader scientific context, the empirical part of the thesis will follow.

Within the first study, theoretical assumptions concerning illusions will be put to the test. Here, it will be investigated which forms of illusions could be described as adaptive and which forms of illusions could have the potential to have a negative effect on psychological functioning. This study will also be used to validate theoretical assumptions about the positive and negative effect of certain illusions. The results support the theoretical assumptions about illusions. Therefore, the conceptualisation of real posttraumatic growth and illusory reports of posttraumatic growth can be used with more confidence within the next studies.

The subsequent studies will investigate whether real transformational posttraumatic growth and illusory posttraumatic growth differ concerning their correlation with diverse well-being measures. In addition, all studies will investigate whether reports of posttraumatic growth are correlated with illusions as defined by defence mechanisms.

Chapter 5 investigates whether reports of posttraumatic growth are correlated with defence styles. Furthermore, it examines whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with negative change following adversity. It is suggested that real posttraumatic growth is indicated by low levels of a neurotic or an immature defence style or by high levels of a mature defence style. In contrast, illusory reports of posttraumatic growth were assumed to be indicated by high levels of a neurotic or an immature defence style or low levels of a mature defence style.

The results suggested that reports of posttraumatic growth were especially and significantly correlated with a neurotic defence style. Real posttraumatic growth, indicated by low levels of a neurotic or an immature defence style, was correlated positively with negative change following adversity. In contrast, illusory posttraumatic growth, indicated by high levels of a neurotic or an immature defence style, was not correlated with negative change following adversity. Although the difference between illusory posttraumatic growth and real posttraumatic growth concerning negative change following adversity had a meaningful effect size, it was not significant.

In chapter 6, the research will look more into the detail of a specific defence mechanism, namely humour. Here, it will be investigated whether reports of posttraumatic growth are correlated with certain humour styles defined as defence mechanisms. Moreover, it will be investigated whether reports of posttraumatic growth are correlated with self-enhancing strategies after Taylor (1989/ 1983). Furthermore, it will be examined whether real posttraumatic growth and illusory reports of posttraumatic growth differ in their correlation with negative change following adversity. It was suggested that real posttraumatic growth is indicated by high levels of positive humour. In contrast, illusory posttraumatic growth was assumed to be indicated by high levels of negative humour. The results suggested that reports of posttraumatic growth measured by the Posttraumatic Growth Inventory (PTGI) are not significantly correlated with any humour style. Moreover, reports of posttraumatic growth were not correlated with self-enhancing strategies after Taylor (1989/ 1983). Real posttraumatic growth and illusory posttraumatic growth, indicated by the level of humour, did not significantly differ concerning their correlation with negative change following adversity.

The correlation between reports of posttraumatic growth, measured by the Changes in Outlook Quesionnaire (CiOQ-P), and negative change following adversity was significantly moderated by the level of self-deceptive enhancement. The next study investigates whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with well-being besides negative change following adversity.

Chapter 7 investigates again whether reports of posttraumatic growth are correlated with any defence style. Furthermore, it examines whether real

posttraumatic growth and illusory reports of posttraumatic growth differ in their correlation with posttraumatic stress and emotional dysregulation. Two studies were conducted as the sample size of the first study was rather low.

Within the latter case, no moderation analyses could be carried out because of its low sample size. Within the first study, reports of posttraumatic growth, measured by the PTGI, were inversely correlated (non-significant) with any defence style. Within the second study, a neurotic defence style was significantly correlated with reports of posttraumatic growth (PTGI). Real posttraumatic growth, indicated by extremely low levels of neurotic defensiveness, was correlated significantly with posttraumatic stress. In contrast, illusory posttraumatic growth, indicated by extremely high levels of neurotic defensiveness, was not correlated with posttraumatic stress. Here, the difference between real posttraumatic growth and illusory posttraumatic growth was significant.

However, well-being is not only defined by the absence of distress, but may also be defined by positive mental states (Joseph, 2011). Therefore, the next study explores whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with hedonic well-being (positive and negative affect) and psychological well-being. Moreover, the study investigates whether reports of posttraumatic growth are correlated with any defence style. Reports of posttraumatic growth were again uniquely and significantly correlated with a neurotic defence style. Real posttraumatic growth (indicated by high levels of mature defensiveness) was correlated with decreases in hedonic well-being. In contrast, illusory posttraumatic growth (indicated by low levels of mature defensiveness) was correlated with increased levels of hedonic well-being. Here, the difference between real posttraumatic growth and illusory posttraumatic growth was significant.

Finally, the main results are discussed in light of posttraumatic growth theories and the conceptualisation of real posttraumatic growth and illusory posttraumatic growth as suggested in section 1.4. Attention will be drawn to clinical implications. Limitations of the thesis are discussed and new ways for researching real posttraumatic growth and illusory posttraumatic growth are suggested.

To my knowledge, the thesis explores reports of posttraumatic growth from a new theoretical, methodological and empirical perspective. First, the theoretical assumptions on how reports of posttraumatic growth could be influenced by certain forms of illusions and how those forms of illusions could impact the correlation between reports of posttraumatic growth and well-being offer a new perspective. Second, the methodological procedure used to separate real transformational posttraumatic growth from illusory posttraumatic growth is mainly a new approach. Third, these new approaches are used to explore, preliminarily, the possibility of (a) whether reports of posttraumatic growth are correlated with illusions and (b) whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with well-being.

The theoretical assumptions and conceptualisations will be discussed and developed within the following literature review. The theoretical and methodological rationale used within this thesis, as well as its significance, should be found at the end of the chapter.

# 1. Literature Review

Within the following literature review, the concept of posttraumatic growth is illustrated, and diverse theories on posttraumatic growth are described. A review of concepts and theories should place this research within a wider context. Moreover, some theoretical assumptions are used in order to develop my own theory on real and illusory reports of posttraumatic growth and to suggest hypotheses on how they could correlate with well-being.

Second, a literature review is conducted on the validity of reports of posttraumatic growth. Here, theoretical considerations and empirical research is discussed. The literature review on the validity of reports of posttraumatic growth appeared to be important in order to evaluate whether there are, in fact, potential validity issues concerning self-reported posttraumatic growth. The literature review suggested that reports of posttraumatic growth could have some validity issues. Hereupon, it is suggested that those validity issues could be caused by illusions. Third, with special focus on defence mechanisms, illusions will be defined and it will be examined why defence mechanisms could be an important factor in illusory reports of posttraumatic growth. At the end of this chapter, a theory on real and illusory posttraumatic growth is proposed. Furthermore, hypotheses on how real and illusory reports of posttraumatic growth could correlate with well-being are suggested. Afterwards, the methodological procedure used is illustrated. Finally, the significance of the thesis is presented.

## 1.1. What is Posttraumatic Growth?

### 1.1.1. The historical background of posttraumatic growth.

Reports of posttraumatic growth are not new (Calhoun and Tedeschi, 2009; Hefferon and Boniwell, 2011; Joseph and Butler, 2010; Joseph and Linley, 2005; Tedeschi and Calhoun, 2004; Tedeschi and Calhoun; 2004b). Throughout history, people have reported having experienced posttraumatic growth after they went through adverse events or were exposed to a trauma. The assumption that suffering can produce something good and that people are able to experience posttraumatic growth is also found in religion, myth, ancient philosophy, and fiction (Calhoun and Tedeschi, 2009; Joseph and Butler, 2010;

Joseph and Linley, 2005; Joseph, 2008; Linley and Joseph, 2004; Tedeschi and Calhoun, 2004).

The broad scientific interest in posttraumatic growth began in the twentieth century (Joseph and Linley, 2006; Tedeschi et al., 2007; Tedeschi and Calhoun, 2004). Although different terminologies were used, the concept of posttraumatic growth was, for example, recognised and highly influenced by philosophers and/or psychologists in the ’60s who used an existential and humanistic approach. Notable, for example, is Frankl (1985) who describes in his book “Man’s Search for Meaning” his own horrific experience and observations while imprisoned in Nazi death camps. According to Frankl (1985) people grow if they find meaning in their unique and sometimes painful fate and if they are able to sustain their dignity by sticking to their values.

Also Yalom (1980), an existential psychologist, recognised and described posttraumatic growth or personal growth as he puts it. He observed, for example, that his cancer patients often changed their priorities. To investigate this phenomenon, Yalom and his colleagues created a questionnaire to measure posttraumatic growth caused by a fatal cancer diagnosis. Patients were asked to rate on a seventeen-item questionnaire how they were before and after the cancer diagnosis. Items included statements such as: (1) “I communicate very openly with my husband” (2) “I appreciate the beauty of nature” and (3) “I have a sense of personal freedom”.

Although several researchers recognised and examined posttraumatic growth during the last century, in the late ’80s, the phenomenon gained wide scientific attention that incorporated the broad use of empirical examinations (Joseph and Linley 2006b; Tedeschi and Calhoun, 2004). The increased interest in posttraumatic growth is probably associated with the occurrence of the psychological movement of positive psychology and its attempt to put the “positive” side of human experience into the foci of research (Joseph et al., 2012; Joseph and Butler, 2010). Although the concept of posttraumatic growth is widely embedded in the positive psychology movement (Joseph and Butler, 2010; Joseph et al., 2005), it is also recognised and investigated within other schools of psychology.

### 1.1.2. The terminology and definition of posttraumatic growth.

A wide range of terminologies for posttraumatic growth exists. The following list does not claim to be complete, and illustrates only the diversity of philosophical frameworks in which the concept of posttraumatic growth is embedded and accordingly termed (e.g. Joseph and Butler, 2010; Tedeschi and Calhoun, 2004). Researchers termed positive psychological changes as posttraumatic growth (Tedeschi and Calhoun, 2004/ 2004b), growth through adversity (Joseph and Linley, 2005), personal benefits (Sledge, James, Boydstun, and Rabe, 1980), growth following adversity (Joseph and Linley, 2006), positive tertiary appraisal (Dohrenwend, Neria, Turner, Turse, and Marshall, 2004), stress-related growth (Park, Cohen, and Murch, 1996), personal growth (Yalom, 1980), thriving (O'Leary and Ickovics, 1995) and psychological benefits (Fontana and Rosenheck 1998). A full list can be found in Joseph and Linley (2006) or Tedeschi and Calhoun (2004).

Moreover, several definitions of posttraumatic growth exist. Those definitions often capture different aspects of posttraumatic growth and, therefore, leave space for diverse and ambiguous interpretations of what exactly constitutes posttraumatic growth.

For example, O'Leary and Ickovics (1995, p. 128) describe posttraumatic growth or thriving as they put it as "(…) the ability to go beyond the original level of psychosocial functioning, to grow vigorously, to flourish. Through the interactive process of confronting and coping with a challenge, a transformation occurs. The individual does not merely return to a previous state, but rather grows beyond it, and in that process adds value to life".

Janoff-Bulman (2009, p.82) views posttraumatic growth as "(… ) psychological 'increases', expansions and developments in survivors' cognitive-emotional understandings of themselves and their world".

Joseph (2011, p.20) suggests, in contrast, that posttraumatic growth consists in accepting uncertainties, accepting personal change and knowledge of the self (psychological mindfulness) as well as carrying "(…) responsibility for the choices one makes in life and an awareness that choices have consequences".

Tedeschi and Calhoun (2004, p.1) defined posttraumatic growth as "(…) the experience of positive change that occurs as a result of the struggle

with highly challenging life crisis. It is manifested in variety of ways, including an appreciation for life in general, more meaningful interpersonal relationships, an increased sense of personal strength, changed priorities, and a richer existential and spiritual life".

Although all cited definitions focus on different aspects of posttraumatic growth, they are united in one crucial assumption. All aforementioned definitions of posttraumatic growth assume that the affected person has gained psychological benefits because of a struggle with an adverse experience. Moreover, several authors suggested (e.g. Hefferon and Boniwell, 2011; Joseph and Linley, 2008; O'Leary and Ickovics, 1995) that posttraumatic growth is accompanied by increased psychological functioning.

The term "posttraumatic" growth has attained broad scientific recognition and is now widely accepted as indicating that a person has gained psychological benefits after struggling with adverse experience (Joseph and Linley, 2008b). The term "posttraumatic" growth does not necessarily imply a clinical point of view on trauma. The term *trauma*, as understood by Tedeschi and Calhoun (2004), also includes adverse life events that are able to shatter pre-existing schemas.

The definition by Tedeschi and Calhoun (2004) goes, therefore, far beyond the definition by the DSM-5 (cf. Joseph and Linley, 2008b). Several authors (e.g. Tedeschi and Calhoun, 2004; Janhoff-Bulman, 2009) strongly indicate that for posttraumatic growth to occur, a disruption of fundamental assumptions and schemas is necessary. Therefore, the experience of a severe life crisis or trauma appears to be necessary for the development of real posttraumatic growth. However, it remains a matter of debate what kinds of adverse events are able to shatter fundamental assumptions.

Calhoun and Tedeschi (2009) give useful guidance as to whether an event could have the potential to shatter prior assumptions. They (2009, p.9) state: "A good way to judge whether an event is truly traumatic may be to consider the way it disrupts the personal narrative. If a person refers to a negative event as a watershed that divides a life into 'before and after' the event, it has been traumatic and it can initiate the cognitive engagement that produces PTG". The latter piece of guidance given by Calhoun and Tedeschi

(2009) will be used throughout this thesis in order to define situations that have the potential for the development of posttraumatic growth.

### 1.1.3. Conceptualisation of posttraumatic growth.

As already indicated, researchers not only define the meaning of self-reported posttraumatic growth differently, they also use diverse theoretical models to explain what exactly constitutes posttraumatic growth. Those theories are often grounded in different philosophical approaches and psychological schools (cf. Joseph and Butler, 2010).

#### *1.1.3.1. The concept of posttraumatic growth*.

The psychological transformational character of posttraumatic growth is the main theoretical assumption uniting all theories on posttraumatic growth such as the theory by Joseph (2011) and the theory by Tedeschi and Calhoun (2004). Furthermore, some scientists have suggested that posttraumatic growth is both an outcome itself2 and at the same time a process (e.g. Joseph and Linley, 2008; O'Leary and Ickovics, 1995; Tedeschi and Calhoun, 2004/ 2004b). This is when a person experiences positive psychological change but continues to change at the same time.

Furthermore, posttraumatic growth is considered as "bouncing forward" following adversity (O'Leary and Ickovics, 1995; Pat-Horenczyk and Brom, 2007; Tedeschi and Calhoun, 2004). Therefore, the individual who experiences posttraumatic growth becomes more resilient (Janhoff-Bulman, 2009; Tedeschi and Calhoun, 2004) and endorses higher psychological functioning levels (e.g. Joseph and Linley, 2006; Joseph, 2004; O'Leary and Ickovics, 1995; Tedeschi and Calhoun, 2004) than they experienced before the trauma. Thus, in contrast to resilience, where people bounce back to pre-trauma levels, the growth theorists assume that people who have experienced posttraumatic growth bounce forward and show *higher* resilience than before the trauma (e.g. Joseph and Linley, 2006; Joseph, 2004; O'Leary and Ickovics, 1995; Tedeschi and Calhoun, 2004). Posttraumatic growth, therefore, is related

[2] The term "outcome" as used here means that the concerned person actually changed in some way and developed new attitudes and schemas. It does not mean that these outcomes are rigid and do not develop further over time (cf. O'Leary and Ickovics, 1995; Joseph and Linley, 2008).

to the concept of resilience and could be considered as the "younger brother" of resilience (Pat-Horenczyk and Brom, 2007).

Moreover, although posttraumatic growth is considered as "bouncing forward", it is also assumed that those who experience it were not resilient but rather had moderate coping capabilities (Calhoun and Tedeschi, 2004; Tedeschi and Calhoun, 2004; Joseph, 2011)[3]. Exactly this moderate vulnerability may be responsible for the need to transform and to change in some domains (Joseph, 2011). Posttraumatic growth arises, therefore, through the struggle with the consequences of adversity (Janhoff-Bulman, 2009; Joseph, 2011; Tedeschi and Calhoun, 2004). People who could be considered as resilient may not feel the urge and necessity to change (Joseph, 2011; Tedeschi and Calhoun, 2004). Tedeschi and Calhoun (2004) and Joseph (2011) assume, therefore, that moderate levels of distress and posttraumatic stress set posttraumatic growth in motion.

People who experience posttraumatic growth may have also initially suffered from posttraumatic stress (e.g. Joseph and Linley, 2005). Based on the completion tendency theory by Horowitz (1986), Joseph and Linley (2005) and Janoff-Bulman (1992) assume that states of posttraumatic stress help people process and understand the traumatic experience. Joseph (2004) and Joseph and Linley (2005) assume, moreover, that posttraumatic growth arises when the trauma experience has been processed sufficiently. Therefore, with time, posttraumatic stress should diminish to a critical degree when posttraumatic growth is reported (Joseph, 2011).

Finally, the concept of posttraumatic growth has evolved from a eudemonic philosophy. Rather than with subjective well-being (SWB), it is usually concerned with psychological well-being (PWB) (Joseph and Linley, 2005). "Broadly speaking the domain of PWB refers to a person's character strengths, meaning and purpose in life, and psychological maturity, whereas SWB refers to a person's balance of affective states and overall satisfaction, and happiness" (Joseph and Linley, 2005, p.269). Although subjective well-being and psychological well-being are usually positively correlated (ibid) they

[3] The words "coping ability" could be misleading. A better understanding could be to consider the person's coping abilities as not sufficient enough in relation to the event or events experienced (Lazarus and Folkman, 1984). Therefore, throughout the thesis the words "coping resources" will be used.

are treated by some researchers as almost separable constructs. For example, Joseph and Linley (2005) suggest that the differentiation between SWB and PWB may bridge the simultaneous experience of posttraumatic growth and posttraumatic stress. While posttraumatic growth is correlated with PWB posttraumatic stress is about SWB (ibid).

There are various theories explaining the nature of posttraumatic growth, some of which are presented in the next section. The theories discussed are selected according to their relevance to the present thesis and do not represent a complete range of existing theories on posttraumatic growth. All theories presented propose that posttraumatic growth goes beyond the pre-trauma level of psychological functioning and are transformational in nature.

#### *1.1.3.2. Theories on posttraumatic growth.*

##### *1.1.3.2.1. Posttraumatic growth after Janoff-Bulman.*

Janoff-Bulman (1992) suggests that humans hold a set of fundamental assumptions to understand the world and themselves. These fundamental assumptions direct their interaction with their environment. Moreover, fundamental assumptions are comparable to the constructs of global meaning (Park and Folkman, 1997) or schemas (Horowitz et al., 1995). Fundamental assumptions are mainly built in early childhood by parents or other significant caregivers who fulfill to a good enough degree the needs of their children (Janoff-Bulman, 1992). By overgeneralisation, a child who is well cared for learns that the world is predictable, controllable and benevolent. These overgeneralisations about the world are what Janoff-Bulman (1992) refers to as fundamental assumptions or illusions.

According to Janoff-Bulman (1992, p.6) these "…fundamental assumptions are: The world is benevolent. The world is meaningful. The self is worthy". These beliefs will be honed through experiences that are made during the course of life; however, fundamentally they have been developed in early childhood (ibid). Changes of the fundamental assumptions in adulthood occur rarely (Janoff-Bulman, 1992; Park and Folkman, 1997).

Experiencing a trauma may contradict prior fundamental assumptions and has the potential to threaten them. Trauma survivors are often forced to recognise that their assumptions about the world were illusory (Janoff-Bulman,

1992). This disintegrative state causes anxiety and the affected people face the task of reconstructing their fundamental assumptions and trying to make sense of their experience through cognitive processing (Janoff-Bulman, 2009). According to Janoff-Bulman (2009) three outcomes of cognitive processing are possible. First, the trauma survivor returns to the fundamental assumptions that they were holding prior to the trauma. Second, the trauma survivor changes their positive fundamental assumptions to negative fundamental assumptions, such as "the world is unfair, unsafe and meaningless". Third, the trauma survivor incorporates their experience into their fundamental assumptions but in such a way that they also account for the good and precious in life. The latter outcome could be regarded as posttraumatic growth (Janoff-Bulman, 2009).

In her article, Janoff-Bulman (2009) considers three forms of posttraumatic growth, namely, strength through suffering, existential re-evaluation and psychological preparedness. According to Janoff-Bulman (ibid), each dimension of posttraumatic growth originates from different factors and forms of cognitive processing. Strength through suffering may occur when people recognise their strength through the management of highly difficult situations, and in this way, they often realise their own potential (ibid). Therefore, these changes are caused by applied coping strategies and actual behaviour. Existential re-evaluation is caused through an effort to find meaning as comprehensibility and as significance. In the process of finding meaning as comprehensibility, trauma survivors may recognize that the trauma itself has no meaning and that life is not always fair, predictable and controllable. The knowledge that everything can be lost may make one appreciate all the more, for example, valuable experiences, life-settings, opportunities and humans that have not been lost (ibid).

Finally, psychological preparedness is assumed to arise from the newly built fundamental assumptions incorporating the possibility of future misfortune. These new schemas are considered to be more flexible and complex and in this way they may mitigate the effects of a second trauma (ibid).

*1.1.3.2.2. Posttraumatic growth after Tedeschi and Calhoun.*

Tedeschi and Calhoun (1996) invented the term posttraumatic growth. In accordance with the theory after Janoff-Bulman (1992) they suggested (Tedeschi and Calhoun, 2004) that individuals hold some goals and fundamental assumptions about the world and themselves. These assumptions usually include the belief in a predictable and controllable world that is benevolent and safe. Furthermore, schemas/ fundamental assumptions about the self and the world are used by the individual to organize and comprehend their internal and external experience (Calhoun and Tedeschi, 2013). In other words, those fundamental assumptions help individuals to navigate themselves within a complex internal and external world. These assumptions could become shattered by highly stressful events like traumas or adversities. In this state, the individual is often fragile and emotionally distressed and faces the task of reconstructing their schemas and managing their emotions (ibid).

Initially, the concerned individuals often experience automatic intrusive thoughts that are beyond their control (Calhoun and Tedeschi, 2013; Tedeschi and Cahoun, 2004). These intrusive thoughts are comparable, if not identical, to intrusive thoughts experienced in the condition of posttraumatic stress. These intrusive thoughts might be used to find meaning as comprehensibility and to let go of former goals and schemas that no longer fit the lived experience and life situation of the concerned person (Tedeschi and Calhoun, 2004). However, Calhoun and Tedeschi (2013) and Tedeschi and Calhoun (2004) suggest that in order to develop posttraumatic growth, deliberate rumination or cognitive engagement may be especially important. Deliberate rumination does not usually occur right after the traumatic event has taken place, but after some time has passed (ibid). In this stage, trauma survivors try to find meaning as significance (ibid) that helps to reconstruct their schemas and to find new goals in life (Calhoun and Tedeschi, 2009). Therefore, deliberate rumination serves the aim of reconstructing destroyed schemas or fundamental assumptions (ibid).

Accordingly, Tedeschi and Calhoun (2004, p.5) define posttraumatic growth as "Cognitive rebuilding that takes into account the changed reality of one's life after trauma produces schemas that incorporate the trauma and possible events

in the future, and that are more resistant to being shattered. These results are experienced as growth".

Besides deliberate cognitive engagement, factors like self-disclosure and social support might be crucial facilitators of posttraumatic growth (Tedeschi and Calhoun, 2004). The development of posttraumatic growth and the expression of posttraumatic growth could be influenced by cultural and social context (Calhoun and Tedeschi, 2013). Therefore, it might be especially important to understand the cultural and social context from which the individual is coming (ibid). Moreover, they suggest that distress and posttraumatic growth can co-exist in the same individual and could be, to some degree, even necessary to sustain posttraumatic growth (ibid). However, the term 'distress' is not conceptualised in a meaningful way (Bitsch, Elklit, and Christiansen, 2011). Here, it is not clear whether the authors consider distress as posttraumatic stress or whether they view distress as lowered subjective well-being.

*1.1.3.2.3. Person centred-theory and growth following adversity after Joseph.*

One of the basic assumptions of the Person Centred-Theory is that humans are growth oriented (Joseph and Linley, 2006). That is, human beings have an intrinsic drive to actualise themselves (ibid). This actualisation tendency remains relatively stable if the individual is open to and incorporates new experiences so that they can change, shape or reconstruct the self-structure of the individual (Rogers, 1959). The self-structure is formed "(…) through interaction with the environment, particularly the environment composed of significant others (…)" (Rogers, 1959, p.223). An environment that values or accepts all self-experiences made by another facilitates a self-structure, which remains open to new experiences (ibid). However, an environment that accepts only certain self-experiences creates a self-structure that includes conditions of worth (ibid). In the latter case, all experiences that clash with internalised conditions of worth may be pushed away or warded off from awareness (ibid). One may reasonably assume that a person without conditions of worth is not existent but an ideal (ibid). Hence, it is assumed that everyone has, in varying degrees, internalised conditions of worth into their self-structure.

A trauma, by its very nature, breaks through the defences of an individual and in doing so, it disorganises the self-structure (Joseph and Linley, 2006). The person is facing the task of reconstructing their self-structure in such a way that it incorporates the experience of the trauma (ibid). In this way, the newly constructed self-structure could be more in accordance with and accepting of the experience which has been made (ibid). "Congruent reintegration of self with experience is not about the client returning to his or her pre-trauma levels of functioning, but about the client going beyond his or her previous levels of functioning" (Joseph, 2004, p.108).

This newly gained self-structure is, therefore, more congruent to their experience. In this way, the actualisation tendency is facilitated (Joseph, 2004). This process of becoming more congruent with experiences is termed posttraumatic growth (ibid). Here, the affected person moves toward their intrinsic need for organismic enhancement (self-actualisation) (ibid). Joseph and Linley (2006) assume that growth after adversity (posttraumatic growth) could have some similarities to Roger's concept of a fully functioning person (2009).

*1.1.3.2.4. Organismic valuing theory after Joseph and Linley.*

This approach combines the person-centred theory with ideas of positive psychology (Joseph and Linley, 2006). The basic assumption of this theory is that people have an intrinsic drive to develop and to grow in accordance to their experience and their potential (ibid). Also, the theory states that people have knowledge about what serves this aim and what does not (ibid). "They are naturally inclined to integrate their psychological experiences into a unified sense of self and to integrate themselves into larger social groups and structures" (Joseph and Linley, 2005, p.269). Furthermore, the organismic valuing theory assumes that people are motivated to accommodate positively new experiences into their self-structure (Joseph and Linley, 2005). Following an adverse experience (trauma), positive accommodation is perceived as posttraumatic growth. Within this model, posttraumatic growth is considered to be a move towards self-actualisation (ibid). How posttraumatic growth arises is described in the next paragraph.

A traumatic event breaks, by its very nature, through the defences of an individual and thus has the potential to disorganise the self-structure of a person (Joseph and Linley, 2006). Prior assumptions about the world as a safe and fair place and about the self in general are threatened (ibid). However, since humans are motivated to integrate the new information into their self-structure, they start to process their experience (ibid). Trauma processing happens cognitively and emotionally (Joseph and Linley, 2005). Trauma processing is characterised by intrusive and avoidant states and is highly distressing (ibid). Horowitz labelled this kind of processing (1986) completion tendency[4]. As already mentioned, according to the Organismic Value Theory, cognitive processing is used to understand and to incorporate the adverse experience (trauma) and its implications into the self-structure. Therefore, intrusive and avoidant states disappear or significantly diminish when a person has cognitively and emotionally understood and worked through their experience (Joseph and Linley, 2005).

The learning processes of assimilation and accommodation explain the significant decrease of cognitive and emotional processing (posttraumatic stress) (ibid). Both processes are ways of learning described by Piaget cited in Joseph (2011). Although Piaget was primarily interested in describing learning processes in children, these processes could also be useful in order to describe how trauma survivors deal with their experience (Joseph, 2011). Following a trauma, the self-structure built in childhood is negatively affected or disorganised (Joseph, 2011). According to this theory, within such a state an adult has to learn like a child (cognitively and emotionally) to understand and to find meaning in their unique experience (Joseph and Linley, 2005). Here, two forms of meaning-making (understanding) are possible. First, the affected person could reconstruct the adverse experience (assimilation) (ibid). Second, the self-structure is reconstructed in such a way that it is coherent with the experience (accommodation) (ibid).

In total, cognitive processing (posttraumatic stress) and emotional processing indicate that the affected person still needs to understand or to

[4] The completion tendency has been termed differently by researchers; most prominent are terms such as "cognitive processing" and "posttraumatic stress". In the subsequent thesis the completion tendency will be termed predominantly posttraumatic stress.

process the experience (Joseph and Linley, 2008). The experience is subjectively understood through the learning processes of assimilation or accommodation. In other words, cognitive processing (posttraumatic stress), indicative of the need to understand an experience, significantly reduces, therefore, when the experience has been understood through the processes of assimilation and accommodation (Joseph, 2004; Joseph and Linley, 2005; Joseph and Linley 2006). However, it should be borne in mind that accommodation and assimilation have a process character and do not usually occur abruptly or at a particular point of time. Instead, the self-structure is complex and consists of many parts (Joseph and Linley, 2008). In reality, people may assimilate and accommodate at the same time. While some parts of the self-structure may be assimilated, other parts may be either positively or negatively accommodated (Joseph or Linley, 2008). Joseph (2011) also argues that a balance between accommodation and assimilation could lead to posttraumatic growth.

In the next section, the processes of assimilation and accommodation and their impacts are examined in more detail. Assimilation means the person returns to their pre-trauma schemas and again assumes that the world is, for example, fair, safe and benevolent. Since assimilation does not incorporate the experience and meaning as significance, it is assumed that the individual uses more defences and is more prone to posttraumatic stress responses (Joseph and Linley, 2008).

Accommodation refers to the alteration of pre-trauma schemas according to the new experience. To accommodate experiences, the affected person needs to engage in finding meaning as significance. Hence, the affected person attempts to find an answer to questions about how the trauma has shaped the understanding of what life is about and how it can be lived (Joseph and Linley, 2005). The adverse experience can be accommodated in either a positive or negative way (Joseph and Linley, 2008; Joseph and Linley, 2006). Reconstruction of schemas through negative accommodation would lead to assumptions that consider the world, for example, as unfair, unpredictable, uncontrollable and unsafe (Joseph and Linley, 2005). Therefore, negative accommodation may cause feelings like hopelessness and despair and could be connected as well to psychopathology (Joseph and Linley, 2008). Positive

accommodation is considered to be posttraumatic growth (Joseph and Linley, 2005). Here, the affected person restores their self-structure in such a way that it takes into account the adverse experience and the good and precious in life as well. Through the knowledge that adversity could happen, one could value the good in life all the more (Joseph and Linley, 2005). “As the self is reconstructed, it is reconstructed in such a way that individuals are more true to themselves and to their own innate directions in life, that is, their organismic valuing process” (Joseph and Linley, 2005, p.270). Therefore, posttraumatic growth within this framework means that the individual has become more fully functioning or more psychologically adjusted (ibid).

Nevertheless, posttraumatic growth does not necessarily make human beings happier. They still have to deal with the distress and sadness that the trauma inflicted on them (ibid). Joseph and Linley (2005) explicitly state that posttraumatic growth may not be so much about subjective well-being, but rather about psychological well-being. Therefore, a person who has experienced posttraumatic growth may not experience positive emotions at their peak. Instead, the person who experienced posttraumatic growth may be “sadder, but almost inevitably wiser” (Joseph and Linley, 2005, p.273).

*1.1.3.2.5. Cognitive-affective model of posttraumatic growth after Joseph, Murphy and Regel (2012).*

The affective-cognitive processing model bridges the Organismic Value Theory and the Psychosocial Model of Posttraumatic Stress (Joseph et al., 2012; Joseph and Murphy, 2013). Following a traumatic event, a person starts processing their experience affectively and cognitively. Here, processing is understood as finding meaning and as appraisal activity. Processing is characterised by intrusive states, ruminative brooding and reflective pondering. Reflective pondering is similar to the concept of deliberate rumination. Processing causes several emotional states. A circle is created between appraisal processes, affect and coping. However, only through reflective pondering is a person enabled to constitute meaning of significance. The circle between cognitive appraisal, affect and coping strategies continues either until a person has adapted their schemas/fundamental assumptions to the changed

reality (accommodation) or until a person has reappraised/reconstructed their experience to pre-existing schemas (assimilation). Posttraumatic growth occurs only through positive accommodation. The main innovation of this model is its incorporation of affective states and coping strategies.

All theories reviewed above consider posttraumatic growth as psychological transformational change. Thus, it is assumed that a person who reports posttraumatic growth has in fact psychologically changed within the areas indicated (Sumalla, Ochoa, and Blanco, 2009). These changes are usually measured by self-reports. Several self-report measurements have been developed to assess posttraumatic growth within the last thirty years. However, it is not entirely clear to what extent those measurements accurately assess the theoretical construct. In other words, it is not clear whether reports of posttraumatic growth indicate, in fact, real transformational posttraumatic growth (Davis and McKearney, 2003; Frazier et al, 2009; Maercker and Zoellner, 2004; Sumalla et al., 2009; Wortman, 2004; Zoellner and Maercker, 2006). Therefore, doubts about the validity of such measurements still exist. Within the next section, the validity of self-reported posttraumatic growth is examined. A potential factor for invalid reports of posttraumatic growth is, hereupon, suggested.

### 1.2. The Validity of Self-reported Posttraumatic Growth

The theories just reviewed (e.g. Janoff-Bulman; 2009; Joseph and Linley, 2005; O'Leary and Ickovics; 1995; Tedeschi and Calhoun, 2004) presume that posttraumatic growth represents real and transformational psychological change (Sumalla et al., 2009). However, other authors doubt to varying degrees that posttraumatic growth takes place very often (Sumalla et al., 2009). Moreover, the discussion about posttraumatic growth is sometimes transferred to another level (Joseph, personal communication, February 11, 2014). Here, validity issues of posttraumatic growth, but not their measurement, are the focus of discussions. In total, several authors assert, to varying degrees, that such reports are often/sometimes not valid/true (e.g. Davis and McKearney, 2003; Frazier et al, 2009; Wortman, 2004). Such allegedly invalid reports of posttraumatic growth are conceptualised in various ways.

For example, Taylor (1983) and Zoellner and Maercker (2006) suggest that reports of posttraumatic growth may sometimes not be valid and may in such cases be better described as positive illusions. Other researchers describe invalid reports of posttraumatic growth as coping strategies (e.g. Park and Folkman, 1997) or defensive strategies (Davis and McKearney, 2003; Hall et al., 2009; Pyszczynski, Greenberg, and Solomon, 1999). In other words, some researchers take the theoretical view that reports of posttraumatic growth are sometimes invalid and/or illusory (Sumalla et al., 2009). If so, reports of posttraumatic growth and respective measurements would not be reflective of true psychological change. Within the next section theoretical and empirical issues concerning the validity of self-reported posttraumatic growth are reviewed. Hereupon, the results of the review are summarised. Assumptions about how and what kind of illusions could be a responsible factor for invalid reports of posttraumatic growth are discussed.

### 1.2.1. Theories on illusory reports of posttraumatic growth.

Despite a large number of studies that have investigated reports of posttraumatic growth, it is still not entirely clear how these reports could be conceptualised (Jayawickreme and Blackie, 2014; Joseph and Butler, 2010). One main issue is whether reports of posttraumatic growth can be taken at face value or whether such reports could include other psychological mechanisms such as illusions (Hefferon and Boniwell, 2011).

Theories focusing on real posttraumatic growth assume that through the process of positive accommodation, the self-structure and world-view has also changed in a positive way (Joseph and Butler, 2010). Reports of posttraumatic growth and respective measurements are considered to be reflections of these personal transformations (Aspinwall and Tedeschi, 2010; Tedeschi, Calhoun, and Cann, 2007). In other words, measurements of posttraumatic growth are considered to be valid.

On the other hand, some theories suggest that reports of posttraumatic growth and their respective measurements sometimes reflect illusions.

#### *1.2.1.1. Taylor's theory of cognitive adaption.*

In sum, Taylor (1983) suggests that a person whose life is threatened uses positive illusions to deal with their experience. Taylor (1983) evaluated these positive illusions as adaptive. In her study, Taylor interviewed 78 breast cancer patients and their relatives over a period of two years and found that they attempted to alleviate threat of mortality by finding meaning, by restoring a sense of control and by self-enhancing cognitive manoeuvres. Taylor gives some examples how cancer patients found meaning as significance, which are similar to reports of posttraumatic growth. Taylor (1983, p.1163) categorises the positive illusion of meaning as significance as "(…) rethinking of one's attitudes and priorities to restructure one's life along more satisfying lines (…)". Furthermore, another branch of positive illusions reported by the patients was self-enhancing strategies. These self-enhancing strategies were used to foster self-esteem and to ward off the threat of mortality and a sense of meaninglessness (ibid).

However, the positive illusion of meaning as significance especially resembles reports of posttraumatic growth. Taylor (1983, p. 1170), further states that positive illusions may allow affected individuals "(…) to return to or exceed their previous level of psychological functioning". The description neatly resembles real transformational posttraumatic growth. Taylor and Brown (1988) also recognise the possibility of developing real posttraumatic growth, which may be fostered by positive illusions. According to Taylor and Brown (1988) positive illusions could be a necessary facilitator of posttraumatic growth because otherwise the concerned person may shrink from the challenges ahead.

#### *1.2.1.2. The Janus-face of self-perceived growth after Zoellner and Maercker.*

Zoellner and Maercker (2009/ 2006) suggest that self-reported posttraumatic growth may not always represent an adaptive response towards stress. They (2009, p.347) proposed a "(…) a two-component model (the "Janus-Face model")" of posttraumatic growth. Unfortunately, they do not differentiate clearly between the theoretical construct of real transformational posttraumatic growth and reports of posttraumatic growth including their respective

measurements. Maercker and Zoellner (2004) and Zoellner and Maercker (2006/ 2009) suggest that posttraumatic growth consists of two faces (Janus-Face). One facet of self-reported posttraumatic growth may in fact be real and transformative posttraumatic growth. However, the other side of posttraumatic growth may be illusory in order to deal with distress. Maercker and Zoellner (2004) and Zoellner and Maercker (2006/ 2009) speculate that those illusory reports of posttraumatic growth are caused by positive illusion after Taylor (1983).

Those two sides of posttraumatic growth may co-exist and there dominant features may be dependent on time. While immediately after a traumatic event, the illusory side of self-reported posttraumatic growth may be the main feature. As time passes, the transformational and real side of posttraumatic growth may be the more important facet. Moreover, Maercker and Zoellner (2004, p.45) speculate that real posttraumatic growth "(…) should be related to aspects of adjustment or well-being in the short-run and in the long-run". The illusory side of self-reported posttraumatic growth could be adaptive in the short-term (ibid). However, the short-term adaptive function of positive illusions could not be long-lasting and could even potentially cause long-term difficulties concerning cognitive and emotional trauma processing (Zoellner and Maercker, 2009). Maercker and Zoellner (2004, p.43) suggest: "It could, therefore, be the case that true [i.e., objective] posttraumatic growth is positively linked with the broadly termed functions of mental health and that self-reported posttraumatic growth is in part based on processes of distortion".

Furthermore, Zoellner and Maercker (2006, p.640) suggest that the illusory side of posttraumatic growth "(…) might be correlated with self-consolidation or even with denial in the short or in the long run". These statements by Maercker and Zoellner (2004) and Zoellner and Maercker (2006) question the preceding assertion by the same authors that the illusory side of self-reported posttraumatic growth is a function of positive illusions. Positive illusions, however, are defined by Taylor (1989) as adaptive and reality based which allow for effective use of negative information. Therefore, it appears that Maercker and Zoellner (2004) and Zoellner and Maercker (2006/ 2009) do not sufficiently differentiate between positive illusions and other more maladaptive forms of distortions such as maladaptive defence mechanisms.

#### *1.2.1.3. The terror management theory after Greenberg, Pyszczynski and Solomon.*

Within the terror management theory, defensive strategies are used to ward off anxiety of death (Kwiatkowska, Knysz, Gasiorowski, Luszczynska, and Gladysz, 2011; Pyszczynski et al., 1999). Because of their advanced intelligence, humans are usually aware that there existence will ultimately end in death (Davis and McKearney, 2003). This awareness results in terror "(…) unless one is able to adopt a cultural worldview that buffers one from this terror (Davis and McKearney 2003, p.480). Following the threat of mortality, those worldviews may be defended in order to ward off anxiety concerning death (ibid). These cultural worldviews may be similar to fundamental assumptions (ibid). The terror management theory suggests that posttraumatic growth could be a defensive strategy in which the concerned person holds on to their cultural worldviews and self-views even more (Luszczynska et al., 2012). Here, reports of posttraumatic growth could be considered as an attempt to defend preexisting worldviews such as the beliefs in control and meaning (Davis and McKearney, 2003).

However, several researchers (e.g. Cozzolino, 2006; Lykins, Segerstrom, Averill, and Evans, 2007; Vail et al., 2012) attempt to reconcile the ideas of the Terror Management Theory with ideas of real transformational posttraumatic growth. Vail and colleagues (2012) describe in detail how perceived posttraumatic growth could be a function of worldview defences that buffer against the threat of mortality. In this case, reports of posttraumatic growth would be illusory. On the other hand, they suggest, in accordance with, for example, Cozzolino (2006) and Lykins and colleagues (2007), that especially under circumstances of near-death experiences, the terror management system is shattered. Here, the terror management system is considered similar to fundamental assumptions as described by Janoff-Bulman (1992). When the terror management system is reconstructed it could be rebuilt in a way that is more meaningful for the affected person (Vail et al., 2012). Vail and colleagues (2012) argue that in this case real transformational posttraumatic growth has taken place and forms again a terror management system, which is by definition, and to some extent, defensive. This paradoxical view on real posttraumatic growth indicates that real posttraumatic growth is

also a defensive system. This view on real posttraumatic growth, taken by Vail and colleagues (2012), is, therefore, not the same construct of real transformational posttraumatic growth as suggested by most posttraumatic growth theorists such as Janoff-Bulman (2009), Joseph and Linley (2005); Joseph (2004). Here, the affected person becomes more open to experience, including anxiety-provoking experiences[5].

Hobfoll and colleagues (2007) suggest another theoretical model to conceptualise real transformational posttraumatic growth and illusory posttraumatic growth. They propose that illusory posttraumatic growth may not transform into actions. Here, reports of posttraumatic growth remain within the cognitive realm. In contrast, real posttraumatic growth may transform into constructive action.

In summary, the reviewed theories suggest that reports of posttraumatic growth are at least occasionally caused by illusions or defensive strategies. In other words, the theories propose that sometimes reports of posttraumatic growth cannot be taken at face-value. No real transformational posttraumatic growth is assumed to occur in case of illusory reports of posttraumatic growth (Sumalla et al., 2009). Instead, illusory reports of posttraumatic growth may be an indicator that the affected person is highly distressed and has used self-enhancing strategies to cope with threatening emotions (Zoellner and Maercker, 2009/ 2006). Within the Terror Management Theory, illusory reports of posttraumatic growth could indicate that the self-structure and worldviews of the affected person remained unchanged (Sumalla et al., 2009) or may have even hardened (cf. Hall et al., 2009). Here, the process of assimilation and self-reported posttraumatic growth may overlap (Sumalla et

[5] A detailed discussion on this issue is unfortunately beyond the scope of the thesis. However, most theorists on real posttraumatic growth consider fundamental assumptions or worldviews not as defensive strategies per se. Instead, those fundamental assumptions are guiding and organisation principles that enable the person to function within a complex world (Calhoun and Tedeschi, 2013). Thus, openness to change those assumptions, to some degree, according to the experience is the basis for real transformational posttraumatic growth. The new fundamental assumptions that constitute real posttraumatic growth are assumed to be prosocial (Joseph and Linley, 2005) more complex (Janoff-Bulman, 2009), flexible (Janoff-Bulman, 2009; Joseph and Linley, 2005) and are coined by higher openness to experience (e.g. Joseph, 2004). Here, real transformational posttraumatic growth will be a process (Joseph and Linley, 2008). In contrast, the theory by Vail and colleagues (2012) suggests that real posttraumatic growth is a change of fundamental assumptions but those fundamental assumptions are not flexible and open but constitute another defensive system.

al., 2009). To assimilate following a traumatic event one probably needs to use defence mechanisms (Joseph and Linley, 2005).

### 1.2.2. Failures in temporal comparisons.

Further skepticism towards reports of posttraumatic growth revolves around the possibility that a valid account of change demands high cognitive abilities, which are not easily met (Joseph, 2011; Ford, Tennen, and Albert, 2008). Ford and colleagues (2008) suggested that giving valid information about emerged posttraumatic change demands that the subjects work through at least six cognitive stages. The subjects have to remember their former self and to evaluate it objectively. They also need to evaluate their current self objectively and compare the current self to the former self. Moreover, they have to evaluate how much they have changed and finally how much this change was caused by an adverse experience.

This cognitive evaluation is a very complicated act especially since the self is never one-dimensional but highly complex. Ford and colleagues (2008) suggest, therefore, that self-reported posttraumatic growth is highly questionable or invalid. They argue, furthermore, that the perception of posttraumatic growth may be mainly a form of "self-protective psychological adaption" (Ford et al., 2008, p.297). Therefore, they conclude that self-reported posttraumatic growth could often not represent real positive change but rather illusory thinking or biased mental processes to deal with the psychological consequences of a trauma.

Several studies appear to support the idea by Ford and colleagues (2008). For example, McFarland and Alvaro (2000) investigate in four studies whether the perception of personal growth (posttraumatic growth) is partly caused by derogating attributes of the self prior to the trauma. All four studies suggest that people who experienced crisis derogate their former self in order to enhance their current self. In other words, cognitive manoeuvres are sometimes used in order to perceive posttraumatic growth which, in fact, is illusory in order to enhance self-esteem.

In contrast, Ransom, Sheldon and Jacobsen (2008) investigate temporal comparison within a prospective study design and suggested that people tend to inflate their former self following a traumatic event (radiotherapy). Therefore,

they suggest that self-report measurements quite probably underestimate true posttraumatic growth.

McFarland and Buehler (2012) suggest later that the phenomenon of temporal comparison could depend on mental theories and desires concerning individual change and development respectively. People who believe in or desire personal development could be inclined to derogate their former self following a crisis. In contrast, people who believe that humans usually stay the way they always have been may be inclined to inflate their former self. McFarland and Buehler (2012) tested their theory in seven experimental studies. All seven studies support the theory that people use cognitive manoeuvres (illusions) which are in accordance with their beliefs or desires. Both strategies, namely inflating or derogating the former self, were assumed to be used in order to cope with negative affect.

Overall, self-reports of posttraumatic growth may be affected by inaccurate or biased temporal comparisons used in order to cope with crisis or trauma. Therefore, the reviewed reflections and studies cast doubt on the validity of self-reported posttraumatic growth. Calhoun and Tedeschi (2004) argue that such biases may be a general problem of self-report questionnaires. However, the tendency to bias reports of posttraumatic growth may be higher following a highly stressful event or traumatic event (Joseph, 2011; McFarland and Buehler, 2012). In sum, several theories suggest that self-reported posttraumatic growth is sometimes illusory.

However, studies investigating the validity of self-reported posttraumatic growth should reflect such allegedly illusory reports of posttraumatic growth. Therefore, in the subsequent sections, studies will be reviewed concerning the question, to what degree self-reported posttraumatic growth could represent real positive change.

The focus of this review is on standardised self-report measurements, which show satisfactory reliability. Therefore, those measurements correctly assess self-reported posttraumatic growth. Hence, those measurements can be used as a proxy to evaluate the validity of self-reported posttraumatic growth. Moreover, most posttraumatic growth measurements originate to some degree in qualitative research such as the Posttraumatic Growth Inventory (1996) and the Changes in Outlook Questionnaire (1993). Because of the qualitative

research origin, one could safely assume that those measurements assess self-reported posttraumatic growth.

### 1.2.3. Extent of validity of self-report measurements on posttraumatic growth.

Although reports of posttraumatic growth and their measurements are usually reliable, they may not be valid. The fact that a measurement or the respective reports assess something in a reliable way does not mean that the intended construct is measured (Diekmann, 2002). Measurements could sometimes inadvertently assess another phenomenon. Therefore, empirical literature that examined the validity of self-reported posttraumatic growth will be reviewed. If the studies reviewed do support the validity of self-reported growth, the assumption that reports of posttraumatic growth are genuinely real would be consolidated. In other words, the question that will be investigated is whether reports and measurements of posttraumatic growth assess real transformative psychological change.

Several self-report measurements have been developed to assess occurrences of posttraumatic growth. Most prominent are the Stress-Related Growth Scale (SRGS) developed by Park and colleagues (1996) and the Posttraumatic Growth Inventory (PTGI) by Tedeschi and Calhoun (1996). However, to measure posttraumatic growth other instruments have also been developed such as the Perceived Benefits Scale (PBS) by McMillen and Fisher (1998) and the Changes in Outlook Questionnaire (CiOQ) by Joseph, Williams and Yule (1993). However, the Posttraumatic Growth Inventory (PTGI) is the most prominent questionnaire (Frazier et al., 2009; Joseph et al., 2012; Joseph and Butler, 2010) and will be used primarily within this review and throughout this thesis. All listed measurements were constructed in order to measure real transformational posttraumatic growth. As already mentioned, until now it is not entirely clear whether reports of posttraumatic growth and their measurements do indeed assess real posttraumatic growth or whether they also incorporate illusory posttraumatic growth.

Within this section, the validity of posttraumatic growth measurements are used as a proxy for self-reported posttraumatic growth and are discussed in more detail. First, several theoretical issues on measuring posttraumatic growth

are presented. Moreover, empirical studies evaluating the validity of posttraumatic growth measurements are reviewed and discussed.

#### *1.2.3.1. Theoretical issues concerning the measurement of posttraumatic growth.*

Although self-report measurements of posttraumatic growth are widely used in research, their validity is still called into question. Bitsch and colleagues (2011) have summarised some issues concerning the validity of the assessment of posttraumatic growth. They argue that posttraumatic growth is not defined in a way that facilitates a valid operationalisation of the construct. Constructing a valid measurement, however, depends on a proper operationalisation. For example, it is not clear whether posttraumatic growth is an outcome or a process and, therefore, how it is possible to differentiate posttraumatic growth from coping. They also criticise that the amount of distress needed to develop posttraumatic growth is not properly defined. The incoherent and/or insufficient definition of what constitutes a situation that shatters basic assumptions makes it difficult to determine when posttraumatic growth could potentially arise. For example, does a person have to experience high distress or posttraumatic stress in order to develop posttraumatic growth? Or may a small interpersonal conflict or a “minor” chronic disease also bear the potential to develop real posttraumatic growth?

However, the argument brought forward by Bitsch and colleagues (2011) could be negligible if one assumes that distress is not an objective measurable truth that can be conceptualised by specific criteria of an external event alone (Brewin, Dalgleish, and Joseph, 2009). In contrast, distress may depend on a subjective evaluation by the concerned person, as suggested by Lazarus and Folkman (1984) and Joseph and colleagues (2012). In this case, one relies on the report of the participants and assumes that they know best how distressing the event has been for them. Nevertheless, it is probable that sometimes people do not report their distress level correctly. This situation will be discussed in more detail within section 1.4. Bitsch and colleagues (2011) conclude that the measurement of posttraumatic growth is likely invalid, as the two most important variables, namely trauma/distress and posttraumatic growth, are not sufficiently defined.

Moreover, Bitsch and colleagues (2011) doubt the utility of the items included in the SRGS and the PTGI. For example, items which ask *whether* a person has closer relationships because of the trauma do not assess *why* this change of interpersonal relations has occurred. It might be that a person has not changed at all, but rather experiences closer relationship patterns because significant others feel responsible and increase their caring level. However, for the evaluation of self-reported posttraumatic growth, it is quite irrelevant why the change has occurred. Oversimplified, change is change no matter why. Regardless of the cause of changed relationship patterns, it is improbable that such change does not have any influence on the involved persons (cf. Rogers, 1971).

Furthermore, Bitsch and colleagues (2011) argue that some items, which are supposed to measure positive change, may actually measure negative change in some people. They illustrate their assumption with an example. The item "I am more willing to express my emotions" in the PTGI could be regarded as something positive in a person who was very inhibited prior to trauma but may constitute a negative change in a person who already had problems controlling their temper. However, this problem does not solely pertain to posttraumatic growth measurements. Similar issues exist within all self-report measurements (cf. Calhoun and Tedeschi, 2009). Ideally, to evaluate change within a person, one needs to know the respective person before and after trauma.

#### *1.2.3.2. The concurrent validity of self-report posttraumatic growth measurements.*

Some studies support the assumption that self-reported posttraumatic growth has sufficient concurrent validity. This is when a measurement of posttraumatic growth corresponds with other kinds of measurements assessing the same construct. In this review, only articles are included that assess the correspondence of self-reported posttraumatic growth by at least one measurement which is not a self-report measurement. This strategy was used due to the assumption that a person who scaled high in one self-report measurement will scale similarly high on another self-report measurement assessing the same construct. A comparison of two self-report measurements of

posttraumatic growth may only show the subjective or inner reality of a person, but states less about real transformative psychological change.

First, several corroborating studies are reviewed. For example, Shakespeare-Finch and Enders (2008) examine the validity of the PTGI in a student sample (N=61) who experienced a trauma no later than five years ago. The Posttraumatic Growth Inventory (PTGI) measured reports of posttraumatic growth. The scores of the students were compared to scores of significant others who also rated the respective student. The significant others had known the survivors before the traumatic event and were relatively close to them (close friends, family members and partners). Shakespeare-Finch and Enders (2008) found that the report of posttraumatic growth by the students correlated significantly with the ratings of significant others ($r=.69$, $p< .01$). However, as mentioned by the authors, the study design could not ensure the independence of the two ratings. This means, the students could have discussed their results with significant others or the reverse. Moreover, although the selected significant others may have been the ones with the most knowledge, they could have also been the most biased ones (cf. Jayawickreme and Blackie, 2014). Despite the limitations, the study supports preliminarily the validity of self-reported posttraumatic growth.

In another study, Shakespeare-Finch and Barrington (2012) investigated again whether trauma survivors' (N= 88) reports of posttraumatic growth were confirmed by significant others who had known the survivor before the traumatic event. The majority of the trauma survivors were students while the rest was recruited from the wider community. The traumatic event had occurred no later than five years ago. Posttraumatic growth was measured by the PTGI and five open-ended questions regarding positive behavioural changes. Reports of posttraumatic growth correlated significantly with the ratings given by significant others ($r=.58$, $p<.01$). In addition, the PTGI ratings of both groups did not significantly differ from each other. The only exemption was the dimension of 'appreciation of life'. The difference of the latter may be founded in its intrinsic nature. Moreover, positive behavioural change experienced by trauma survivors was also corroborated by significant others. The study supports the validity of self-reported posttraumatic growth although it faces similar limitations as reported within the previous study.

In addition, Park and colleagues (1996) suggested that reports of posttraumatic growth measured by the Stress-Related Growth Scale (SRGS) are valid. The validity of the SRGS was examined by comparing the scores of 73 students who had experienced a negative event with scores obtained by significant others (parents or friends) who also rated the change of the students. The students gave information about their most adverse event during the last 12 months and completed the Stress-Related Growth Scale. Significant others rated the respective student on the SRGS concerning their change within the last 12 months. Park and colleagues (1996) found no group difference between both ratings. In addition, they reported a small but positive correlation between the statements of the students and the evaluation of change given by significant others ($r= .21$; $p<.05$). Park and colleagues (1996) related posttraumatic growth to the most stressful event within the last 12 months. However, the most stressful event does not necessarily equal a traumatic event. Moreover, the ratings could lack independence. Like all reviewed studies within this section, all data were retrospective and, therefore, prone to recall bias (cf. Shakespeare-Finch & Enders, 2008). Because the study found only small correlations and had the aforementioned limitations, it could only marginally support the validity of self-reported posttraumatic growth.

In the same vein, Moore and colleagues (2011) investigated the agreement of self-reported posttraumatic growth in 83 cancer patients and the corroborating scores of significant others (caregivers) using the Posttraumatic Growth Inventory. A moderate and significant correlation was found between the reports of the patients and significant others at the time of cancer diagnosis (ICC=.47**). All subscales also reached significance except from the subscale of ‘appreciation of life’. However, this subscale may be rather intrinsic and potentially invisible for the observer perspective. Moreover, the corroboration study was conducted immediately after the diagnosis and it may be a matter of debate whether it is possible to observe posttraumatic growth immediately following a trauma. Despite the listed limitations, the study suggests that self-reported posttraumatic growth is valid or real.

In addition, Weiss (2002) investigated to what degree the reports of posttraumatic growth of 41 former breast cancer patients correspond with accounts of their husbands concerning observed positive change. The sample

was gained through diverse channels such as care centers, breast cancer coalitions and a hotline and support program. The Posttraumatic Growth Inventory was used to measure positive psychological change (posttraumatic growth). No significant group difference could be discovered between the reports of former breast cancer patients on posttraumatic growth and the ratings by their husbands ($t(39)=.88$; ns). In addition, the ratings of the former breast cancer survivors and their husbands correlated significantly in all domains. However, the study design did not guarantee the independence of the raters. Moreover, as suggested by Weiss (2002) it cannot be excluded that both parties shared the same positive illusions. Despite the limitations, the study preliminarily supports the validity of self-reported posttraumatic growth.

All the reviewed studies investigated corroboration relatively shortly after the traumatic event. According to Helgeson (2010) a study that measures reports of posttraumatic growth many years after the diagnosis opens the possibility to observe long-term effects. Therefore, Helgeson (2010) investigated whether the report of posttraumatic growth in 180 breast cancer survivors, who were diagnosed ten years ago, corresponded to ratings given by significant others (spouse, close family member or friend). Posttraumatic growth was measured by five open-ended questions and the Benefit-Finding Scale (BFS). No group differences (mean) between the two parties could be found when measured by the BFS. However, the ratings of both parties showed no significant correlation. That is, the mean of the two groups (breast cancer survivors vs. significant others) did not differ, however, survivors reported posttraumatic growth in different dimensions than significant others. When examined individually, this indicates that the ratings of both parties do not correspond. Reports of posttraumatic growth measured through the open-ended questions were also not significantly correlated with ratings by significant others ($r= .11$, $p>.05$). The dimension of ‘helping others with cancer’ was the only dimension were the ratings of both parties were significantly correlated. In comparison to the other reviewed studies, this study did not support the validity of self-reported posttraumatic growth. However, this study investigated rather long-term effects and may, therefore, be more prone to recall bias.

In summary, the corroboration studies on self-reported growth mainly support the validity of such reports. However, the study by Helgeson (2010) could not find an agreement between breast cancer survivors and ratings by significant others, exempt from the dimension of behavior changes (helping others with cancer). Moreover, the study by Park and colleagues (1996) found only a small correlation between reports of posttraumatic growth and ratings of significant others. Nevertheless, the reviewed studies suggest that reports of posttraumatic growth are often confirmed by significant others.

Although observer corroboration is often used in order to investigate the validity of a measurement, it is, nevertheless, not the most valid way to do so. For example, significant others could also be biased favourably towards observing posttraumatic growth (Helgeson, 2010; Joseph, 2011). Moreover, trauma survivors could have discussed their perceptions on positive change with significant others (Cohen, Cimbolic, Armeli, and Hettler, 1998). Hence, such ratings could lack independence (Shakespeare-Finch and Enders, 2008). It is, therefore, possible that sometimes significant others only repeat the perceptions of the trauma survivors (Cohen et al., 1998). Furthermore, all studies reviewed were retrospective and may be, therefore, prone to recall bias and memory failures. Ford and colleagues (2008) cite a range of studies in which observer corroboration is rather unreliable and influenced by memory failures such as deterioration of the past. Another possibility making corroboration studies rather questionable is that significant others may not recognise positive change in some areas such as appreciation of life (Calhoun and Tedeschi, 2004), insight and integrity (Jayawickreme and Blackie, 2014). Moreover, if a person is highly distressed, their life struggle to meet responsibilities, could be perceived by the individual in question as a strength and a positive step in the process of self-development. This view could be adopted because the concerned person fights the negative consequences created by adversity and suffering everyday anew. However, the observer's view could be blind to such an inner struggle and they could be more inclined to see negative external changes, which are likely to arise.

In the next section, studies are reviewed that investigate the construct validity of self-reported posttraumatic growth.

#### *1.2.3.3. The construct validity of posttraumatic growth.*

1.2.3.3.1. *Comparison studies.*

Construct validity, in a broad sense, means that the theory and measurement correspond with each other. This correspondence allows making theoretical predictions or inferences, which can in turn be tested (Diekmann, 2002; Schnell, Hill and Esser, 1992). One possible way to test construct validity is, for example, the use of comparison groups. If a measurement is valid, one should find significant differences between the "trial" group and the comparison group. In the case of posttraumatic growth, people who have experienced a trauma should show significantly more posttraumatic growth than people who have not experienced a trauma. However, comparison studies evaluating the validity of self-reported posttraumatic growth are still rare. Therefore, comparison studies that did not particularly evaluate the validity of self-reported posttraumatic growth were also included. This has the advantage to include more studies but the disadvantage that some studies may not add much information. This potential disadvantage will be stated where appropriate.

Frazier and Kaler (2006) investigate the validity of self-reported stress-related growth in three studies, of which two use a comparison group. Posttraumatic growth is measured by scales which are assumed to tap the most prominent domains of self-reported posttraumatic growth. In the first study, reports of posttraumatic growth of 70 breast cancer patients are compared to a matched control group. Frazier and Kaler (2006) did not find that people who had breast cancer showed higher levels of well-being. "Individuals with breast cancer did not report greater life satisfaction, better relationships, more concern for others, or more positive self-images, despite that these are commonly reported positive life changes among survivors of breast cancer (…)" (Frazier and Kaler, 2006, p.863). The second study by Frazier and Kaler (2006) evaluated whether students who report posttraumatic growth (N=34) differ from students who report that no positive change has emerged because of the event (N=34). Both groups did not differ significantly in several domains, which are usually captured by posttraumatic growth measurements. However, the sample size of both studies was small. Therefore, meaningful differences may have been overlooked. Moreover, Frazier and Kaler (2006) did not use a

posttraumatic growth measurement that has been specifically developed to assess posttraumatic growth.

In addition, Andersen Brix and colleagues (2013) conducted a comparison study between 774 breast cancer patients and 666 healthy women. The sample was a large prospective study. The advantage of this study is its high statistical power. Both groups completed the Posttraumatic Growth Inventory. No significant group difference could be discovered concerning the total score of the PTGI. However, cancer patients showed significantly higher scores in the domains of “appreciation of life” and “relating to others”. Hence, the study does not completely support the assumption that reports of posttraumatic growth are valid. However, the majority of the breast cancer patients did not rate their illness as the most stressful experience but another traumatic event. Moreover, only healthy women who had experienced another stressful event were included in the study. Therefore, the groups may be not well fitting in order to evaluate the validity of self-reported posttraumatic growth.

In the same vein, Ruini, Vescovelli and Albieri (2013) compared scores of self-reported posttraumatic growth of breast cancer survivors (N=60) with scores of a healthy matched control group (N=60). Only breast cancer survivors who did not report another traumatic event were included within the study. All participants within the control group had experienced another stressful life event. The Posttraumatic Growth Inventory measured posttraumatic growth. No significant group difference was discovered concerning the total score of the PTGI. However, women diagnosed with cancer reported significantly higher scores than healthy women within the domains “appreciation of life” and “spiritual changes”. Hence, the study does not completely support the assumption that reports of posttraumatic growth are valid. However, the results should be read carefully as all participants within the control group experienced a stressful life event. Therefore, the groups may be not the best way in order to evaluate the validity of self-reported posttraumatic growth.

Jenewein and colleagues (2008) compared scores on self-reported posttraumatic growth in parents whose preterm newborn died (N= 54) with reports of parents whose preterm newborn survived (N= 38). All preterm

babies were born between the 24th to 26th weeks of pregnancy. The Posttraumatic Growth Inventory measured posttraumatic growth. Parents whose child died reported more posttraumatic growth than parents whose child survived. However, this was not significant. Bereaved parents reported only in the domain of 'Relating to others' significant higher posttraumatic growth scores than parents whose child survived. These results may not be surprising considering the high stress levels of preterm birth among parents whose child survived. Although the study does not support the validity of self-reported posttraumatic growth, it should be borne in mind that the groups may be not well-fitting in order to evaluate the validity of self-reported posttraumatic growth.

The previously reviewed comparison studies do shed doubt on the validity of self-reported posttraumatic growth. However, several studies exist supporting the validity of self-reported posttraumatic growth. Those studies are reviewed next.

Posluszny, Baum, Edwards and Dew (2011) compared scores of self-reported posttraumatic growth within four groups. The first group consisted of women diagnosed with advanced cancer (N= 16) and the second group was made up of women with early-stage cancer (N=18). The third group consisted of women with minor medical conditions (N=21). The final group consisted of healthy women (N=14). The PTGI measured reports of posttraumatic growth. Women diagnosed with a medical condition reported more posttraumatic growth than did healthy women. The three groups consisting of women who were diagnosed with a medical condition endorsed similar scores on the PTGI total score and on the relevant subscales. Therefore, the study suggests that women who are diagnosed with medical conditions, including minor medical conditions, report higher levels of posttraumatic growth than healthy women did (Posluszny et al., 2011). This study supports the validity of self-reported posttraumatic growth. Furthermore, it suggests that minor conditions are also able to set the process of posttraumatic growth in motion. However, the sample size was very small. Therefore, the statistical power was limited and with that its generalisability.

Martins da Silva, Moreira and Canavarro (2011) investigate whether women diagnosed with breast cancer (N= 71) and a healthy matched control

group (N=89) differ concerning reports of posttraumatic growth. The included breast cancer patients rated posttraumatic growth in relation to their illness. In contrast, the control group rated in general how they have changed within the last two years. Reports of posttraumatic growth were measured according to the Posttraumatic Growth Inventory. Breast cancer survivors reported significantly higher levels of posttraumatic growth than healthy women did. This study supports the validity of self-reported posttraumatic growth. However, recall bias or other trauma-related processes could have caused higher reports of posttraumatic growth. Since the study was retrospective, this possibility cannot be excluded.

Currier, Mallot, Martinez, Neimeyer and Sandy (2013) compared scores on reports of posttraumatic growth within three groups. The first group consisted of subjects who experienced violent bereavement (N= 123). The second group consisted of subjects who experienced non-violent bereavement (N= 123). The third group consisted of subjects not being bereaved but instead experiencing another form of stress (N= 123). The Posttraumatic Growth Inventory assessed posttraumatic growth. Both groups of loss reported significantly more posttraumatic growth within the domains "relating to others" and "spiritual change" when compared with the group not having experienced bereavement. Moreover, subjects who had experienced a violent bereavement also reported significantly more posttraumatic growth within the domains "appreciation of life" and "personal strength" than subjects who have not experienced bereavement. Therefore, this study supports the validity of self-reported posttraumatic growth. However, recall bias or other trauma-related processes could have caused higher reports of posttraumatic growth. Currier and colleagues (2013) acknowledge similar possibilities when they mention that a higher level of self-reported posttraumatic growth was not necessarily correlated with the behavioural counterpart. Because the study was retrospective, this possibility cannot be excluded.

The reviewed studies gained mixed results concerning the validity of reports of posttraumatic growth. Two studies by Frazier and Kahler (2006) suggested that reports of posttraumatic growth are not valid. Three further studies (Andersen Brix et al, 2013; Jenewein et al., 2013; Ruini et al., 2013) suggested that the total score of self-reported posttraumatic growth is not valid.

In contrast, three studies (Currier et al., 2013; Posluszny et al., 2011; Martins da Silva et al., 2011) supported the validity of reports of posttraumatic growth. However, it should be born in mind, that most of the studies were not specifically designed to measure the validity of self-reported posttraumatic growth. Moreover, most of the studies showed some limitations that could have affected the evaluation of the validity of self-reported posttraumatic growth. In total, the results of the studies were somewhat mixed and no conclusive summary is possible. Moreover, the retrospective research design does not exclude the possibility that higher levels of self-reported posttraumatic growth are caused by other factors such as failure in temporal comparisons or illusions (cf. Currier et al., 2013). One way to solve this problem is the use of a prospective study design (e.g. Shadish, Cook and Campbell, 2002; Yanez, Stanton, Hoyt, Tennen and Lechner, 2011). Studies that have taken this approach will be discussed within the next section.

1.2.3.3.2. *Prospective studies (pre-to-post natural traumatic experience).*

Another possible way to assess the validity of self-reported posttraumatic growth is to use a prospective study design that assesses posttraumatic growth before a traumatic event has naturally occurred and that measures posttraumatic growth after the event has occurred (Yanez, Stanton, Hoyt, Tennen and Lechner, 2011). In other words, data are gathered before the traumatic event occurs and are compared to data gathered after the traumatic event has occurred (ibid).

Ransom and colleagues (2008) tested whether self-reported posttraumatic growth is real or whether self-reported posttraumatic growth is possibly illusory. The study uses a prospective study design (pre-to-post natural traumatic experience) with two times of measurement. The sample consisted of 83 cancer patients who completed a questionnaire battery prior to radiotherapy (T1) and 6 weeks following radiotherapy (T2). Measurements used were the Posttraumatic Growth Inventory, the Personal Attribute Rating Scales and the Aspiration Index. Actual change of goal orientation and of attributes was measured by subtracting the scores obtained at T2 from scores obtained at T1. Perceived change, in contrast, was measured by subtracting the

scores of T2 from scores, which patients gave at T2 when asked to recall their scores given at T1. The perceived change score was also used in order to find out whether patients derogate their former self to enhance or protect their current self.

The results suggested that subjects did not derogate their former self but instead even enhanced their former self. Therefore, perceived change in attributes was caused by an error in temporal comparison in order to enhance life prior to trauma. Moreover, reports of posttraumatic growth, measured at T2, were correlated with actual goal orientation change and perceived attribution change. The correlation between an intrinsic goal shift following a trauma and reports of posttraumatic growth support the validity of self-reported posttraumatic growth. In fact, the study suggests that self-reported posttraumatic growth reflects real change and may even underestimate the occurrence of posttraumatic growth.

Frazier and colleagues (2009) used a prospective study design (pre-to-post natural traumatic experience) with two times of measurement. One-hundred and twenty-two students filled in questionnaires prior to a traumatic incident (T1) and eight weeks after the traumatic experience (T2). The aim was to test whether actual posttraumatic growth corresponds with perceived posttraumatic growth measured by the Posttraumatic Growth Inventory (PTGI). The validity of perceived posttraumatic growth measured by the PTGI would be confirmed if actual posttraumatic growth and perceived posttraumatic growth (PTGI) correlate to a meaningful degree. Two types of measurements were used to explore whether self-reported posttraumatic growth is valid.

First, Frazier and colleagues (2009) created a current standing edition (questionnaire) of the PTGI. That is, prior to trauma and after trauma subjects filled in a questionnaire containing the same items as the PTGI. However, those items deviated from the PTGI by not evaluating change but rather measuring how a person had felt during the past two weeks. The PTGI was completed at time 2 (T2) and, therefore, after a traumatic event. Actual posttraumatic growth was calculated by subtracting the scores of the current standing PTGI before trauma (T1) from the scores of the current standing PTGI after trauma (T2). The PTGI, in contrast, served as proxy for perceived (self-reported) posttraumatic growth. The total score of self-reported growth

showed only a minor positive correlation with actual growth (r= .22**). This small correlation between actual posttraumatic growth and perceived posttraumatic growth could suggest that the PTGI is not validly measuring real posttraumatic growth.

Second, Frazier and colleagues (2009) also included in their study other self-report measurements, which assess the same domains as the PTGI. These measurements were the relationship subscale of Ryff's Psychological Well-being Scale, the meaning subscale from the Meaning in Life Questionnaire, Satisfaction with Life Scale, the Gratitude Questionnaire and the Religious Commitment Inventory. All questionnaires were filled in twice, namely before the trauma experience (T1) and after the trauma experience (T2). Actual posttraumatic growth was calculated by subtracting the scores obtained at T1 from the scores obtained at (T2). Again, most of the dimensions of actual change were not correlated with the PTGI, which was used as a proxy for perceived psychological change. For example, actual change in relationships was uncorrelated to perceived change measured by the PTGI (r= -.10, ns).

Moreover, with the exception of religious commitment, actual posttraumatic growth was consistently inversely correlated with distress at T2, while perceived posttraumatic growth measured by the PTGI was consistently positively correlated with distress at T2. Distress was measured by the Depression Anxiety Stress Scales. Moreover, actual posttraumatic growth mainly showed only a small correlation with positive reinterpretation coping (R= .18* to -.07). In contrast, only perceived posttraumatic growth measured by the PTGI showed a moderate to strong correlation with positive reinterpretation coping (r=.52**). In total, Frazier and colleagues (2009, p.917) suggest "(…) that perceived and actual growth reflect different processes".

In the same vein, Yanez and colleagues (2011) used a prospective study design (pre-to-post natural traumatic experience) with two times of measurement. They examined whether real posttraumatic growth and perceived posttraumatic growth correspond with each other. Moreover, they tested whether real posttraumatic growth and only perceived posttraumatic growth differ in their correlation with adjustment. Within this study, 152 students filled in questionnaires at two times of measurement. The second measurement followed six weeks after the first measurement. At T2, students were asked to

report the most stressful event they had experienced since the first measurement. The Posttraumatic Growth Inventory measured only perceived posttraumatic growth.

To measure real posttraumatic growth, students filled in a current standing version of the Posttraumatic Growth Inventory at both times of measurement. Real posttraumatic growth was calculated by subtracting the two scores of the current standing version of the Posttraumatic Growth Inventory obtained at T1 and T2. Results suggested that real posttraumatic growth and mere perceived or illusory posttraumatic growth were not correlated significantly ($r=.10$, $p>.05$). Moreover, real posttraumatic growth was correlated inversely with distress ($r=-.15$, $p<.05$) measured by the intrusion subscale of the Impact of Event Scale. Only perceived (illusory) posttraumatic growth correlated with denial coping and was marginally correlated with higher distress ($r=.13$, $p<.05$). Real posttraumatic growth was positively correlated with positive affect ($r=.22$, $p<.01$). In addition, only perceived (illusory) posttraumatic growth was correlated with positive affect when mediated by approach coping ($r=.21$, $p<.01$).

All studies reviewed above are exceptionally valuable because of their prospective study design (pre-to-post natural traumatic experience). However, some limitations should be taken into account. Most limitations are shared by all three studies reviewed above. Those shared limitations will be illustrated primarily on the example of the study conducted by Frazier and colleagues (2009).

Aspinwall and Tedeschi (2010) argue that the measures used by Frazier and colleagues (2009) to evaluate actual posttraumatic growth may not be the best choice. First, the measures used to evaluate actual posttraumatic growth missed any reference to a traumatic event. Therefore, it could be possible that any change observed from pre-to-post trauma is independent of the traumatic experience. If this were the case, the observed change would not constitute actual posttraumatic growth. To make this possibility less probable, the inclusion of a comparison group would have been valuable.

Second, to assess actual posttraumatic growth, Ransom and colleagues (2008) and Frazier and colleagues (2009) use questionnaires that were not directly related to any posttraumatic growth measurement. Frazier and

colleagues (2009) argue that those measurements assess typical domains that are usually tapped by the PTGI. However, Aspinwall and Tedeschi (2010) question the assumption that the measurements used by Frazier and colleagues (2009) reflect the PTGI and the theoretical construct of posttraumatic growth. The PTGI measures positive change as they emerge through the struggle with the consequences of a trauma within the dimensions of relating to others, personal strength, new possibilities, appreciation of life, spiritual change and changed sense of self (Tedeschi and Calhoun, 1996).

In contrast, Frazier and colleagues (2009) use measurements assumed to reflect the PTGI that assess gratitude, life satisfaction, meaning in life, relationship quality and religious commitment. Those domains assessed by Frazier and colleagues (2009) appear to be sometimes very different from those measured by the PTGI (Aspinwall and Tedeschi, 2010). Although well-being, meaning in life and gratitude may constitute a domain within psychological well-being, the PTGI may assess a completely different domain of psychological well-being (Aspinwell and Tedeschi, 2010). For example, no item within the PTGI taps on gratitude. One could argue that appreciation of life corresponds with gratitude but this is by no means a given as one could also appreciate life without being grateful.

Within the study by Yanez and colleagues (2011), a trauma experience was not an inclusion criterion. Instead, students were asked to report their most distressing event within the last six weeks. Here, the majority of students reported academic problems or interpersonal problems as most significant stressors within the last six weeks. However, it is not clear whether the students experienced the stressful situation as a crisis or trauma that could shatter their fundamental assumptions. Although such situations are surely sometimes highly stressful, people who faced, for example, death or serious illness may often be more affected and may usually also respond differently (Aspinwall and Tedeschi, 2010).

Finally, actual (real) posttraumatic growth was not measured by any study, but reports of posttraumatic growth were measured (Aspinwall and Tedeschi, 2010). It was instead assumed that one could infer actual (real) posttraumatic growth through the research design used. However, this should not be considered a given.

Despite the obvious limitations, the reviewed studies raise the question as to what extent reports of posttraumatic growth reflect real transformational posttraumatic growth.

### 1.2.4. Discussion.

Several researchers (e.g. Luszczynska et al., 2012; Taylor, 1983; Zoellner and Maercker, 2006/ 2009) have suggested that reports of posttraumatic growth are sometimes illusory or defensive. If this were the case, measurements based on self-reports may be assumed to be invalid. Invalid measurements, in turn, are not able to capture the intended theoretical construct and could facilitate false empirical conclusions. The previous section reviewed, therefore, theories and empirical research on the validity of self-reported posttraumatic growth and its measurements. In summary, the literature was reviewed in order to evaluate whether reports of posttraumatic growth and its measurements were sufficiently valid.

The reviewed studies have found mixed results concerning the validity of self-reported posttraumatic growth measurements. While the majority of studies supported the validity of reports of posttraumatic growth, several studies suggested that such reports are not always valid. In total, the validity of self-report measurements on posttraumatic growth is still questionable. Hence, it cannot be excluded that those measurements are assessing two independent psychological phenomena, namely real transformative posttraumatic growth and illusory reports of posttraumatic growth as suggested, for example, by Frazier and colleagues (2009) and Maercker and Zoellner (2004). In other words, reports of posttraumatic growth may sometimes represent real transformational change and at other times illusory psychological change (cf. Frazier et al., 2009).

Potential issues concerning the validity of self-reported posttraumatic growth, described above, could cause an unfounded rejection of the theory of posttraumatic growth by claiming its invalidity. Within this context, it may be useful to bear in mind the difference between the validity of a theory and the validity of self-reports and self-report measurements respectively. In other words, a theory could be valid although their measurements are not.

Although the differentiation between posttraumatic growth as a theory and self-reported posttraumatic growth and respective measurements could appear trivial, it is, nevertheless, crucial to differentiate between theory and the methods used to measure the theory/construct. As long as the validity of a measurement and its foundations, such as self-reports, has not been tested sufficiently, the measurement and the theory should be considered as separate. A theory around a construct cannot be tested as long as the measurements and their foundations (self-reports) are invalid (cf. Diekmann, 2002). Specifically, the theory and its implications on real transformative posttraumatic growth could be, nevertheless, valid.

In summary, reports of posttraumatic growth could include two different psychological phenomena with diverging psychological consequences (e.g. Frazier et al., 2009; Maercker and Zoellner, 2004). While sometimes such reports may reflect real transformational posttraumatic growth they may at other times be illusory.

Moreover, self-reported posttraumatic growth is in itself an interesting phenomenon that is worth investigating (Jayawickreme and Blackie, 2014; Zoellner and Maercker, 2006), even though it may often not correspond with reality. Through its examination, one could perhaps be able to separate illusory posttraumatic growth from transformational posttraumatic growth. This could enable researchers to explore the phenomena of real posttraumatic growth in more detail and to develop, hereupon, a valid measurement for measuring real posttraumatic growth.

Moreover, although various studies have suggested that self-reported posttraumatic growth is sometimes not real, it is not clear which specific processes could be responsible for the difference between real and illusory posttraumatic growth. The word “illusions” is often used in a broad sense with no reference to specific psychological processes. Within this thesis, it is attempted to clarify the concept of illusory posttraumatic growth one step further by investigating how diverse illusions could be correlated with reports of posttraumatic growth. In other words, the aim will be to detect some illusory processes that could be responsible for illusory reports of posttraumatic growth. Moreover on the basis of these illusions, it will be investigated whether real transformational posttraumatic growth and illusory reports of

posttraumatic growth differ in their correlation with well-being. Within the next section, the concept of illusions, as used throughout the thesis, is illustrated in order to understand the potential other side of self-reported posttraumatic growth. In accordance with the focus of the thesis, a specific emphasis will be placed on defence mechanisms.

### 1.3. Illusory Posttraumatic Growth

The several researchers, theories and studies reviewed above have questioned the validity of self-reported posttraumatic growth and respective measurements (e.g. Cheng, Wong and Tsang, 2006; Davis and McKearney, 2003; Ford et al., 2008; Frazier et al., 2009; Frazier and Kaler, 2006; Goorin, 2011; Hall et al., 2009; Hobfoll et al., 2007; Maercker and Zoellner, 2004; McFarland and Alvaro, 2000; Taylor, 1983; Wortman, 2004; Yanez et al., 2011; Zoellner and Maercker, 2006). Hence, it is still not clear whether self-report measurements on posttraumatic growth capture, in fact, the construct of posttraumatic growth or whether they measure another phenomenon.
Some researchers suggested that such reports are sometimes illusory (e.g. Gunty et al., 2011; Frazier et al., 2009; Maercker and Zoellner, 2004; McFarland and Buehler, 2012; Yanez et al., 2011; Zoellner and Maercker, 2006, Zoellner, Rabe, Karl and Maercker, 2008; Wortman, 2004). However, several researchers (e.g. Taylor, 1989; Taylor and Brown, 1988; Taylor, 1983) consider such illusions, although not real, as mainly adaptive ways of coping, through which a person gathers the strength needed in order to face their struggle with adversity.

Other authors suggested that sometimes reports of posttraumatic growth are defensive in nature (e.g. Davis & McKearney, 2003; Hall et al., 2009; Hobfoll et al., 2007). Here, potentially invalid reports of posttraumatic growth may be indicative for increased defensiveness where the affected person attempts to protect their worldviews against mortality threat. Simplified, theories on illusory posttraumatic growth may fall into two categories. First, illusory reports of posttraumatic growth are assumed (e.g. Maercker and Zoellner, 2004; Taylor and Brown, 1988; Taylor, 1983; Zoellner and Maercker, 2009) to be caused by positive illusions after Taylor (1989/ 1983).

Second, illusory reports of posttraumatic growth are considered worldview defences against mortality threat within the Terror Management Theory (e.g. Davis & McKearney, 2003; Hall et al., 2009; Luszczynska et al., 2012).

Within this thesis, it is tested whether reports of posttraumatic growth are correlated with illusions. Furthermore, it is examined whether real transformational posttraumatic growth and illusory reports of posttraumatic growth differ in their correlation with well-being. In order to answer those questions, illusions need to be defined and conceptualised. Within the thesis, illusions are conceptualised in two ways.

First, in accordance with Taylor (1983/ 1989) illusions will be conceptualised in a positive way. "Illusion is a perception that represents what is perceived in a way different from the way it is in reality. An illusion is a false mental image or conception, which may be a misinterpretation of a real appearance or may be something imagined. It may be pleasing, harmless or even useful" (Taylor, 1989, p.44). In contrast to maladaptive defences, those illusions are within a reasonable frame and allow a person to see and utilize threatening experiences (Taylor, 1989). Positive illusions do not push away internal or external reality but instead only change the perspective towards a brighter outlook (ibid). In summary, while the use of maladaptive defences may impede active coping strategies that face internal and external reality, positive illusions may facilitate such an approach (Taylor, 1989).

Second, in contrast to Taylor (1983/ 1989) illusions are also defined negatively within the thesis. The word negative is used in the sense that some illusions may have maladaptive long-term implications. However, it should be borne in mind that the word maladaptive should not be understood in a far too rigid way (Vaillant, 1995). Such long-term maladaptive implications of negative illusions could be caused by pushing away negative internal or external experiences from awareness (cf. Taylor, 1989; Horowitz et al., 1995; Vaillant, 1995). Usually, such negative illusions are described as maladaptive defence mechanisms by, for example, Vaillant (1995) or are considered as an overuse or unregulated use of defence mechanisms by, for example, Horowitz and colleagues (1995).

Within the thesis, positive illusions are specifically defined as self-enhancing strategies measured by the Balanced Inventory of Desirable

Responding (BIDR) (Paulhus, 1984). Positive illusions are furthermore defined by a mature defence style measured by the Defense Style Questionnaire-40 (DSQ-40) (Andrews, Singh and Bond, 1993). However, mature defensiveness could represent a special case of positive illusions where experiences are accommodated. This assumption will be explained next.

Defence mechanisms are often considered to be used in order to distort internal and external reality substantially; however, this is not assumed to be the case for a mature defence style (Vaillant, 1995). Here, internal and external reality is experienced although in an attenuated manner (ibid). Therefore, a mature defence style could be considered a domain of positive illusions or an adaptive form of emotion-focused coping (Weinberger, 1995). Moreover, it will be assumed that people who use a mature defence style are able to accommodate their internal and external experience (Vaillant, 1995). Therefore, reports of posttraumatic growth that are correlated with a mature defence style are assumed not to be highly influenced by processes that distort experience and may, therefore, be considered as real.

Finally, positive illusions were also defined by a particular mature defence mechanism namely positive humour as measured by affiliative humour and self-enhancing humour within the Humor Style Questionnaire (HSQ) (Martin, Puhlik-Doris, Larsen, Gray and Weir, 2003). In contrast, negative illusions, therefore, illusions that could have long-term maladaptive implications, were defined by a neurotic defence style and by an immature defence style after Vaillant (1995, 1995b). These negative illusions are measured by the DSQ-40. Negative illusions were also defined by a particular immature defence mechanism namely negative humour as measured by aggressive humour and self-defeating humour within the Humor Style Questionnaire (HSQ) (Martin et al., 2003).

Within the thesis, illusions are defined and conceptualised in a different way as most authors understand and describe them. For example, Taylor (1989/ 1983) understands illusions as a positive and helpful way to adapt to life and crisis. In contrast, within the thesis, illusions are defined as mechanisms that help adaption (positive illusions) and as mechanisms that could have long-term maladaptive implications (negative illusions).

Zoellner and Maercker (2006/ 2009) define illusions and the concept of illusions relatively loose. First, they describe illusions as positive illusions after Taylor (1983). However, at other times their description of illusions better resembles maladaptive defence mechanisms. Within the thesis, the differentiation between potentially adaptive illusions and potential maladaptive illusions is made explicit. The categorisation of positive and negative illusions may be a good umbrella in order to describe diverse biases and distortions according to their potential implications for trauma processing and self-reported posttraumatic growth.

Davis and McKearney (2003), Hall and colleagues (2009) and Luszczynska and colleagues (2012) approach the topic of illusions from different perspective. They consider illusions, to some degree, as worldview defences used to ward off mortality threat. However, within this theoretical framework, it is not specified which individual defences may be used in order to sustain a certain worldview. For the sake of speculation, it could be reasonable to assume that individuals need to use defence mechanisms in order to cling to worldview defences that have been or appear to be partly or completely contradicted by experience.

Within this thesis, two assumptions about illusory posttraumatic growth are made. First, based on Taylor (1983/ 1989), Taylor and Brown (1988), Marcker and Zoellner (2004) and Zoellner and Maercker (2006/ 2009) illusory posttraumatic growth could be a positive illusion. These reports are assumed to be helpful in order to deal with distress and may over time transform into real posttraumatic growth.

Second, illusory reports of posttraumatic growth could sometimes be a negative illusion as defined by high levels of negative humour (aggressive humour and self-defeating humour), a neurotic defence style or an immature defence style. The focus of this thesis, however, will be on defence mechanisms measured by the DSQ-40. As mentioned, illusory posttraumatic growth may be caused by defensive strategies to ward off threats (e.g. Luszczynska et al., 2012) and to sustain psychological stability (e.g. Luszczynska et al., 2012; Sumalla et al., 2009). Therefore, it might be possible that self-reported posttraumatic growth is sometimes a defensive operation to push away internal and external experience of adversity (Maercker and

Zoellner, 2004) rather than real posttraumatic growth where the person processes and accommodates the adverse experience (e.g. Tedeschi and Calhoun, 2013; Joseph and Murphy, 2013; Joseph, 2011; Joseph and Linley, 2005).

It is important to evaluate reports of posttraumatic growth concerning its potential defensiveness for the three following reasons. First, the classification of self-reported posttraumatic growth as real transformational change could cause a general misinterpretation of the latter phenomenon. A potential misinterpretation bears, however, the risk of drawing false conclusions in research. Second, defensive processes often indicate that the affected person is highly distressed (e.g. Horowitz et al., 1995; Vaillant, 1995). Therefore, if defensive operations sometimes cause reports of posttraumatic growth, these reports could indicate that the respective person is still highly impacted by the adverse experience. Moreover, as suggested by Maercker and Zoellner (2004) and Zoellner and Maercker (2009) those defensive reports of posttraumatic growth could under some circumstances signal that the respective person deals with the trauma in a rather maladaptive way. Finally and most importantly, to investigate and conceptualise real posttraumatic growth one may attempt to separate it from illusory posttraumatic growth. In this way, one could be able to characterise the phenomenon of real posttraumatic growth in more detail.

The subsequent section discusses the theory of defence mechanisms in order to understand the mechanisms that could potentially lead to illusory reports of posttraumatic growth. The focus within the thesis is on defence mechanisms measured by the DSQ-40 and, therefore, self-enhancing strategies measured by the BIDR and the defence mechanism of humour measured by the HSQ are not considered in detail.

### 1.3.1. Historical background of defence mechanisms.

"A defense is a descriptive metaphor for the temporary clouding of reality through thoughts, feelings and behaviours" (Vaillant 1995: 11).

Defence mechanisms derive from a psychoanalytical concept mainly developed by Sigmund Freud. Sigmund Freud (1894) cited by Cramer (2006) described defence mechanisms as a way for the ego to ward off unaccepted

drives or the libido. Freud was mainly interested in aggressive and sexual drives but he also analyses drives for self-preservation, power and approval (cf. Freud, 1921). If not warded off, those drives or impulses could inflict anxiety (Cramer, 2006). The use of defences indicates an internal conflict between drives and culture and superego respectively (Rattner, 1999). Adverse mental states occur when the conflict cannot be resolved but instead an adverse compromise is made (ibid).

Later, Anna Freud (2006) developed the idea of defence mechanisms further and drew a very comprehensive picture of nine defences that the ego uses to ward off threatening drives and affects that are attached to each drive. Drives, and emotions attached to the drives, could cause fear if an over-rigid superego has been developed (ibid). According to Freud (2006) the ego uses defence mechanisms in order to escape fear of drives, fear of reality and fear of consciousness. Therefore, the ego protects itself from fear by using defence mechanisms to ward off unaccepted impulses (ibid). As mentioned, affects which are associated with the respective drive may also be pushed away in order to ward off those drives and impulses (Freud, 2006). However, the concept of defence mechanisms has developed and become to some degree even detached from the psychoanalytical theory. Therefore, although defence mechanisms are highly associated with early psychoanalytical concepts, the theory on defence mechanisms is also used by humanistic authors such as Rogers (1959/ 1971), by authors in existential psychotherapy such as Yalom (1980) and in cognitive psychology (Vaillant, 1995). Moreover, defence mechanisms are also acknowledged by social psychologists, although different terminology is used (Baumeister, Dale and Sommer, 1998).

The detachment of defence mechanisms from the original psychoanalytical viewpoint might be warranted for several reasons. For example, the early psychoanalytical viewpoint incorporates several superiority theories on which further interpretations about pathology and therapeutic work have been made. For instance, Freud (1972) presumes, cited by Bourdieu (1997), that women are principally inferior compared to men. Therefore, the theoretical framework of defences will be detached, to some degree, from earlier assumptions made in psychoanalysis because those presumptions are

barely justifiable and lack sensitivity towards imbalanced social power structures.

However, the concept of defence mechanisms is useful for understanding stress, trauma, and the "irrational" side of humans (Vaillant, 1995). Therefore, the concept of defence mechanisms could be useful to understand the emotional side of humans as well.

### 1.3.2. Defence mechanisms and coping strategies.

Because the concepts of cognitive coping and defence mechanisms are quite analogous, similarities and differences are summarized in the following section.

Defence mechanisms are assumed to be employed without immediate awareness and possess a hierarchical order concerning their adaptive or maladaptive character (Cramer, 1998). Moreover, immature defences are assumed to distort external reality especially concerning relationships (Vaillant, 1995b), and neurotic defences are assumed to distort internal reality (ibid).

Cognitive coping strategies draw their origins from cognitive behavioural psychology (Aldwin and Yancura, 2004). Moreover, it is assumed that people consciously choose to use them (ibid). This assumes mainly a non-automatic estimation of a difficult situation in which various possibilities are more or less balanced and one decides upon an evaluation which procedure could be the best to solve a stressful situation. However, those coping strategies usually depend on situations where people are free in their choice of decisions and possess enough information and intelligence to evaluate circumstances (Vaillant, 1995). Unfortunately, such a situation is a luxury not available and accessible for everyone at any given time (Vaillant, 1995). The latter is especially the case within high stress situations as stress usually is caused by, for example, a reduction of free choice and access to and integration of information (ibid).

Therefore, cognitive coping seems to emphasize non-automatic or conscious appraisal of a threatening situation while defence mechanisms are used automatically. The majority of stress appraisals, however, appear to be processed automatically. Several researchers such as Cozolino (2010) support

the latter assumption. He suggests that appraisal of emotions and thoughts mainly, happen unconsciously or automatically. Furthermore, cognitive coping strategies primarily assess and explain how people deal with various forms of information, while, in contrast, defence mechanisms explicitly focus on emotions and how people deal with such emotions (Aldwin and Yancura, 2004).

Furthermore, defence mechanisms do not change the immediate external world for the better (Cramer, 1998) and immature defences may even hinder such useful attempts (Bond, 1992).

### 1.3.3. Theories on defence mechanisms.

Within this section two theories on defences are introduced. First, Roger's (1959) theory of defence mechanisms is introduced. The theory derives from a person-centred approach. Second, the theory of defence mechanisms by Vaillant (1995) is illustrated. This theory derives from a psychoanalytical view. Similarities and differences between the two theories will be discussed. Finally, I will state my own point of reference, which is used throughout the thesis with respect to the use of defence mechanisms.

#### *1.3.3.1. The use of defence mechanisms after Rogers (1959).*

Rogers (1959) assumes that people possess a self or a self-structure. This self-structure consists of a coherent perception of the self, which is embedded, in a network of relationships, in diverse domains in life and in values associated with the various aspects of the self (ibid). The self-structure is built through interactions with the environment (ibid). Of particular importance are interactions with other people (ibid). When the self-structure is coherent with the actualising tendency, the respective person is open to new experiences (Rogers, 1959).

According to Rogers (1959, p.196) actualising tendency

"(…) is the inherent tendency of the organism to develop all its capacities in ways which serve to maintain and enhance the organism. (…). Life is an autonomous event which takes place between the organism and the environment".

As mentioned above, the actualising tendency is facilitated if the self-structure is, to a critical degree, coherent with the experiences made (Rogers, 1959; Joseph, 2004). In the described case, new experiences form consistently the self-structure (Joseph, 2004).

However, people often incorporate a self-structure that is not coherent with experiences made because they attempt to gain positive regard from people in their environment (Joseph, 2004). Joseph (2004, p.104) illustrates this situation with an example: "Imagine, if love is withheld from a child when she cries, she gets the message 'in order to be loved, I mustn't cry'". When the self-structure is not coherent with experiences made, the respective person has conditions of worth (Rogers, 1959; Joseph, 2004).

"Conditions of worth are those messages we introject from society and those around us about how we should behave if we are to be accepted and valued" (Joseph, 2004, p.104).

If the self-structure is incoherent with experiences made, a person may use defence mechanisms to ward off all experiences that threaten the current self-structure (Rogers, 1959; Joseph, 2004). New experiences are pushed away from awareness to sustain an antiquated self-structure despite of contradicting facts (experiences) (Rogers, 1959). In other words, all experiences, which are incoherent with the self-structure, are warded off and are not allowed to reach awareness or consciousness (Rogers, 1959). In this way, the self-structure becomes incoherent with and detached from the actualizing tendency (Rogers, 1959). In other words, a person who has conditions of worth attempts to actualise a self that is out of touch with certain aspects of reality (experiences) (Rogers, 1959). The consequence of this incoherence is that the self-structure becomes consistently more rigid, "inauthentic" (Joseph and Linley, 2006b) and the person becomes more psychologically maladjusted (Rogers, 1959).

#### *1.3.3.2. The use of defence mechanisms after Vaillant (1995).*

Vaillant (1995) considers defence mechanisms as mainly a form of communication, which is used when a person is under stress caused by emotional conflict. Also here, the clinical model is not embraced. Instead, Vaillant (1995) argues that defences are used when the ego is threatened.

The "(…) term ego encompasses the adaptive and executive aspects of the human brain: the ability of the mind to integrate, master, and make sense of inner and outer reality. (…) The term ego addresses the capacity of the integrated mind to accommodate and assimilate the world" (Vaillant, 1995, p.3). The integration of experiences into a united sense of self becomes blocked or altered when the ego (integration principle) is threatened by overwhelming stress. Thus, Vaillant (1995) explicitly differentiates between the self as united sense of being and the ego as an integration principle. According to Vaillant (1995) defence mechanisms are mental strategies automatically used to protect the integration principle (ego) from overwhelming stress. Through defence mechanisms, the ego is able to survive and to wait until the experience can be accommodated into a united self without being overwhelmed by anxiety and depression (ibid).

Moreover, Vaillant (1995) suggests that defences are used by the ego in response to change which has produced significant conflict within one of the four areas namely the areas of relationships, reality, desire (affect) or conscience (superego) (ibid). Within this theory, external circumstances are considered to be of similar importance for the use of defence mechanisms as internal circumstances such as desire and conscience (superego). The domain of conscience may be comparable with the self described by Rogers (1959). Here, a person internalises relationships, expectations and society, which could become a source of conflict when they contradict new experiences.

Vaillant (1995) differentiates between adaptive and maladaptive defences. Mature defences allow the respective person to see internal and external reality, though in an attenuated manner (1995). In this case, the integration (accommodation) of experiences into a united sense of self is still possible. Hence, those mechanisms allow for personal development and growth (Vaillant, 1995b). Neurotic defences, in contrast, distort inner reality (affect and ideas) while immature defences distort internal and external reality (Vaillant, 1995b). According to Vaillant (1995), the integration of experiences into a united sense of self is blocked when one is using neurotic or immature defensiveness. Therefore, it is reasonable to assume that here personal development and growth is hindered.

#### *1.3.3.3. Two theories: similarities, differences and own point of reference.*

The psychological potential of people is emphasised within both views on defensiveness. However, each theory takes a slightly different perspective. Rogers (1959) focuses in his analysis on the negative consequences of defence mechanisms for the actualising tendency. Distorting experience hinders the person's ability to adapt their self-structure in congruence with the experience. In this way, the actualising tendency is negatively affected (Rogers, 1959; Joseph, 2004).

In contrast to Rogers (1959), Vaillant (1995, 1995b) also focuses on mechanisms which have the potential to hinder personal development and, therefore, real transformational posttraumatic growth. Neurotic defences and immature defences could be comforting in the short-term, but have a tendency to produce maladaptive long-term effects (Vaillant, 1995, Vaillant, 1995b). Vaillant (1995, 1995b) argues that sometimes people are incapable of acknowledging their situation/experience, as otherwise they would be overwhelmed by anxiety and depression. The ego, or the integration system of the united self, wards off some aspects of experiences in order to remain in function (ibid). This defensive operation may, in case of neurotic and immature defensiveness, cause psychological mal-adaption (ibid). However, in the first instance, defence mechanisms are considered a way to keep the integration system (ego) in motion and to gain time when stress is high and external resources are sparse (cf. Vaillant, 1995).

However, Vaillant (1995, 1995b) identifies several adaptive defence mechanisms which do not distort inner and outer reality but attenuate conflicts. Those defence mechanisms are conceptualized as mature defence mechanisms (Vaillant, 1995, 1995b). This concept of continuous development may be comparable with the term "actualizing tendency" used by Rogers (1959). Using Rogers (1959) terminology, mature defences attenuate the awareness of the incongruence between experience and current self-structure. However, the experience itself is not distorted and is allowed to enter awareness to some degree (Vaillant, 1995). The adverse experience may be accommodated into the self even under high stress circumstances when mature defences are used (Vaillant, 1995). Hence, according to Vaillant (1995, 1995b), not all defences

hinder personal growth but instead in case of mature defences may even facilitate it.

At the first glance, the theory by Rogers (1959) and the theory by Vaillant (1995, 1995b) appear to be mutually exclusive. While Rogers (1959) assumes that people need to be low in defensiveness in order to grow, Vaillant (1995, 1995b) assumes that mature defensiveness allows and facilitates, nevertheless, personal growth. However, it will be argued within the next paragraphs that Rogers may have not considered mature defences as defences but instead as mature (constructive) behaviour.

Rogers (1959, p.204) defines defensiveness as "(…) the behavioral response of the organism to threat, the goal of which is the maintenance of the current structure of the self. This goal is achieved by the perceptual distortion of the experience in awareness, in such a way as to reduce the incongruity between the experience and the structure of the self, or by the denial to awareness of an experience, thus denying any threat to the self". Later on, Rogers argues (1959, p. 205) that defensiveness occurs "(…) When an experience is dimly perceived (or "subceived" is perhaps the better term) as being incongruent with the self-structure (…)". Rogers (1959), however, defines Subception, as being outside of awareness. Rogers defined awareness (1959, p.198) "(…) as the symbolic representation (not necessarily in verbal symbols) of some portion of our experience. This representation may have varying degrees of sharpness or vividness, from a dim awareness of something existing as ground, to a sharp awareness of something which is in focus and figure". Moreover, awareness is characterised by creating theories and assumptions that could potentially be tested (Rogers, 1959).

Vaillant (1995, 1995b) considers mature defenses as automatic operations to stress where ideas, feelings, objects and subjects are accurately experienced in awareness, although in an attenuated manner. Therefore, mature defences do not hinder experiences to enter awareness. Here, theories concerning the experience are built and could potentially be tested. In addition, Rogers (1959) describes mature behaviour which is not in contradiction with behaviour that Vaillant (1995, 1995b) captures with the term mature defensiveness. In contrast to Rogers (1959) Vaillant's term of mature

defensiveness, however, focuses on behaviour that occurs as a response towards stress.

In summary, mature defences may not be considered as defensiveness but as mature behaviour when using Rogers (1959) framework. Therefore, no matter whether one defines those behaviours as mature defensiveness or constructive responses, they are assumed to facilitate personal growth. However, within this thesis, the term mature defences will be used in order to underline their automatic nature to confront stressful life experiences. In other words, mature defensiveness is conceptualised as automatic behaviour occurring as a response towards stress that facilitates the actualising tendency of the organism or continuous development respectively.

The main difference between Rogers's theory (1959) and Vaillant's theory (1995, 1995b) may be their perspective. Rogers (1959) focuses on the incongruence between experience and the self and its consequences for personal growth. Vaillant (1995, 1995b) focuses primarily on how defence mechanisms may help the person to survive and adapt to life even under adverse conditions. Because of the above diverging viewpoints, the theories evaluate the use of defence mechanisms differently. The theory by Rogers (1959) emphasises that defence mechanisms are used to sustain an incongruent self or self-structure. This incongruent self causes psychological maladaptation and hinders a person to actualize themselves according to experiences made. Rogers's (1959) focus is on flourishing under good or good enough circumstances.

In contrast, Vaillant (1995) focuses explicitly on how people survive even under adverse conditions such as low social support, low freedom of choice and within ambiguous situations. Here, even maladaptive defences may serve a function, namely to bear otherwise unbearable anxiety and depression (ibid). Vaillant (1995) goes even further and asserts that using no or low levels of defences is a luxury and a sign for having enough coping resources which replace, to some degree, the use of defence mechanisms. Sufficient coping resources are unfortunately not available for everyone (ibid). Moreover, in situations where stress is arising, those coping recources have usually diminished substantially (ibid). Using defence mechanisms is a possible way of the ego to stay more or less intact even in highly stressful situations. Moreover,

Vaillant (1995) describes resources of conflict that exceed the theory by Rogers (1959). The reason is that Vaillant (1995) defines the self more broadly than Rogers (1959) as an united subjective sense of being. The self incorporates, therefore, not only internalised relationships. For example, conflicts and the use of defences could arise through clashing external realities.

However, both theories assume that low defensiveness allows for accommodating new experience (Rogers, 1959; Vaillant, 1995). Therefore, both theories assume that low defensiveness is either a sign of mental health (Rogers, 1959) or a sign of low stress or sufficient coping resources (Vaillant, 1995). According to Vaillant (1995), accommodation and personal growth may even be possible within stress situations when mature defences are used. However, as argued above, Rogers (1959) would probably define mature defences as mature behaviour.

Within this thesis, the theory by Vaillant (1995) is mainly used as point of reference. However, it should be borne in mind that the difference between the two reviewed theories is minor. This decision was primarily made for two reasons. First, the term self-structure as used by Rogers (1959) focuses mainly on the domain of conscience. Therefore, the meaning of the term self used by Rogers (1959) is narrower than the meaning of the term self used by Vaillant (1995). The latter understands the self rather as a united sense of subjective experience. For example, people also use defence mechanisms to balance or to be unaware of clashing external circumstances. Moreover, Vaillant (1995, 1995b) developed a profound theory which focuses especially on defence mechanisms. Therefore, the theory by Vaillant (1995, 1995b) appears to be more useful in order to investigate the impact of defence mechanisms on reports of posttraumatic growth.

Within this thesis, it will be assumed that low defensiveness (Rogers, 1959; Vaillant, 1995) and mature defensiveness (Vaillant, 1995) allow the individual to be aware of experiences and to accommodate them into their self. In contrast to overall low defensiveness, the use of mature defence mechanisms could be considered as a sign of stress or insufficient external coping resources. However, low levels of maladaptive defensiveness as well as high levels of mature defensiveness may facilitate the occurrence of real posttraumatic growth.

All other forms of defensiveness may have the potential to hinder self-development and, therefore, real posttraumatic growth through the process of assimilation. Nevertheless, neurotic or immature defence mechanisms could be considered as a resource when the ego is not able to accommodate the threatening emotions or cognitions without being overwhelmed by anxiety or depression (ibid). Therefore, in the short term, these defence mechanisms also fulfil a useful function for the individual. However, these short-term benefits may have a tendency to produce maladaptive long-term implications.

The previous sections introduced the concept, as well as several theories, on posttraumatic growth. Validity issues concerning reports of posttraumatic growth were also discussed. Hereupon, it was suggested that reports of posttraumatic growth could incorporate two separate phenomena with diverging psychological implications, namely real transformational posttraumatic growth and illusory posttraumatic growth. Several theories on illusions (Taylor, 1983/ 1989; Vaillant, 1995, 1995b; Zoellner and Maercker, 2006/ 2009) were used to define and conceptualise illusions within the thesis. Measurements used to assess those illusions were listed. Hereupon, illusory posttraumatic growth was defined by using the conceptualisation of illusions. Through this conceptualisation of illusions, it may be possible to pin down what processes constitute illusory posttraumatic growth. Furthermore, it may be possible to evaluate the potential adaptive or maladaptive implications of illusions and illusory posttraumatic growth. Because defence mechanisms constitute the focus of this thesis, the concept of defence mechanisms as conceptualised by Vaillant (1995, 1995b) and measured by the DSQ-40 was examined and contrasted to Rogers's (1959) view on defences.

Within the next section, the concept of self-reported posttraumatic growth is conceptualised as used within this thesis. In order to investigate whether real transformational posttraumatic growth and illusory posttraumatic growth differ in their correlation with well-being, real posttraumatic growth is separated from illusory posttraumatic growth. This will be done through the concept of defence mechanisms measured by the DSQ-40, the concept of self-enhancement (positive illusions) measured by the BIDR and the concept of the defence mechanism of humour measured by the HSQ. A model is constructed

which will guide the research and the development of hypotheses throughout the thesis.

### 1.4. Conceptualisation of Self-Reported Posttraumatic Growth within the Thesis

Posttraumatic growth is a real, positive transformational change of the self following adversity or a trauma (e.g. Joseph and Linley, 2005; Joseph, 2004; O'Leary and Ickovics, 1995; Tedeschi and Calhoun, 1996). However, self-report measurements of posttraumatic growth may not always assess real transformational posttraumatic growth in a valid way. Empirical research suggests that, in fact, self-reported posttraumatic growth is sometimes not real or valid (e.g. Andersen Brix et al., 2013; Frazier et al., 2009; Frazier and Kaler, 2006; Helgeson, 2010; McFarland and Buehler, 2012; Mc Farland and Alvaro, 2000; Yanez et al., 2011). Reports of posttraumatic growth could sometimes reflect not real transformational posttraumatic growth but illusions (e.g. Frazier et al., 2009; Hall et al., 2009; Maercker and Zoellner, 2006; Park and Folkman, 1997; Taylor and Brown, 1988). Therefore, reports of posttraumatic growth may incorporate two separate psychological constructs, namely real transformational posttraumatic growth and illusory posttraumatic growth (Frazier et al, 2009; Maercker and Zoellner, 2004; Zoellner and Maercker, 2006).

Frazier and colleagues (2009), Maercker and Zoellner (2004) and Jayawickreme and Blackie (2014) have all argued that real transformative posttraumatic growth may not be the same as reports of posttraumatic growth. The same will be suggested within this thesis. Reports of posttraumatic growth may be caused by either real posttraumatic growth or by illusory posttraumatic growth. The latter may be an indicator that the respective person has not experienced psychological change but uses illusions such as self-enhancing strategies or defence mechanisms. Maladaptive defence mechanisms could even hinder the development of real posttraumatic growth (cf. Zoellner and Maercker, 2009). Here, reports of posttraumatic growth could be caused by distress and subsequently maladaptive defence mechanisms could be used. These maladaptive defence mechanisms could lead to the perception of posttraumatic growth, though no actual change has occurred. Hence, the

hypothesis tested throughout the thesis is whether reports of posttraumatic growth are correlated with illusions, especially with defence mechanisms. If this were the case, the question under investigation is whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with well-being.

Here, a methodological problem emerges. How is it possible to separate real posttraumatic growth from illusory posttraumatic growth since both phenomena are captured by self-reported posttraumatic growth? Within this thesis, defence styles as measured by the DSQ-40, self-enhancing strategies, as measured by the BIDR and the defence mechanism of humour as measured by the HSQ are used as an auxiliary construction to differentiate between real and illusory posttraumatic growth. Low defensiveness, or high levels of mature defensiveness, are used as indicators for real posttraumatic growth. In contrast, high levels of neurotic and immature defensiveness are used as indicators for potential maladaptive illusory posttraumatic growth. Moreover, low levels of self-enhancing strategies are used as an indicator for real posttraumatic growth. In accordance with Taylor (1983/ 1989) and Taylor and Brown (1988), high levels of self-enhancing strategies are used as indicators for adaptive illusory posttraumatic growth. Finally, high levels of positive humour (affiliative humour and self-enhancing humour) are used as indicators for real posttraumatic growth. In contrast, high levels of negative humour (aggressive and self-defeating humour) are used as indicators for potential maladaptive illusory posttraumatic growth. The hope is that this procedure preliminarily allows for the exploration and description of the nature of the concept of real as well as illusory posttraumatic growth in more detail.

Moreover, it could be possible to test a developed model on how real posttraumatic growth and illusory posttraumatic growth are correlated with well-being. A model is introduced on the next page that describes the suggested correlation of well-being with real and illusory reports of posttraumatic growth. The model is based on the Organismic Value Theory of posttraumatic growth developed by Joseph and Linley (2005) and Joseph (2009). The model used within the thesis is extended by the explicit incorporation of diverse defence styles. Only defence styles as measured by the DSQ-40 are included in the model in order to hold it as simple as possible.

This simplification should not by any means significantly deteriorate the model, as the main focus of the thesis is on defence styles. Thus, nearly all tests within this thesis use the concept of defence styles as measured by the DSQ-40.

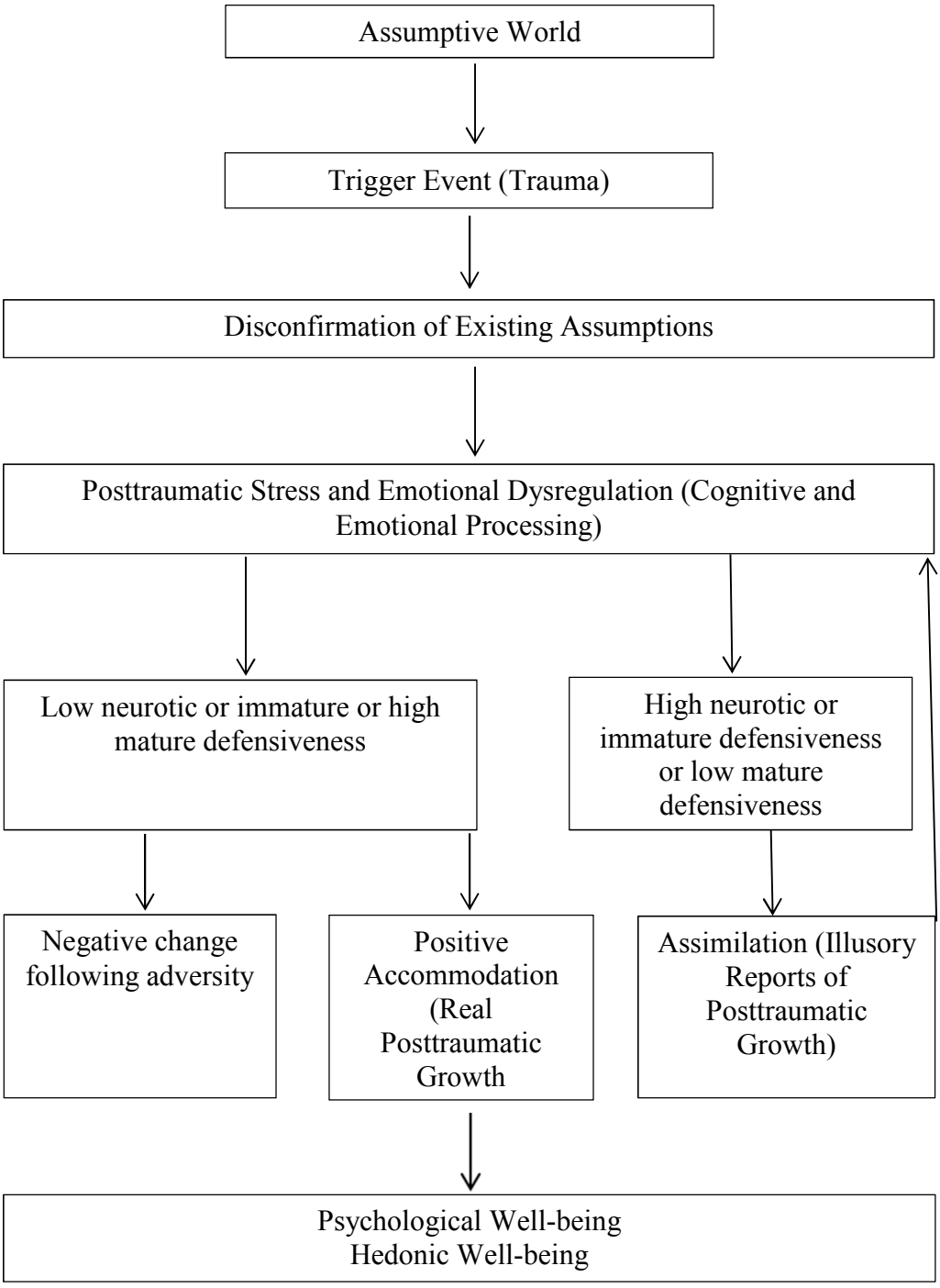


Figure 1. *Real and Illusory Posttraumatic Growth*

The next paragraph will explain the model (see figure 1.) in more detail. First, in line with Janoff-Bulman (1992), it is suggested that people hold some basic

assumptions about the world and themselves. A trauma has the potential to threaten such fundamental assumptions. However, the assumptive world remains unaffected if the adverse experience does not contradict fundamental assumptions (Joseph, 2009). In case the assumptive world of an individual is disconfirmed by the adverse experience, people attempt to integrate their experience by processing the trauma (Joseph and Linley, 2005; Joseph and Linley, 2008). Horowitz (1986) and Horowitz and colleagues (1995) suggest that trauma processing is characterised by intrusive and avoidant states (cognitive processing) or posttraumatic stress respectively (ibid). According to Joseph and Linley (2005) and Joseph (2004), cognitive processing represents an intrinsic drive by the individual to develop themselves in accordance with their experience. The person oscillates between intrusive and avoidant states (cognitive processing or posttraumatic stress) until they have worked through the experience (Horowitz, 1986; Horowitz et al., 1995). "When a baseline is reached and intrusive and avoidant states are no longer present, this is explained as resulting from either cognitive assimilation of the traumatic memory or a revision of existing schemas to accommodate the new information" (Joseph and Linley, 2005, p.272). Thus, two outcomes are assumed to emerge through trauma processing, namely accommodation of the trauma experience and assimilation of the trauma experience (Joseph and Linley, 2005).

In case of accommodation, pre-existing fundamental assumptions (schemas) have changed in accordance to the experience (Joseph et al., 2012; Joseph, 2011; Joseph and Linley, 2005; Joseph, 2004). This change can be negative or positive. Negative accommodation is characterised by hopelessness, helplessness and despair (Joseph and Linley, 2006b). Positive accommodation, in contrast, is the essence of real posttraumatic growth (e.g. Joseph and Linley, 2005). Here, trauma-related information changes fundamental assumptions or the self-structure in such a way that it is consistent with the experience (ibid). However, these changes do not lead to a hopeless outlook but instead are perceived as a gain in some domains.

Within this thesis, it is assumed that low levels of neurotic and immature defensiveness or high levels of mature defensiveness allow the respective person to accommodate their experience. Within this assumption,

mature defence mechanisms are considered to facilitate accommodation processes and, therefore, real posttraumatic growth. Therefore, the theory presented here differs slightly from the Organismic Valuing Theory concerning how defence mechanisms and their functionality are constructed. While the Organismic Valuing Theory assumes that defensiveness in general could hinder the development of posttraumatic growth (cf. Joseph, 2004). The theory proposed within the thesis assumes that only neurotic and immature defences have the capacity to hinder the development of posttraumatic growth. However, as already mentioned mature defences may be considered as mature behaviour instead of defensiveness when using a Rogerian framework such as the Organismic Valuing Theory. In summary, in accordance with Vaillant (1995), it is suggested that mature defence mechanisms facilitate posttraumatic growth even under highly stressful circumstances. When using low levels of defensiveness (Joseph, 2011) or high levels of mature defensiveness (Vaillant, 1995) the affected person remains, open to experiences and information. Hereupon, the self-structure of a person changes in congruence to the experience. In other words, external and internal information and experiences (e.g. an adverse event) are processed within the individual and shape, hereupon, the self (Joseph, 2004; Vaillant, 1995). In this way, real posttraumatic growth could develop (cf. Joseph, 2004).

In contrast, assimilation may occur when the person uses defensive processes (Joseph et al., 2012). Cognitive processing, which is caused by traumatic events (posttraumatic stress), is highly painful and has the potential to cause substantial anxiety (Horowitz et al., 1995). If an individual is not able to bear it, the distressing states of cognitive processing defensive strategies could be used in order to ward off pain. By using some maladaptive defence mechanisms emotions and information relating to the trauma may not be experienced or recognised and could lose their connection to the event or the self (Vaillant, 1995, Vaillant, 1995b). However, the experience of trauma-related emotions and information is considered crucial in order to work through the trauma and to accommodate the adverse experience (Joseph and Linley, 2005). Therefore, the use of defence mechanisms that hinder the experience of emotions and recognition of information may also hinder cognitive and emotional processing and trauma processing respectively (Horowitz et al.,

1995). Moreover, new experiences may be warded off when associated in one way or another with the adverse experience (Joseph, 2004).

Thus, by being defensive a person may become increasingly defensive (Joseph, 2011) by pushing away all new or past experiences which are threatening (Freud, 2006) and do not fit into the pre-existing schema. Instead of thriving or personal growth, the person could become prone to experience the opposite. Therefore, a highly defensive person may assimilate trauma information to deal with the experience. Here, reports of posttraumatic growth are considered part of an overall defensive pattern to push away discomforting feelings and cognitions. In other words, high levels of neurotic or immature defences are assumed to be responsible for the assimilation processes and could, therefore be the foundation for potentially long-term maladaptive illusory reports of posttraumatic growth.

Several hypotheses were developed in order to investigate whether real transformational posttraumatic growth and potentially long-term maladaptive illusory posttraumatic growth differ in their correlation with well-being. In accordance with, for example, Janoff-Bulman (2009), Joseph and Linley (2005), Joseph (2004), Tedeschi and Calhoun (1996) and Calhoun and Tedeschi (2013), it is assumed that real posttraumatic growth is a psychological transformation arising through the struggle with a highly distressing event or a range of highly distressing events. It is hypothesised that posttraumatic stress has diminished substantially or is not existent anymore when real transformational posttraumatic growth is reported (Joseph and Linley, 2005; Joseph, 2004). The contrary was hypothesised for illusory posttraumatic growth (high levels of neurotic or immature defensiveness or low levels of mature defensiveness). Although real posttraumatic growth may be more an aspect of psychological well-being than of hedonic well-being both concepts are usually correlated as, for example, suggested by Chen, Jing, Hayes and Lee (2012), Gallagher, Lopez and Preacher (2009), Linley and colleagues (2009) and Ryan and Deci (2001). Therefore, it was hypothesised that real transformative posttraumatic growth is correlated with hedonic well-being as well as psychological well-being. This was not assumed the case for illusory posttraumatic growth.

To my knowledge, the theoretical and methodological framework developed takes a new perspective on investigating real and illusory posttraumatic growth concerning their correlation with well-being. This perspective could allow exploring real posttraumatic growth and illusory posttraumatic growth from a new angle. How the thesis and the subsequent research could contribute to existing knowledge is discussed within the next section.

### 1.5. Significance of the Thesis

Several researchers have suggested that self-reported posttraumatic growth may have an illusory side or could sometimes be defensive itself (e.g. Cheng et al., 2006; Dekel, Mandl and Solomon, 2011; Hall et al., 2009; Frazier, 2009; Wortman, 2004; Zoellner and Maercker, 2006). It has also been suggested that therapists should start to think about the facilitation of posttraumatic growth (e.g. Calhoun and Tedeschi, 1999; Calhoun and Tedeschi, 2013). Posttraumatic growth is already a fundamental ingredient of the Comprehensive Soldier Fitness Program in the United States (Tedeschi, 2011). Moreover, Tedeschi and Calhoun (2013) and Calhoun and Tedeschi (2013) give detailed descriptions how posttraumatic growth can be facilitated in therapy. However, the facilitation of posttraumatic growth in therapy or other projects could be happening too early and could even have unexpected side-effects. As already mentioned, research (e.g. Frazier et al., 2009) indicates that reports of posttraumatic growth could constitute two separate phenomena, namely real transformative posttraumatic growth and illusory posttraumatic growth.

Moreover, it is not clear whether illusory or real posttraumatic differing in their correlation with well-being. Both types of self-reported posttraumatic growth could have different, almost incompatible implications for psychotherapy (Sumalla et al., 2009). For example, illusory posttraumatic growth could be correlated with defensive operations to avoid the implications of adversity and may so impede trauma processing (cf. Zoellner and Maercker, 2006). Thus, a furtherance of illusory posttraumatic growth may only increase defensive processes. In contrast, real transformational posttraumatic growth

may arise by not pushing away trauma implications and being open to internal and external experiences (e.g. Joseph, 2004; Joseph, 2011).

These diverging theories and respective implications show a need to investigate the phenomenon of reports of posttraumatic growth in more detail before starting its implementation in therapy or other projects. Coyne and Tennen (2010, p.19) state this problem as follows: "After decades of study, we still do not know what benefit-finding is, nor do we understand the circumstances in which finding benefits has positive adaptational value. Yet, positive psychology investigators have begun to identify interventions enhancing benefit finding among seriously ill individuals". The core reason for implementing such interventions could be an unproven assumption about the universal positive nature of self-reported posttraumatic growth. However, this assumption could be premature.

In summary, research on posttraumatic growth is still in its infancy and doubts about the validity of self-reported posttraumatic growth have emerged. Self-reported posttraumatic growth could be real and transformational in some cases while in other cases those same reports could be illusory (e.g. Maercker and Zoellner, 2004; Sumalla et al., 2009). However, although several researchers (e.g. Frazier et al., 2009) have indicated that reports of posttraumatic growth are not always valid, it remains a matter of further investigation *why* those reports are not real and what differentiates real from illusory reports of posttraumatic growth.

As suggested above, reports of posttraumatic growth could include illusory posttraumatic growth (Sumalla et al., 2009). If this were the case, real posttraumatic growth and its characteristics could only be described when separated from illusory posttraumatic growth. However, this has seldom been done. Within this thesis, a way to separate real from illusory posttraumatic growth within a cross-sectional research design is attempted. The subsequent thesis also attempts, therefore, to investigate *when* and *why* reports of posttraumatic growth are illusory. Here, the focus lies on defence mechanisms. The level of defensiveness is used as an indicator for real transformative posttraumatic growth or illusory posttraumatic growth. In order to achieve the latter aim, various moderation analyses will be carried out. In this way, it is attempted to explore preliminarily the nature (characteristics) of real

posttraumatic growth and illusory posttraumatic growth concerning well-being. Here, cognitive processing (posttraumatic stress), emotional processing (emotional dysregulation), negative psychological change, hedonic well-being and psychological well-being will serve as proxies for well-being.

It is hoped to evaluate the nature of real posttraumatic growth in more detail through a separation of real posttraumatic growth from illusory posttraumatic growth. Well-established measurements are used in order to examine the phenomenon of self-reported posttraumatic growth and its potential two diverging dimensions. In summary, the thesis investigates reports of posttraumatic growth from a new angle. To my knowledge, the theoretical framework developed and the methodological procedure used to investigate real and illusory posttraumatic growth and their correlation with well being is unique. The thesis takes, therefore, a new perspective on evaluating and examining self-reports of posttraumatic growth, which has not been used elsewhere. It is hoped that this perspective is able to contribute to existing knowledge on real transformational posttraumatic growth and illusory posttraumatic growth.

The thesis attempts to answer the following questions:

1. Are reports of posttraumatic growth correlated with illusions?
2. Do real posttraumatic growth and illusory posttraumatic growth differ in their correlation with well-being?

The previous chapter has described the theoretical construct of posttraumatic growth. Theories and empirical research was reviewed concerning the validity of reports of posttraumatic growth. Some potential validity issues were identified. Hereupon, it was suggested that reports of posttraumatic growth could include two separate phenomena, namely real transformational posttraumatic growth and illusory posttraumatic. It should be borne in mind that the validity of posttraumatic growth is not questioned, but rather the validity of self-report measurements of posttraumatic growth. Illusions and illusory posttraumatic as understood within this thesis were defined and conceptualised. Thereafter, real and illusory posttraumatic growth were conceptualised as used within the thesis. A model was developed to explain

how real and illusory posttraumatic growth could differ in their correlation with well-being. Finally, the significance of the thesis was illustrated. Within the next chapter, the literature will be systematically reviewed in order to identify a research gap and to place the research within a broader context.

## 2. Systematic Literature Review

Existing literature is systematically reviewed in order to examine whether other studies have already investigated the correlation between illusions and reports of posttraumatic growth. The aim of this review is (a) to gain knowledge whether reports of posttraumatic growth are indeed correlated with defensiveness and (b) to place the research conducted within this thesis in a wider scientific context.

Illusory reports of posttraumatic growth were defined by defence styles, humour as a special form of defensiveness and self-enhancing strategies. To narrow the review down, the review only includes research on posttraumatic growth and defensiveness. Humour as a special form of defensiveness and self-enhancing strategies are not within the focus of this review. This procedure appears to be useful for two reasons. First, inferences that are more precise can be made. Second, the focus of this thesis is on posttraumatic growth and defence styles. It is, therefore, also reasonable to use this focus as a guiding framework for the literature review.

### 2.1. Introduction

Even up until now, several researchers (e.g. Bitsch et al., 2011; Ford et al., 2008; Frazier et al., 2009; Frazier and Kaler, 2006; Hall et al., 2009; Hobfoll et al., 2007; McFarland and Buehler, 2012; McFarland and Alvaro, 2000; Wortman, 2004; Zoellner and Maercker, 2006) have questioned the validity of reports of posttraumatic growth. For example, reports of posttraumatic growth may sometimes represent cognitive manoeuvres (illusions) in order to cope with crisis (e.g. Ford et al. 2008; McFarland and Buehler, 2012; McFarland and Alvaro, 2000; Taylor, 1983).

One of the main aims of this thesis is to investigate whether reports of posttraumatic growth are, in fact, sometimes illusory. The particular focus will be on defence styles after Vaillant (1995) and, therefore, on defensiveness. Moreover, this thesis will examine whether low defensive reports of posttraumatic growth (real posttraumatic growth) and high defensive reports of posttraumatic growth (illusory posttraumatic growth) differ in their correlation with diverse well-being outcomes. In other words, the question under investigation is, among others, whether real posttraumatic growth and illusory

posttraumatic growth are two separate psychological phenomena. Existing research on this matter may help to answer those questions more concisely.

Therefore, in the subsequent section, the literature will be systematically reviewed concerning existing research on posttraumatic growth and defensiveness. Therefore, this systematic literature review attempts to find studies that have investigated the correlation between reports of posttraumatic growth and defensiveness. After bringing such studies to light, the results will be summarised and discussed. A systematic literature review is a well-recognised research method to make the review process systematic and transparent (Jesson, Matheson and Lacey, 2011; Bower, 2010). However, it should be borne in mind that this research method has its origins within the clinical realm (Jesson et al., 2011). This method often remains ambiguous within the social sciences, where concepts and theories are sometimes used in a more flexible way (Jesson et al., 2011).

**2.2. Method**

Within the following section, the method used for systematically reviewing the literature will be described. Jesson and colleagues (2011) suggest several guidelines when conducting a systematic literature review. These guidelines will be used throughout. Moreover, an article by Linley and Joseph (2004) is also used to guide the procedure of the systematic literature review.

The databases “Ingentaconnect”, “PILOTS” (Published International Literature on Traumatic Stress) and PubMed were systematically reviewed. These databases publish an array of national and international peer-reviewed articles around psychological and medical topics. Keywords entered were *posttraumatic growth, post-traumatic growth, stress-related growth, psychological growth, positive change following adversity and growth following adversity.* The keywords were searched within the abstract or the title. The exact search criteria were: "posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth" OR "psychological growth" OR "positive change following adversity" OR "growth following adversity".

The searching procedure consisted of three strategies. First, the databases listed above were searched for suitable articles. Second, the bibliography of included articles was scanned in order to detect further relevant

articles. This procedure was carried out until no further relevant articles could be found. Third, articles, which were known to the researcher or were recommended, were also eligible to be included into the literature review.

*Inclusion and Exclusion Criteria*

Inclusion and exclusion criteria were set in order to make a transparent and systematic decision for or against an article (Jesson et al., 2011).

Only quantitative and peer-reviewed journal articles were included in the systematic literature review. Moreover, only articles published in English were included into the review. In addition, articles were only included when they explicitly explored the relation between reports of posttraumatic growth and defensiveness.

Articles published before 1990 were excluded. In addition, grey literature and academic discussions, theses and presentations at conferences were excluded. Finally, duplicates were excluded from the systematic literature review.

The inclusion of articles followed a three-step procedure as suggested by Jesson et al. (2011). First, the title of identified articles was examined concerning possible inclusion criteria and exclusion criteria. If the article remained after the first screen, the abstract of the article was examined concerning its suitability. All articles that made it through the second screen were examined in depth. Hereupon the final decision for or against the inclusion of the article was made.

The results of included articles will be discussed within the subsequent section.

## 2.3. Results

### 2.3.1. Search results.

Within the initial search, 1532 articles were found by entering the keywords. However, only 28 articles were examined in depth because their abstract indicated potential suitability. Hereupon, 25 articles were excluded. Three articles were excluded because they did not explicitly examine defensiveness, only denial. Ten articles were excluded because they did not explicitly investigate the correlation between reports of posttraumatic growth and defensiveness but their primary focus has been on illusions, cognitive bias or

they investigated posttraumatic growth and defence mechanisms separately. One article was not published in English and two articles did not examine reports of posttraumatic growth, but rather motivation styles. Finally, nine articles were identified twice by the search engines and were, hereupon, excluded from the literature review. Following this examination, only three articles were included within the systematic literature review. Another four articles, which were known to the researcher, were included into the review. Seven articles were finally included in the literature review. Within the seven articles, ten studies investigated the correlation between reports of posttraumatic growth and defensive strategies.

### 2.3.2. Description of included articles.

To assess posttraumatic growth, six studies used measurements developed for measuring posttraumatic growth or adapted versions of those measurements (Posttraumatic Growth Inventory, Benefit Finding Scale, Silver Lining Questionnaire). One study investigated posttraumatic growth by a self-developed questionnaire (Cheng et al., 2006) and two studies examined posttraumatic growth by the Meaning in Life Scale (Davis and McKearney, 2003). Dohrenwend and colleagues (2004) examined posttraumatic growth or tertiary appraisal respectively by non-standardised reports of positive change.

Defensiveness was mainly inferred by group-differences under experimental conditions (N= 6). To infer defensiveness, three studies used either a measurement of social desirability (Cheng et al., 2006), negative out group attitudes (Hall et al., 2009) or the lie-scale from the Eysenck Personality Questionnaire (Sodergren, Hyland, Crawford and Partridge, 2004). Dohrenwend and colleagues (2004) tested whether posttraumatic growth is defensive denial by looking at the prevalence rate of current PTSD. It was hypothesised that reports of posttraumatic growth are defensive when veterans report high rates of posttraumatic growth and high importance of the event for their current life and when those veterans show at the same time the highest rates of current PTSD. None of the authors used scales specifically developed to measure defensiveness.

The reviewed research varies greatly concerning the study design and the theoretical assumptions used to infer defensiveness. For example, six

studies used experimental designs in order to infer defensiveness while three studies were cross-sectional. One study used a prospective study design. The latter four studies used diverse questionnaires to infer defensiveness. Therefore, the comparison and subsequent coherent conclusion is impeded. However, seven of ten studies (Cheng et al., 2006; Davis and McKearney, 2003; Hall et al., 2009; Luszczynska et al., 2012) concluded that posttraumatic growth may be sometimes a defensive operation or is sometimes correlated with defensiveness. One study (Dohrenwend et al., 2004) concluded that posttraumatic growth is usually not defensive in nature. Moreover, when reports of posttraumatic growth present defensive denial, they are rare and meaningless (ibid). In the same vein, Kastenmüller, Greitemeyer, Epp, Frey and Fischer (2012) suggest that reports of posttraumatic growth are not correlated with the use of defensive strategies. Finally, one study (Sodergren et al., 2004) could not find a significant correlation between reports of posttraumatic growth and defensiveness. However, the non-significant correlation showed a positive direction namely higher reports of posttraumatic growth were correlated with more defensiveness. The authors were, therefore, hesitant to reject the hypothesis that reports of posttraumatic growth are not correlated with defensiveness, as the power of the study was rather modest.

Several researchers investigate when reports of posttraumatic growth may be illusory and when they may be real. Cheng and colleagues (2006) suggested that reports of posttraumatic growth are real when negative change following adversity is also reported. Luszczynska and colleagues (2012) suggested within three studies that the development of real posttraumatic growth may depend on time elapsed since the trauma. Posttraumatic growth reported shortly after the trauma may be indicative for defensive posttraumatic growth. In contrast, reports of posttraumatic growth after a longer period since the occurrence of a trauma may be indicative of real posttraumatic growth. Particulars of the reviewed studies are listed in table 1.

Table 1. *Summary of the Systematic Literature Review*

| **Study** | **Event** | **N** | **Design** | **Measure Posttraumatic Growth (PTG)** | **Measure Defensiveness** | **Results** (Correlation between reports of posttraumatic growth and defensiveness) |
|---|---|---|---|---|---|---|
| Cheng, Wong and Tsang (2006) | Severe acute respiratory syndrome (SARS) | 197 | Prospective[a] | Self-developed scale to assess perceived benefits and costs | MCSDS | *Group 1* consisting of subjects who reported only positive change (r= .37; p=.01).<br>*Group 2* consisting of subjects who reported only negative change (r= -.31; p=.03).<br>*Group 3* consisting of subjects who reported a mixture of positive as well as negative change (non-significant).<br><br>It was concluded that reporting exclusively positive outcomes is correlated with defensiveness. |
| Davis and McKearney (2003) | Mortalitity salience manipulation | 46 | Experimental Design with control group | Adapted version of the MLS | To infer defensiveness the trauma-recall group was compared to the control group. | The trial group scored higher on the Meaning in Life scale than the control group (F (2.34) =2.74, p<.10).<br><br>The use of defences was inferred when reported meaning in life increased following mortality threat. |
| Davis and McKearney (2003) | Mortalitity salience and defending manipulation | 43 | Experimental Design with control group (after mortality reminder the control group was not allowed to defend their word view) | Adapted version of the MLS | Groups were compared to infer defensiveness | The Group allowed to defend their worldviews scored higher on the Meaning in Life scale than the group not allowed to defend their world views (F (1.39) =3.20; p<.05).<br><br>Higher reports of meaning in life were correlated with the possibility to defend one's worldviews. |
| Dohrenwend, Neria, Turner, Turse, Marshall, Lewis-Fernandez, | Theater veterans of the Vietnam War | 1183 | Secondary data use of cross-sectional survey (NVVRS) | Reported positive outcomes caused by the experience. | Defensive denial was inferred when current PTSD was most prevalent in veterans who reported mainly positive outcomes and | Current PTSD was not highest among veterans who reported mainly positive outcomes and who considered at the same time the experience as highly important. For example, veterans who reported mainly negative outcomes because of their experience and who considered this experience as still highly important were 10 times more likely to report current |

| **Study** | **Event** | **N** | **Design** | **Measure Posttraumatic Growth (PTG)** | **Measure Defensiveness** | **Results** (Correlation between reports of posttraumatic growth and defensiveness) |
|---|---|---|---|---|---|---|
| Koenen (2004) | | | | | considered the experience as highly important. | PTSD (OR= .10).<br>It was concluded that posttraumatic growth (tertiary appraisal) is usually not defensive denial. |
| Hall, Hobfoll, Canetti, Johnson and Galea (2009) | Terrorism | 1136 | Cross-sectional Survey | Adapted version of the PTGI | Defensiveness was inferred by negative outgroup attitudes towards Palestinian citizens. | Posttraumatic growth was correlated positively with exclusion ($r=.19$; $p<.01$) and threat perception ($r=.17$; $p<.01$).<br>It was concluded that posttraumatic growth may be a defensive strategy. |
| Luszczynska, Durawa, Dudzinska, Kwiatkowska, Knysz and Knoll | HIV Diagnosis | 80 | Experimental design with control group (mortality salience group vs. control group). | Adapted version of the PTGI | Defensiveness was inferred when group differences in reports of posttraumatic growth were explained by time elapsed since the trauma. | Time moderated significantly the correlation between group assignment (mortality salience group vs. control group) and reports of posttraumatic growth ($\beta=.25$, $p=.02$; $\triangle R^2=.06$, $p=.02$).<br>The mortality salience group recently diagnosed with HIV reported less PTG than the control group. The mortality salience group knowing their diagnoses for a longer period reported the same amount of PTG as the control group.<br><br>It was concluded that reports of PTG may be illusory when the traumatic experience has only been recently. |
| Luszczynska, Durawa, Dudzinska, Kwiatkowska, Knysz and Knoll (2012) | Breast cancer | 164 | Experimental design with control group (mortality salience group vs. control group). | Adapted version of the PTGI | Defensiveness was inferred when group differences in reports of posttraumatic growth were explained by time elapsed since the trauma. | Time moderated the correlation between group assignment (mortality salience group vs. control group) and reports of posttraumatic growth ($\beta=.23$, $p=.02$; $\triangle R^2=.03$, $p=.02$). The mortality salience group recently diagnosed with breast cancer reported less PTG than the control group. The mortality salience group knowing their diagnoses for a longer period reported the same amount of PTG as the control group.<br><br>It was concluded that reports of PTG may be illusory when the traumatic experience has only been recently. |

| **Study** | **Event** | **N** | **Design** | **Measure Posttraumatic Growth (PTG)** | **Measure Defensiveness** | **Results** (Correlation between reports of posttraumatic growth and defensiveness) |
|---|---|---|---|---|---|---|
| | | | | | | |
| Luszczynska, Durawa, Dudzinska, Kwiatkowska, Knysz and Knoll (2012) | Caregivers of family members with Huntington disease | 50 | Experimental design with control group (mortality salience group vs. control group). | Adapted version of the BFS | Defensiveness was inferred when group differences in reports of posttraumatic growth were explained by time elapsed since the trauma. | Time moderated the correlation between group assignment (mortality salience group vs. control group) and reports of posttraumatic growth ($\beta$=.36, p=.04; $\triangle R^2$=.08, p=.04). The mortality salience group recently diagnosed reported less PTG than the control group. The mortality salience group knowing the diagnoses for a longer period of time reported the same amount of PTG as the control group.<br><br>It was concluded that reports of PTG may be illusory when the traumatic experience has only be recently. |
| Sodergren, Hyland, Crawford and Partridge (2004) | Respiratory outpatients | 194 | Cross-sectional survey | SLQ | The lie-scale of the (EPQ-R) – Short Scale | Reports of posttraumatic growth were correlated with defensiveness. However, the correlation was not significant (r=.10; p>.05).<br>Although not significant, a small correlation between reports of posttraumatic growth and defensiveness has been found. The authors were, therefore, hesitant to infer that reports of posttraumatic growth are not correlated with defensiveness. |
| Kastenmüller, Greitemeyer, Epp, Frey, Fischer (2012) | Mortality salience manipulation | 33 within each group | Experimental design with trauma recall group and control group (recalled stressful event) | PTGI | Defensiveness were inferred when trauma and reports of posttraumatic growth were mediated by death-related thoughts. | No significant correlation between death-related thoughts and reports of posttraumatic growth could be found (rs<.18, ps>.16).<br><br>It was concluded that reports of posttraumatic growth are not caused by defensiveness. |

*Note.* PTGI= Posttraumatic Growth Inventory (Calhoun & Tedeschi, 1996); MLS= Meaning in Life Scale (Thompson and Pitts, 1993); BFS= Benefit Finding Scale (Antoni et al., 2001); SLQ= Silver Lining Questionnaire (Sodergren and Hyland, 2000); MCSDS= Marlowe Crowne Social Desirability Scale (Crowne and Marlowe, 1960); EPQ-R – Short Scale= The Eysenck Personality Questionnaire - Revised – Short Scale (Eysenck, Eysenck and Barrett, 1985).

[a] At 4-6 weeks follow-up.

**2.4. Discussion**

Seven out of ten studies significantly indicate that self-reported posttraumatic growth is sometimes correlated with defensiveness. However, a coherent summary of the reviewed studies is impeded by diverging research designs and theoretical assumptions. For example, all non-experimental studies infer defensiveness through measurements which were not uniquely constructed for measuring defensiveness (N= 4).

Moreover, the experimental studies used different theoretical assumptions to infer defensiveness. Davis and McKearney (2003) assume that people reminded of their mortality would use defensive strategies to ward off death anxiety. If constructing meaning were a defensive operation subjects assigned to the trial group would report more meaning in life than subjects within the control group would. This assumption was supported within their studies. Hence, they concluded increased levels of meaning following a death threat might be defensive.

In contrast, Luszczynska and colleagues (2012) suggest that people who have recently experienced a trauma fail to use healthy defence mechanisms and respond to mortality reminders in unusual ways. Instead of reporting increased levels of posttraumatic growth, they will instead report decreased levels of posttraumatic growth. The decrease of posttraumatic growth was interpreted as a disruption of defensiveness as assumed to occur within PTSD. However, a disruption of defensiveness was also interpreted as defensiveness. Although their hypothesis was supported by three studies, the study design was constructed in such a way that posttraumatic growth could only be considered as defensive, no matter what result. In other words, whether posttraumatic growth is defensive or real was never tested but it was assumed that posttraumatic growth is in any case defensive.

Kastenmüller and colleagues (2012) infer defensiveness following mortality salience by not increased reports of posttraumatic growth alone. They hypothesise that reports of posttraumatic growth are defensive when the correlation between the recall of a traumatic event and reports of posttraumatic

growth are mediated by death-related thoughts. The study suggests that reports of posttraumatic growth are not defensive.

In total, none of the reviewed studies used a well-established scale to measure defensiveness. This situation makes the interpretation of results difficult. For example, Davis and McKearney (2003) assume that reports of posttraumatic growth are defensive when the mortality salience group reports higher posttraumatic growth than the control group. However, this assumption also fits into theories of real posttraumatic growth (Joseph, personal communication, February 11, 2014), which suggest that positive change develops because of the awareness of shattered assumptions. The awareness of shattered assumptions is probably higher when one is reminded on one's mortality.

The previous studies remain ambiguous because none of the studies use a measurement explicitly developed for evaluating defence mechanisms and their functionality. Therefore, the results remain to some degree imprecise and could be sometimes easily interpreted in the opposite way. In contrast, using a measurement explicitly designed for measuring defensiveness and their functionality may be useful to examine the correlation between reports of posttraumatic growth and defensiveness. Moreover, such a measurement may also be able to separate real posttraumatic growth from illusory reports of posttraumatic growth.

Therefore, within this thesis, defensiveness is measured by the Defense Style Questionnaire-40 (DSQ-40). The DSQ-40 may be especially useful to investigate the correlation between reports of posttraumatic growth and defence mechanisms. Moreover, one could attempt to separate real posttraumatic growth from illusory posttraumatic growth by using the DSQ-40. Finally, by using the DSQ-40 one does not rely on changes following mortality threat which make a differentiation between real posttraumatic growth and illusory posttraumatic growth unreliable and ambiguous. In contrast, the DSQ-40 differentiates between behaviours, which facilitate coping and accommodation and between behaviours, which impede accommodation processes. This makes a separation between real posttraumatic growth and illusory posttraumatic growth less ambiguous. Moreover, the DSQ-40 appears to be a useful instrument in order to perform

moderation analyses, which may help to differentiate between illusory posttraumatic growth and real posttraumatic growth.

In summary, no study investigates the correlation between defence mechanisms and self-reported posttraumatic growth with two well-established questionnaires. Moreover, to my knowledge, no study has attempted to separate real from illusory posttraumatic growth by using the DSQ-40. This thesis attempts to fill the existing gap.

The next chapter will discuss the methodological approach of this thesis. This discussion should enable the reader to evaluate the research undertaken. Here, the philosophical approach will be illustrated and the research design used throughout this thesis will be critically discussed. Finally, potential ethical issues of the research are examined and procedures used to minimise the latter are illustrated.

# 3. Methodology

The following chapter describes the methodology used to examine self-reported posttraumatic growth and its correlation with illusions especially with defence mechanisms. Having described the object of the research in the literature review, it is important to illustrate the various ways in which knowledge about the object is gained. In research, knowledge is gained using certain methods. Different methods gain different knowledge and often interpret information in a different way because a different perspective was used (Hobmair, 1992). Therefore, the purpose of the chapter is to state the methods used and to allow, in this way, the reader to evaluate the results presented within this thesis. First, the philosophical approach is illustrated. This approach will direct how knowledge is gained and will guide the interpretation of data. Second, the study design used throughout the thesis will be critically examined. Finally, ethical issues and considerations concerning the research conducted will be discussed.

## 3.1 Methodological Approach

### 3.1.1. Philosophical view.

The methodological framework of critical rationalism will guide the thesis. Critical rationalism is an "epistemological" approach, or better yet a counter epistemological approach founded by Popper (2000). Popper (2000, p.26) suggests that all "knowledge is guesswork, opinion – doxa rather than episteme". By taking this approach, a researcher usually consciously knows that their knowledge is not fixed and not handed down by a divine god, tradition or a divine self but is rather an attempt to capture an approximation of truth or an idea which may or may not survive over time (Popper, 2000).

The word "critical" refers to the belief that knowledge can only grow in discourse and while being critical towards others and oneself (ibid). Therefore, reasoning, intuition and observation are not the optimum to gain knowledge (ibid). Through his work, Popper intended, among others, to reduce scientific bias and its potential implications. To avoid scientific bias he criticised the induction principle. Popper (ibid) argues that possessing certain knowledge based on observations is

not possible. However, hypotheses are refutable by observations, which contradict the former. That means the researcher is urged to construct a test in such a way that the hypotheses could be destroyed by empirical reality. In other words, theories and hypotheses need to be testable and refutable.

Therefore, although hypotheses are never verifiable, they are refutable. However, the falsification principle, too, has its limitations as Kuhn has pointed out (Shadish, Cook and Campbell, 2002). The falsification of a theory depends on the validity of the measurement and on an ideal test design. Both presumptions are never accomplished in social science (ibid). Although this objection against the falsification principle is valid, it is, nevertheless, possible to test theories although re-specifications of those theories may be often more useful than their total refutation (Shadish et al., 2002).

In total, the author takes a skeptical approach towards the verification principle and attempts to construct tests, which are able to reject hypotheses proposed before conducting the test.

Finally, this thesis should not be read with a clinical lens but rather with a lens interested in individual differences of coping. This thesis does not try to focus on a clinical framework and possible implications but attempts to describe the concept and nature of real posttraumatic growth. However, real posttraumatic growth can only be described when differentiated from illusory posttraumatic growth. A clinical framework could be considered as an almost arbitrary view on individual differences (cf. Joseph, 2009). This statement does not mean that some people feel unbearable suffering and that help should be available (cf. Joseph, 2011). Instead it means that suffering and diverging individual responses from a defined norm are considered differently throughout history (Joseph, 2009) and cultures (Joseph, 2011). Whether a clinical point of view is the most useful approach can be doubted. Until now, a clinical point of view usually bears the risk for devaluation, stigmatisation and discrimination of “otherness”. Moreover, this research attempts to explore a construct in a rather abstract way. This procedure may enable the researcher to investigate reports of posttraumatic growth in more detail by artificially simplifying reality. However, applying such abstractions to

real life settings such as clinical work by dismissing such abstractions as oversimplifications and probability statements has the potential to do more harm than good.

Having illustrated the philosophical approach, the next section will critically discuss the research method and research design used.

### 3.1.2. Research method and research design.

#### *3.1.2.1. Research method.*

The philosophical approach taken within this thesis leaves room for both main scientific methodologies, namely quantitative and qualitative methods. Within the thesis, only quantitative methods are used. This decision is based only on practical considerations such as the aim of the thesis and time management. All these listed practical considerations initiated doubts about the feasibility of qualitative research within the thesis.

It could be argued that basing a thesis only on quantitative methods misses the point of a psychological investigation, namely the person in their complexity. This view has been taken by, for example, Yalom (1980) and Frankl (1974) cited in Yalom (1980). Both psychotherapists argue that a person is more than the composition of their parts (Yalom, 1980). This principle is true when interacting with other people such as in relationship work or in therapy. However, the aim of this thesis is not to study the wholeness of an individual, but rather to study and to describe tendencies of a construct detached from the individual. In other words, the nature of a construct is attempted to be explained by examining its correlation to other constructs. Durkheim (1983) described this approach as creation of a fact. Although Durkheim (1983) explicitly used this method to examine the social world, the methodological principle may also be applicable for psychological investigations. In contrast to the sociological method, one would not create a social fact but a psychological fact. However, the word “fact” may be easily misunderstood. It is not assumed that social and psychological facts are set in stone. They may be better conceptualised as trends and tendencies, which change their direction and implications as soon as the context is changing.

In total, if one detaches a concept from the individual by investigating a group of people in which the concept occurs, one creates, through accumulation, a new "soft" fact (ibid). Through this procedure, one could be able to describe the characteristic nature of a concept and its implications by a trend to a given time and in a given sample. Therefore, this method cannot be used to infer implication for a unique person placed within a unique social situation as indeed a person is more than the sum of their parts. However, one could use this knowledge to make probability statements. In other words, the method used within this thesis shows only trends within a certain time and within a certain sample. These trends may change if, for example, the context changes.

Thus, the concept of posttraumatic growth introduced within the thesis reflects characteristics by trend drawn from a certain sample to a certain time. Social research is often more a snapshot into the past, and all tendencies discovered could change as soon as, for example, significant circumstances change. Therefore, inferences to other samples such as clinical populations cannot be drawn. Moreover, no inferences can be drawn for the individual since the methodology detaches the concept from the person and explores the concept within a sample. All results listed reflect only probability statements. One is doing this so called ecological fallacy when one transfers conclusions drawn from a sample to an individual within the sample (Miles, 2012).

However, this method is useful in research when one attempts to describe a construct and not humans in their wholeness. Therefore, the thesis does not attempt to understand the whole complexity of an individual but instead attempts to explore a construct, which occurs within people. Here, the use of quantitative methods does not contradict the assumption that people are more than the sum of their parts. Moreover, if one attempts to study a construct within a certain framework, the view on the whole is not helpful and may even hinder its examination. Besides, one may be doubtful about the attempt to understand a person in their full complexity as this could be rather unfeasible.

Moreover, and somehow similar to the former, several researchers could argue that the question whether posttraumatic growth is real or not is not relevant,

as the subjective experience is most important. However, within this thesis a different stance is taken. It attempts to explore the nature of real posttraumatic growth and its correlation with well-being. Therefore, the thesis does not focus on the subjective experience. This does not mean that the author negates the importance of subjective experiences. What it does mean is that the research aim focuses on real change, which is not only perceived but has taken place. Park and Helgeson (2006, p.794) argued: "Whether one is interested in perceived growth or actual growth depends on the research question being posed. (…) if researchers want to understand the processes through which some individuals enhance their resources to help them cope with subsequent life stressors, then a focus on veridical [real] growth may be in order".

Having discussed the research paradigm used within this thesis, the next section focuses on research designs that will be applied. Those research designs will be critically discussed by comparing them to other potential research designs.

#### *3.1.2.2. Research design.*

The research design involves several decisions namely when and how often data are gathered, what measurements will be included, how the data will be collected, where the data will be gathered and from whom the data will be collected (Breakwell, Wright and Smith, 2012). Different research designs produce potentially different results and knowledge (Hobmair, 1992). In addition, some research designs may be more appropriate to answer certain research questions than others (Breakwell et al., 2012; Diekmann, 2002). Within the next section, decisions for or against particular research designs are critically discussed. This discussion will involve a comparison to other potential research designs concerning theoretical considerations and their practical feasibility. Statistical methods and measurements used will not be discussed within this section but within the appropriate chapters where those methods are used.

First, a cross-sectional research design is used throughout the thesis. This study design has several disadvantages when compared to a longitudinal study design. First, changes over time cannot be observed when using a cross-sectional

research design (Lazarus, 2003; Diekmann, 2002). Thus, by using a cross-sectional design it cannot be investigated whether the correlation between real posttraumatic growth and illusory posttraumatic growth changes with time. However, the aim of the study was not to examine change over time but to explore in a rather general way whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with well-being. For this purpose, a cross-sectional design is sufficient (Diekmann, 2002).

Furthermore, several researchers (e.g. Lazarus, 2003) suggest that by using a longitudinal research design, causal inferences can be made. Therefore, by using a cross-sectional study design, it is not possible to investigate whether the state of well-being caused illusory posttraumatic growth and real posttraumatic growth, or whether the reverse holds true. Although interesting, the main aim of the thesis is to explore how diverse concepts correlate with each other and whether real posttraumatic growth and illusory posttraumatic growth could differ in their correlation with well-being. The latter is especially not yet well established and studies that explore this possibility from diverse angles are needed. Examining the causal direction might be the next step.

Within this thesis, it was examined whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with well-being. To investigate this research question, a prospective study design has usually been used as, for example, by Frazier and colleagues (2009) and Gunty and colleagues (2011). However, those research designs are often expensive, time consuming, unpredictable and require special knowledge (cf. Frazier et al., 2009; Gunty et al., 2011; Lehman et al., 1993). Moreover, prospective research designs are also often questionable due to inaccuracies caused by various factors, which often cannot be controlled by the researcher. For instance, it is complicated to ensure that measured real posttraumatic growth as, for example, by Frazier and colleagues (2009) is in fact caused by the struggle with the trauma and not by other factors. In addition, most of the participants who take part within the first measurement will, fortunately, not experience a trauma until the second measurement. This means

that a large sample is required at baseline in order to ensure sufficient statistical power. It was expected that this high number of participants could not be ensured.

Moreover, Frazier and colleagues (2009) and Gunty and colleagues (2011) defined actual posttraumatic growth and illusory posttraumatic growth differently than it is defined within this thesis. Frazier and colleagues' (2009) and Gunty and colleagues' (2011) assumptions on real posttraumatic growth are based on the research design. Within this thesis, the assumptions on real posttraumatic growth and illusory posttraumatic growth are theory based. Therefore, the definitions and conceptualisation used within the thesis allow investigating the correlation between well-being and real posttraumatic growth and illusory posttraumatic growth within a cross-sectional design. It was concluded that cross-sectional research designs could be a useful approach for answering the research questions. The main advantage of this choice not yet discussed was, however, that a series of cross-sectional studies were assumed to broaden the horizon of the overall research. In other words, it was possible to explore how real posttraumatic growth and illusory posttraumatic growth, as defined within the thesis, correlate to diverse aspects of well-being. This broad view would not have been accomplished if a time intensive study design, such as a prospective study design, would have been used. Calhoun and Tedeschi (2009), who suggest using a cross-sectional research design if studies explore new ideas and correlations between variables, also express the latter assumption.

Throughout this thesis, the sample was recruited conveniently. This sampling procedure is often considered as a cheap method (Coolican, 1998). Using a random sampling method is usually considered the gold standard in research (Schnell et al., 1992; Shadish et al., 2002). However "everyone knows it is extremely hard to get balanced samples and virtually impossible to obtain random ones" (Coolican, 1998, p.721). Moreover, the research within the thesis explores and test hypotheses mainly by using correlation statistics and not prevalence rates. As Heiervang and Goodman (2011, p.70) point out, "(…) selection bias is much more likely to affect point estimates such as prevalence than patterns of association". Therefore, reduced representativeness and potential selection bias

may not substantially reduce the value of this research (cf. Butler et al., 2002; Heiervang and Goodman, 2011).

As mentioned above, the results of studies using convenient sampling may resemble results of studies with more advanced sampling methods (Burnett, 2009). Moreover, convenient sampling is a quick way to find participants. This particular feature of sampling may be especially useful when one investigates a certain group that is not easily to access. However, it cannot be excluded that this sampling method does not introduce significant sampling bias (ibid). Here, to report the sampling method may be an important quality standard (Coolican, 1998). This was done throughout the thesis.

Moreover, the sampling frame was described in all studies explicitly. Except for one study, all participants must have experienced a trauma. With the exception of one study, all studies used a university sample. Here, students mainly made up the sample. The decision was based on availability. Moreover, Frazier and colleagues (2009, pp. 913) suggested that " undergraduate students (…) are at the peak age for trauma exposure".

Throughout this thesis, the data were gathered through self-administered surveys. Surveys are a common method to gain insight into correlations of variables and to explain some psychological constructs (cf. Burnett, 2009; Rossi, Wright and Anderson, 1996). Although this data gathering method is not able to illuminate deep insights, it still has several advantages. As pointed out by Czaja and Blair (1996) and Rossi and colleagues (1983), surveys are efficient tools to test hypotheses. The use of surveys appeared, therefore, reasonable since testing hypotheses was one aim within the thesis. Moreover, surveys examine a question in a standardised and systematic way (Rossi et al., 1983). These circumstances make the gained results more reliable and valid (ibid). In the same vein, the results are more transparent and comparisons to other studies can often easily be drawn. Those listed advantages made the use of surveys reasonable.

Finally, two studies within the thesis were internet surveys. Since 1998, online surveys are considered as promising alternative to more conservative survey modes (Chang and Krosnick, 2009). Since then, online surveys became a

widespread tool that was used, among others, to investigate posttraumatic growth by, for example, Butler and colleagues (2005), Joseph, Maltby, Wood, Stockton, Hunt and Regel (2012b) and Stockton, Hunt and Joseph (2011). The advantages of doing internet surveys are wide-ranging. First, internet surveys do not rely on geographical areas (Evans and Mathur, 2005; Musch and Reips, 2000; Reips, 2000). Moreover, internet surveys are time and cost efficient (e.g. Bhaskaran and LeClaire, 2010; Fife-Schaw (2012); Krantz and Dalal, 2000). Finally, internet survey are able to reduce missing values substantially (Evans and Mathur, 2005; Fife-Shaw, 2012). All these advantages make the use of internet-surveys reasonable.

### 3.2. Ethical Issues

All studies conducted within this thesis gained ethical approval by the Research Ethics Committee in the School of Sociology and Social Policy or in the School of Education of the University of Nottingham. All participants who were included in data analysis gave their informed written consent. Moreover, it was made clear to the subjects that their participation was voluntarily and that they could withdraw from their consent at any time. Moreover, the participants were informed that their data given would be anonymised and treated confidentially. The ethical conduct of the research was in accordance with the "ESRC Framework for Research Ethics" (2012), with the "Code of Research Conduct and Research Ethics" of the University of Nottingham (2013) and with the Data Protection Act 1998.

In general, no study conducted within the thesis raised major ethical concerns. However, three minor ethical issues were considered and analysed. First, the participants approached were trauma survivors. Although having experienced a trauma cannot be equalised with being vulnerable per se it cannot be excluded that some respondents were especially vulnerable. Although, for example, Butler and colleagues (2002) point out that answering questions about traumatic events may even have a therapeutic effect, it cannot be excluded that people become emotionally affected through answering the questions.

However, the chosen methodology that consists of fully structured questionnaires imposes at the very most a minor risk for the participants. Furthermore, it was made clear to the participants that they have control about their participation and that they can withdraw at any time. All university samples received details of the counseling service of the University of Nottingham, which has been included within the introduction pages of the survey.

By doing research on trauma, one cannot exclude the possibility that respondents talk about crimes they have experienced. Here the researcher needs, nevertheless, to respect the privacy, anonymity and the right of self-determination of the respondents, except for those cases who explicitly indicate otherwise or respondents who fall under the exceptions, which were stated in the consent, form.

Within this thesis, internet surveys were conducted. Every mode of research has its own ethical standards, issues and problems, which have to be acknowledged by the researcher who is working with a certain method. Internet research imposes additional threats for the right of privacy and anonymity of the respondents. To reduce the threat of violation of privacy the researcher avoided to forward spam mails. Cho and Larose (1999) argue that this risk can be reduced by contacting the web-moderator and asking for permission to forward the survey invitations. Therefore, web-moderators or other responsible persons of a department/organization were contacted first and asked for their support and permission to forward email invitations. Furthermore, no more than two reminder emails were forwarded to respect the privacy of the potential participants. To ensure the anonymity of the participants no cookies were used in the online survey and data were encrypted. Moreover, participants were not required to disclose any personal data. However, participants who were interested in the results of the study submitted their email address.

Finally, the methodology of an internet-survey does not allow the researcher to make sure that the respondents receive a copy of their consent form. However, respondents were urged to read the consent form carefully before they enter the actual survey. Furthermore, the respondents had actively to agree to the consent form by ticking “Yes”. Moreover, the respondents were urged to print

their consent form. Internet-surveys have the advantage for the respondents that the pressure to complete the survey is very low and withdrawing needs only a mouse click. Finally, to take part in the survey, participants need to answer the invitation email. By answering to this email, the participants have already made a conscious decision in which they consider to take part in the survey.

Having grounded this thesis within a theoretical framework, the following chapters will describe and discuss the research conducted. Within the next chapter, it will be investigated which forms of illusions could be described as adaptive and which forms of illusions could have the potential to affect negatively psychological functioning. This study was also used to validate the theoretical assumptions (see section 1.3) about the positive and negative effect of certain illusions. The results were used in order to guide the researcher on an empirical basis how to evaluate certain illusions and, therefore, the results of subsequent studies.

## 4. Illusions and their correlation with Emotional Dysregulation: A Student Survey

Within section 1.3, it was suggested that some illusions may be adaptive and some illusions may have the potential to be maladaptive in the long-term for the well-being of a person. Adaptive illusions were categorised as positive illusions after Taylor (1989/ 1983). In contrast, illusions that were suggested to be potentially maladaptive for the well-being of a person were termed negative illusions. This theory on illusions was used in order to speculate when reports of posttraumatic growth are more or less adaptive or maladaptive. However, the assumptions need to be tested. Therefore, the subsequent study investigates whether illusions defined by defence mechanisms, the defence mechanism of humour and self-enhancement differ in their correlation with emotional regulation capacities.

Emotional regulation capacities may be especially correlated with adaptive and potentially maladaptive defence mechanisms (Vaillant, 1995). Moreover, emotional regulation may be one important factor in the development of posttraumatic growth (Wild and Paivio, 2003). Therefore, emotional regulation appeared to be a useful proxy to investigate what kind of illusions could be considered as adaptive and what kind of illusions could be considered as potentially maladaptive. Moreover, inter-correlations were inspected as well in order to validate the results about potential adaptive illusions and potential maladaptive illusions.

The results will be used in order to guide the researcher, on an empirical basis, how to evaluate certain illusions and, therefore, the results of subsequent studies.

### 4.1. Introduction

Emotional regulation may be one important factor for trauma processing and for the development of posttraumatic growth (Wild and Paivio, 2003). Moreover, defence mechanisms are usually considered to be used, among others, to regulate emotions (Vaillant, 1995; Schore, 2003; Westen and Blagov, 2009).

Therefore, emotional regulation and emotional dysregulation may be a good proxy to evaluate illusions concerning their adaptive or potential maladaptive function.

However, emotional regulation is conceptualised differently by diverse researchers (Gratz and Roemer, 2004). The different evaluation of emotions could have influenced the diverging conceptualisation of emotional regulation. While some theorists are rather skeptical towards emotions or some emotions, other theorists emphasise the functional character of emotions (Strongman, 1996).

Therefore, two major perspectives on emotional regulation have emerged. Within the first perspective emotional regulation is characterised by "(…) the control of emotional experience and expression (especially the expressive control of negative emotions) and the reduction of emotional arousal" (Gratz and Roemer, 2004, p. 42). Less emphasis has been placed on controlling emotions within the second view because it considers emotions as rather adaptive (ibid). Here, the experience and awareness of emotions and not their inhibition is considered to be the basis for emotional regulation (Gratz and Roemer, 2004; Neumann, 2010; Wild and Paivio, 2003). Moreover, emotional regulation not only includes the experience of emotions but also the ability to respond to those emotions in a functional way (Neumann, 2010).

After Gratz and Roemer (2004, pp. 42-43), within this thesis, emotional regulation is defined as "(…) (a) awareness and understanding of emotions, (b) acceptance of emotions, (c) ability to control impulsive behaviors and behave in accordance with desired goals when experiencing negative emotions, (d) ability to use situational appropriate emotion regulation strategies flexibly to modulate emotional responses as desired in order to meet individual goals and situational demands. The relative absence of any or all of these abilities would indicate the presence of difficulties in emotion regulation, or emotion dysregulation".

Emotional regulation may sometimes be problematic for trauma survivors (Wild and Paivio, 2003). Therefore, strategies could be used to avoid the experience of overwhelming emotions (ibid). However, especially the capacity to experience negative emotions related to the trauma may be important for trauma

processing (Brewin et al., 1996; Wild and Paivio, 2003) and the development of posttraumatic growth (cf. Wild and Paivio, 2003).

As mentioned above, illusions may be used to regulate emotions. In the name of simplicity, within the thesis illusions were categorised into positive illusions and negative illusions. Within the thesis, illusions include the constructs of self-enhancing strategies after Taylor (1989/ 1989), defence styles after Vaillant (1995, 1995b) and the defence mechanism of humour. First, the constructs that make up positive illusions within the thesis will be discussed.

Self-enhancing strategies may fall under the category of positive illusions according to Taylor (1989/ 1983). Self-enhancing strategies will be measured by the dimensions of self-deceptive enhancement and impression management. Initially it was suggested that impression management is what constructs social desirable responding as a measurement bias (Paulhus, 1984). In contrast, self-deceptive enhancement was assumed to be used on an unconscious level or rather on an automatic level (ibid). However, nowadays the dimension of impression management is also seen as self-deception towards the social self or the self that is embedded in a social context and has absorbed certain social values and ideals (Paulhus and John, 1998). Both dimensions are used for self-enhancement (ibid). Self-deceptive enhancement exaggerates the importance and positive traits of an individual while impression management exaggerates the morality of an individual (ibid). Although self-deception is considered different from defensiveness Paulhus and John (1998) assume that self-deception is an ingredient of defensiveness. However, self-deception could behave differently than defensiveness concerning emotional regulation.

Furthermore, it was assumed that mature defences constitute a special case of positive illusions. Here, the person experiences internal and external reality, though in attenuated manner (Vaillant, 1995). Therefore, although mature defences may buffer a person from the whole strength of the experience it may be, nevertheless, accommodated (ibid). Within the thesis, it furthermore was suggested that positive humour styles (affiliative humour and self-enhancing humour) are mature defence mechanism. That positive humour may be related to

mature defensiveness is supported through a study by Erickson and Feldstein (2007). They examined whether certain humour styles are related to either mature or immature defence mechanisms measured by the Response Evaluation Measure. In their study consisting of 113 adolescents mature defences were positively correlated with self-enhancing and affiliative humour (positive humour). This could suggest that positive humour (affiliative and self-enhancing humour) could be categorised as a mature defence mechanism. Hence, positive humour (affiliative and self-enhancing humour) may help the person to accommodate their experience.

In contrast, it was suggested that negative illusions include potentially maladaptive defence mechanisms such as a neurotic defence style, an immature defence style and negative humour (aggressive humour and self-defeating humour). Neurotic and immature defences may hinder the experience of emotional conflict. If, in fact, emotional regulation depends on the experience of emotions, neurotic defences as well as immature defences could lead to emotional dysregulation. Therefore, those defence mechanisms are considered as rather maladaptive and a risk for psychological functioning (Andrews et al., 1993). Various studies indicated, for example, that an immature defence style is correlated with depression (Bond, 1992; Ryad, Sabry, El-Rakhaway and Abdo, 2009; Vaillant, 1992; Vaillant and Vaillant, 1992), anxiety (Andrews et al., 1993; Ryad et al., 2009), PTSD (Brodaty, Joffe, Luscombe and Thompson, 2004; Elklit and Blum, 2010), overall psychological distress (Nickel and Egleb, 2006), somatisation (Nickel and Egleb, 2006) and personality disorders (Bond, 1992; Vaillant, 1992). Furthermore, several studies suggest that a neurotic defence style is correlated with anxiety (Andrews et al., 1993; Schmidt Petersen and Elklit, 1998, Ryad et al., 2009). Negative humour (aggressive humour and self-defeating humour) was assumed to be a maladaptive defence mechanism that may hinder accommodation processes. The latter assumption was based on the study by Erickson and Feldstein (2007) which suggests that negative humour (aggressive humour and self-defeating humour) is correlated with immature defensiveness.

In summary, within the subsequent study, it will be investigated whether, in fact, positive illusions are correlated inversely with emotional dysregulation and whether negative illusions are correlated positively with emotional dysregulation. To validate the results, further inter-correlations will be inspected. The diverse positive illusions should correlate positively with each other. In the same vein, negative illusions should also correlate with each other. These investigations may allow categorising the diverse illusions concerning their adaptive or maladaptive nature in respect to posttraumatic growth. The results will be used in order to validate the theory suggested within section 1.3. Moreover, the research could be helpful to evaluate illusions on an empirical basis.

A study about how diverse illusions relate to each other has, according to research completed by the author, not been conducted elsewhere. Moreover, a new perspective is taken by investigating whether diverse forms of illusions correlate differently to emotional dysregulation. This perspective may allow making suggestions about the potential functionality of diverse illusions.

*Hypotheses and Aims*

Six hypotheses are proposed to investigate the function of illusions.

1. A mature defence style is negatively correlated with emotional dysregulation, negative humour styles and self-deception.
2. A mature defence style is positively correlated with positive humour styles.
3. A neurotic defence style and an immature defence style are positively correlated with emotional dysregulation, negative humour styles and self-deception.
4. A neurotic defence style and an immature defence style are inversely correlated with positive humour styles.
5. Self-deception is positively correlated with emotional dysregulation and a negative humour style.
6. Self-deception is inversely correlated with positive humour styles.

The hypotheses were tested using correlational statistics. In the next sections this study is described, presented and discussed.

**4.2. Procedure**

A questionnaire battery was created and submitted to the Ethics Board of the School of Sociology and Social Policy at the University of Nottingham. A sample information sheet and consent form can be found in appendix 12. In case further details are requested, all information sheets, consent forms, questionnaire batteries and ethical approvals are archived and can be obtained from the University of Nottingham. The Ethics Board approved the study in February 2013. The ethics form is partly attached within appendix 13. If more detail is requested, please see above. In addition, the School of Sociology and Social Policy stores the whole and complete ethic forms for six years.

One-hundred and sixteen participants were recruited. Data were collected between the 18/02/2013 and 08/03/2013. Students received information concerning the study and were asked to give their written informed consent as provided by the School of Sociology and Social Policy. The information provided by the participants was anonymised as soon as possible. Therefore, every participant received an identification number and the consent form with personal details was separated from the questionnaire battery. All personal data were not entered into SPSS but kept separately.

Following the anonymisation, the data were entered into SPSS twice as, for example, suggested by Carlucci and Wright (2012b). This procedure was chosen to avoid entering errors (ibid). Hereupon, data were checked for accuracy. First, as suggested by Loewenthal (1996), data were inspected for numbers that should not occur using a certain scale. Furthermore, the ID numbers were checked for mistakes. Hereupon, the second data entry was subtracted from the first data entry. Therefore a number above and below zero indicated a mismatch of the files and hence an entering mistake. Mistakes were corrected in the original two files. At the end, the whole procedure was repeated to find mistakes, which have been overseen at the first time.

### 4.3. Subjects

In total, 164 questionnaire batteries were conveniently distributed among students and members of the University of Nottingham[6]. Although it was attempted to gain only members of the University of Nottingham, a non-affiliation was not an exclusion criteria for analysing the data. 118 students returned the questionnaire package to the researcher. However, two participants (1.7%) were excluded in the aftermath because they did not reach the inclusion criteria. One participant did not tick the box of the consent form in which he/she states that he/she agrees to take part in the study. The other person did only complete about 6% of the questionnaire package. This fact made useful interpretation of his/her data impossible. One-hundred and sixteen participants were included for the data analysis. The total response rate of this study was 44.4%.

### 4.4. Measures

To answer the research questions, four self-report questionnaires were used. These questionnaires are listed and discussed below. Special focus will be on the Defense Style Questionnaire-40, as it is used throughout this thesis to differentiate real from illusory posttraumatic growth.

#### 4.4.1. The Defense Style Questionnaire-40 (DSQ-40) (Andrews and colleagues, 1993).

Although the concept of defence mechanisms is widely accepted, they are hard to measure on an empirical basis (Vaillant, 1995). One possible way to measure unconscious processes is the use of projective techniques. However, those tests are often not reliable (Rust, 2012; Clark, 1998) and their validity can be doubted (Clark, 1998). A further possible way to measure unconscious processes is to observe contradictions between emotions, oral expressions and physiological reactions. This procedure is theoretically founded and widely used by, for example, Bonanno and colleagues (1995), Shedler, Mayman and Manis (1993) as

[6] The justification of why convenient sampling was conducted and why students were invited to take part in the study is given in section 3.1.2.

well as Weinberger, Schwartz and Davidson (1979). However, this procedure demands certain technical devices and special knowledge and access to use those devices.

Various researchers started the attempt to make the concept of defence mechanisms measurable via self-report questionnaires (e.g. Andrews et al., 1993). Existing self-report questionnaires are, for example, the Defence Style Questionnaire, the Defense Mechanisms Inventory and the Coping and Defending Scales (Davidson and McGregor, 1998). For a more comprehensive list, see Davidson and McGregor (1998). These researchers developed self-report measurements by assessing certain forms of behaviour indicative of certain defence mechanisms. In other words, the term "defensiveness" and all specific forms of defence mechanisms such as sublimation are metaphors used by Freud to describe a certain set of behaviours (cf. Vaillant, 1995). Within self-report questionnaires, those specific forms of behaviours indicative of certain defence mechanisms are measured (Andrews et al., 1993). In other words, the abstract metaphor was converted to its origin. Hence, the measured behaviour is associated with certain positive or negative mental states.

Within the thesis the Defense Style Questionnaire-40 is used in order to assess indicators for the use of defence mechanisms. This Questionnaire has been chosen because it differentiates between mature, neurotic and immature defences. It is, therefore, possible to differentiate between behaviour that is regarded usually as adaptive and behaviour which is regarded as more maladaptive. The Defense Style Questionnaire-40 suggests, therefore, a hierarchy of defence mechanisms.

#### *4.4.1.1. The hierarchy of defence mechanisms.*

That some forms of defensiveness could be adaptive in order to process trauma and to deal with stress while other forms may hinder such processing is suggested by several researchers such as Horowitz and colleagues (1995) and Vaillant (1995). Defence mechanisms are activated when a person experiences overwhelming stress in order to stabilize the ego (Freud, 2006; Vaillant, 1995). Horowitz and colleagues (1995) suggest, for example, three forms of controls

and/or defence mechanisms. Horowitz is reluctant to use the words "defence mechanisms" and uses instead the word "controls," however, they resemble neatly defence mechanisms. He differentiates between adaptive and maladaptive dis-regulative controls. Adaptive defences are described as flexible, reality and fantasy based so that assessment and future planning is possible (ibid). Maladaptive defences, in contrast, are used rigidly and the fantasy mode cannot be switched off so that an assessment of reality is impaired (ibid). The consequence could be that an individual is not able to plan or an individual is not able to use short-term strategies and only sees the long-term perspective. Horowitz (1985) and Horowitz and colleagues (1995) suggest that an overuse of control could hinder cognitive processing.

In addition, Vaillant (1995) suggests that defence mechanisms may differ in their functionality concerning their value for continuous personal development. He clustered defence mechanisms in four defence styles namely a mature style, a neurotic defence style, an immature defence style and a psychotic defence style. Hereupon, Andrews and colleagues (1993) developed a self-report measurement, which incorporates three defence styles, namely a mature defence style, a neurotic defence style and an immature defence style. Mature defence mechanisms are considered as adaptive and like "white blood cells" serving the individual to deal with stress, to heal a wounded ego and to facilitate personal development (Vaillant, 1995). They ward off threatening information and/or emotions from their full and frightening awareness (Kwon, 2002), although the individual experiences at the same time internal and external reality (Vaillant, 1995). Therefore, they enable the person who is using them to manage their emotions constructively and to turn towards the external world (cf. Bond, Gardner, Christian and Sigal, 1983). This could enable the person to change their external and internal world for the better.

Neurotic defences are considered as more adaptive than immature defences but less adaptive than mature defences (Vaillant, 1995). Furthermore, neurotic defences do not distort external reality but internal reality (Vaillant, 1995).

Therefore, certain internal ideas, feelings or desires could be distorted and the person who is using them could not be aware of it.

Immature defences appear to be linked with a reduced capability of psychological functioning as well as with personality disorders and depression (e.g. Vaillant, 1992; Vaillant and Vaillant, 1992; Bond, 1992). The reason for this assumed counterproductive side of immature defences is that they are considered as distorting of or escaping from reality in an unhealthy way (e.g. Kwon, 2002; cf. Vaillant, 1992). Kwon (2002) argues that a person who displays them is often not capable to process the perceived reality in a helpful and an adaptive way.
The assumption that defence mechanisms have hierarchical character concerning their functionality is the theoretical baseline of the DSQ-40 that is used throughout the thesis.

#### *4.4.1.2. The validity of the Defense Style Questionnaire-40.*

The Defense Style Questionnaire-40 is a self-report questionnaire assessing behavioural derivates of unconscious processes (Andrews et al., 1993). Therefore, not unconscious processes are measured per se but their behavioural expression.

Andrews and colleagues (1993) generated this self-report measurement as an attempt to make the previous scale, DSQ-72, more reliable. The DSQ-40 is a nine-point Likert scale, which contains 40 items that assess 20 defence mechanisms and three defence styles, namely, a mature defence style, a neurotic defence style and an immature defence style. The DSQ-40 separates, therefore, defence mechanisms according to their level of maturity. The scores of the three defence styles range between one and nine. For example, suppression is categorised as a mature defence mechanism and is measured by the following item: (3) “I’m able to keep a problem out of my mind until I have time to deal with it”. Pseudo-altruism[7] is categorised as a neurotic defence mechanism and is, for example, measured by the following item: (1) “I get satisfaction from helping others and if this were taken away from me I would get depressed”.

[7] Pseudo-altruism should not be confused with altruism. Altruism is usually conceptualised as mature defence mechanism (Vaillant, 1995).

Rationalisation is categorised as an immature defence mechanism and is measured, for example, by the following item: (6) I am able to find good reasons for everything I do".

Within table 2 the three defence styles of the DSQ-40 are listed together with corresponding defence mechanisms. This table should allow the reader to evaluate the DSQ-40 and its hierarchy of defence mechanisms.

Table 2. *Defence Styles and appertaining Defence Mechanisms*

| **Mature Defence Style** | **Neurotic Defence Style** | **Immature Defence Style** |
|---|---|---|
| 1. Sublimation | | |
| 2. Humour | | |
| 3. Anticipation | | |
| 4. Suppression | | |
| | 5. Undoing | |
| | 6. Pseudo-altruism | |
| | 7. Idealisation | |
| | 8. Reaction formation | |
| | | 9. Projection |
| | | 10. Passive aggression |
| | | 11. Acting out |
| | | 12. Isolation |
| | | 13. Devaluation |
| | | 14. Fantasy |
| | | 15. Denial |
| | | 17. Dissociation |
| | | 18. Splitting |
| | | 19. Rationalisation |
| | | 20. Somatisation |

The DSQ-40 is used widely but shows some problems concerning item consistency (internal reliability). Andrews and colleagues (1993) reported an internal reliability for mature defences of $\alpha$=0.68 and for neurotic defences of $\alpha$=0.58. The internal reliability for immature defences was satisfactory with an $\alpha$ of 0.80. Therefore, the internal reliabilities of mature defences and neurotic defences are only moderate to unsatisfactory. However, the DSQ-40 shows satisfactory to very good test-retest reliability (Andrews et al., 1993).

Furthermore, although some researchers suggested that the DSQ-40 could be conceptualised, one-dimensional (Trijsburg, Spijker, Van, Hesselink and Duivenvoorden, 2000) the factor structure is mainly supported by research (Andrews et al., 1993; Blaya et al., 2007; Maltby and Day, 2004; Ryad et al, 2009). However, two studies (Hayasshi, Miyake and Minakawa, 2004; Schauenburg, Willenborg, Sammet, Johannes and Ehrenthal, 2007) found that the item-loadings diverged to a critical degree from the initial suggestions made by Andrews and colleagues (1993). However, the construct validity of the DSQ-40 appears to be satisfactory (Andrews et al., 1993; Blaya et al., 2006; Ryad et al. 2009). Nevertheless, the DSQ-40 has minor to moderate problems concerning its content validity (Chabrol et al., 2005; Schauenburg et al., 2007). Moreover, the DSQ-40 is not prone to sex differences (Andrews et al., 1993; Davidson and MacGregor, 1998).

In total, the DSQ-40 shows some weaknesses concerning its factor-structure and reliability. However, the low numbers of items used could explain the latter. Only four items were used to calculate the inter-item consistencies of a neurotic defence style and mature defence style. Cronbach's alpha, however, is affected by the numbers of items used (Zeigler-Hill and Pratt, 2007). The construct validity of the DSQ-40 appears to be supported throughout by research. Nevertheless, the limitations of the DSQ-40 should be borne in mind while reading this thesis and evaluating its results and implications. However, as suggested by Bargh and Williams (2009), it is important to do research on non-conscious processes, which facilitate or hinder emotional dysregulation. Although the

empirical research concerning defence mechanisms is still in its infancy, the DSQ-40 is one of the most valid measurements assessing defence mechanisms.

Andrews and colleagues (1993) reported a general population mean for the mature defence style of 5.76 (SD=1.15), a mean of 4.32 (SD=1.28) for a neurotic defence style and a mean of 3.54 (SD= .95) for an immature defence style (3.54; SD= .95). The whole questionnaire can be found within appendix 1.

### 4.4.2. The Humour Style Questionnaire (HSQ) (Martin and colleagues, 2003).

The HSQ is a 32 item self-report measurement assessing sense of humour as a personality trait by a seven-point Likert Scale. Martin and colleagues (2003) developed the HSQ by reviewing theories and empirical research (Martin, 2003). The HSQ consists of four dimensions or factors. Two factors are considered as rather adaptive while two factors are considered as maladaptive concerning their psychological functionality.

The two adaptive factors are affiliative humour and self-enhancing humour. *Affiliative humour* is directed towards others and shows fairly kind, accepting and tolerant characteristics (Martin, 2003). The aim or motivation for using affiliative humour is predominantly to make other people laugh and to reduce social conflict (ibid). This type of humour may be considered as the form of humour early humanistic philosophers had in mind and humanistic psychologists have described (Martin, 2003). Martin and colleagues (2003) suggested that affiliative humour fosters relationships, group cohesion and makes the owner more attractive to other people.

*Self-enhancing humour* is rather an intra-psychic operation and less directed towards the social environment (Martin, 2003). Here, life paradoxes cause pleasure by the ability to change perspective (ibid). The person who is using self-enhancing humour may be able to remain a humorous and at the same time realistic outlook even under stress or in crisis (ibid). Moreover, it is assumed that self-enhancing humour allows the user to regulate their emotions, to focus more on the simple side in life and to reduce, hereupon, negative emotions (ibid). Self-

enhancing humour is close to the construct of humour Freud was using (ibid). Therefore, self-enhancing humour and to a lesser degree affiliative humour will be conceptualised throughout the thesis as a mature defence mechanism.

Each scale of the two positive humour scales consists of eight items. For example, an item assessing affiliative humour is: (5) "I don't have to work very hard at making other people laugh—I seem to be a naturally humorous person". Self-enhancing humour is measured by items such as: (2) "If I am feeling depressed, I can usually cheer myself up with humor". However, it is suggested that humour also has the potential to harm the psychological functioning of humans (Martin et al., 2003). This potentially harmful type of humour is captured by aggressive and self-defeating humour (ibid).

*Aggressive humour* is highly related to the superiority theory of humour described, for example, by Plato (Martin et al., 2003; Shaw, 2010). Aggressive humour is assumed to be associated with sarcasm, hostility and offensive behaviour towards people where weaknesses have been identified (Martin et al., 2003). Aggressive humour is displayed in order to show the superiority of oneself to the expense of the feelings or dignity of the humour "victim". Furthermore, aggressive humour works with manipulation by the threat of ridiculing (Martin et al, 2003). For example, an item measuring aggressive humour is: (3) "If someone makes a mistake, I will often tease them about it".

In contrast, *Self-defeating humour* is characterised by using humour that is directed towards oneself (Martin et al., 2003). The aim of self-defeating humour is to receive the approval by others (ibid). Furthermore, this kind of humour may be as well a form of denial and a way to avoid the exposure of uncomfortable feelings to others (Martin et al., 2003). Both two maladaptive humour styles are captured by eight items. Self-defeating humour is measured by items such as: (4) "I let people laugh at me or make fun at my expense more than I should".

The range of each factor lies between eight and fifty-six. Martin and colleagues (2003) have reported that the HSQ has satisfactory internal reliability ranging from $\alpha$=.77 to $\alpha$=.81 (ibid). Martin and colleagues (2003) have found a mean for affiliative humour of 46.4 (SD=7.17), for self-enhancing humour of 37.3

(SD= 8.33), for aggressive humour of 28.5 (SD= 8.79) and for self-defeating humour of 25.9 (SD=9.22). The scale shows some weaknesses concerning sex and age differences. The HSQ has satisfactory construct-validity and concurrent validity (ibid).

The HSQ measures positive and negative styles of humour and its functions but does not claim to measure the entire construct of humour (ibid). However, certain aspects of humour are not assessed by the HSQ such as frequency of laughter, ability of humour creation as well as humour appreciation (ibid). The whole questionnaire can be found within appendix 2.

The HSQ was included within the research design because it measures humour as a complex phenomenon that may include adaptive sides as well as potentially rather maladaptive sides.

#### 4.4.3. Balanced Inventory of Desirable Responding (BIDR) (Paulhus, 1984).

The BIDR very neatly measures the concept of positive illusions after Taylor (1989/ 1983). Therefore, the use of this measurement may be especially useful when examining positive illusions after Taylor (1989/ 1983). Paulhus developed 1984 the BIDR through the refinement of two deception scales which were rationally developed by Sackeim and Gur (1978) cited by Paulhus (1984). The BIDR is a 40 item self-report questionnaire, which assesses self-deception on a 7 point Likert Scale. Self-deception is captured by two factors, namely Self Deceptive Enhancement and Impression Management. Originally, it was suggested that the latter factor is what constructs social desirable responding as a measurement bias (Pauhus, 1984). However, nowadays this dimension is also considered to be self-deceptive towards the social self or the self that is embedded in a social context having absorbed certain social values and ideals (Paulhus and John, 1998).

Both categories consist of 20 items. Self Deceptive Enhancement is captured by items such as: (1) “My first impressions of people usually turn out to be right” and Impression Management is captured by items such as: (21) “I

sometimes tell lies if I have to". The range of both scales lies between zero and twenty. The reliability of Self Deceptive Enhancement Scale is fair to satisfactory and ranges from α=.68 to α=.80 (Paulhus, 1991). The reliability of the Impression Management scale is satisfactory and ranges from α=.75 to α=.86 (ibid). Within a student sample, Paulhus (1991) reported a mean for the Self-Deception Enhancement scale of 7.5 (SD= 3.2) and a mean for the Image Management scale of 4.3 (SD=3.1).

The concurrent validity of the BIDR is well established. The BIDR is highly correlated with the Marlowe-Crowne scale (r= .71) and with the Multidimensional Social Desirability Inventory (r= .80) (ibid). The whole questionnaire can be found within appendix 3.

#### 4.4.4. Difficulties in Emotion Regulation Scale (DERS) (Gratz and Roemer, 2004).

Emotional regulation was defined by being aware of emotions rather than repress them (Gratz and Roemer, 2004; Neumann, 2010; Wild and Paivio, 2003). Moreover, emotional regulation may be characterised by responding to emotions in a functional way (Neumann, 2010). The DERS was used because it builds upon this understanding of emotion regulation. Gratz and Roemer (2004) developed the DERS by reviewing existing theories and empirical research as well as by using factor analysis. The DERS is a 36 item self-report measurement, which assesses emotional regulation difficulties on a five point Likert scale. The DERS consists of six dimensions measuring difficulties in emotional regulation. The six dimensions are nonacceptance of emotional responses (Nonaccept), difficulty engaging in Goal-directed behaviour (Goal), impulse control difficulties (Impulse), lack of emotional awareness (Awareness), limited access to emotion regulation strategies (Strategies) and lack of emotional clarity (Clarity) (ibid). The total scale of emotional regulating difficulties is calculated by adding up all six dimensions of the scale. The dimension of nonacceptance of emotional responses is, for example, captured by the item: (11) "When I'm upset, I become angry with myself for feeling that way" and the item difficulty engaging in goal-directed behaviour is

captured by items such as: (13) “When I’m upset, I have difficulty getting work done” (ibid). The range of the total scale lies between 36 and 180.

Gratz and Roemer (2004) reported a high internal reliability of the DERS total scale (α= .93) and satisfactory reliabilities of the respective subscales (α> .80). Gratz and Roemer (2004) reported a mean for the DERS total scale of 79.32 (SD=19.75) within a student sample. Furthermore, the DERS has satisfactory concurrent validity (Roemer and Gratz, 2004). The questionnaire is attached, and can be found in appendix 4.

## 4.5. Results

### 4.5.1. Description of the sample.

The sample consisted of 62.1 % females and 37.9% males and had a mean age of 21.95 (SD=5.30). The majority of the sample was White (69%) followed by Asian/Asian British (16.4%) and Mixed heritage (5.2%). All other ethnic backgrounds represented the sample by less than 5% (Arab, Other ethnical background, Black). The religious affiliation was diverse with 45.7% stated to be non-religious and 32.8% stated to be Christians and 7.8% stated to be Muslims. All other religious affiliations represented the sample by less than 5% (Other religious affiliation, Jewish, Hindu). Three per cent stated that they prefer not answer the question concerning their religious affiliation.

Moreover, the sample consisted of 82.8% undergraduate students and 14.7% postgraduate students. All other evaluated university functions were below 1% (staff member, foundation student, not at the university). 81% of the sample was single and 13 % were in a relationship, which was not institutionalised. Six per cent of the sample was married. 74.1 % of the sample stated that English is their first language while 25.9% of the sample stated that this is not the case.

Table 3. *Description of the Sample*

| | N | % | Mean (SD) | Range |
|---|---|---|---|---|
| **Participants** | 116 | | | |
| **Age** | 116 | | 21.96 (5.30) | 18-52 |
| **Sex** | 116 | | | |
| Female | 72 | 62.1 | | |
| Male | 44 | 37.9 | | |
| **Relationship Status** | 116 | | | |
| Single | 94 | 81 | | |
| Not institutionalised | 15 | 13 | | |
| Married | 7 | 6 | | |
| **First Language** | 116 | | | |
| English | 86 | 74.1 | | |
| Not English | 30 | 25.9 | | |
| **University Function** | 116 | | | |
| Undergraduate students | 96 | 82.8 | | |
| Postgraduate students | 17 | 14.7 | | |
| Other | 3 | 2.7 | | |

### 4.5.2. Missing data analysis.

Missing data are usually unavoidable in the social science (Allison, 2001; Brosius, 2006). For example, people sometimes are reluctant to answer certain questions or have overseen some items within the questionnaire (Allison, 2001). Missing data are not only frustrating for the researcher because they have the potential to reduce the sample size significantly (Allison, 2001; Tabachnick and Fidell, 2007) but they have also the potential to bias the results and their inferences significantly (Allison, 2001). In other words, missing data could produce misleading results.

For example, imagine a survey about posttraumatic stress and posttraumatic growth. Imagine further on that many people who experience posttraumatic stress do not answer the items evaluating posttraumatic stress. The research will show a lower correlation between posttraumatic growth and posttraumatic stress than this is actually the case. Within this fictional example, the researcher knows all their participants and knows those who experience posttraumatic stress and have not filled in the respective questions. Therefore, the researcher knows the results are biased and why this bias has occurred. Hereupon, the researcher can develop a model to compensate for the lack of data.

However, in reality the researcher often does not know why some people did not fill in the questionnaire and whether the potential answers differ from people who have filled in the questionnaire. The researcher only can observe a pattern, which may or may not bias the results. In any case, it is valuable to examine the missing data concerning such non-random patterns in order to evaluate the degree of risk for obtaining biased results and to reduce this risk in some cases. Within the next paragraph, missing data are examined concerning their potential for biasing the results.

#### *4.5.2.1. Analyses of missing data.*

Missing data are analysed for age, sex and all variables included into the data analysis. First, the percentage of missing data for each variable was investigated. This procedure is important to evaluate whether the missing data pattern has the potential to bias the results. Missing data below 5% do usually not impose a

substantial risk to bias the results (IBM, 2011; Tabachnick and Fidell, 2007). The percentage of missing values was minor and no variable had missing data above 10%. However, four of twelve variables showed missing values above 5% namely: the immature defence style (6.9%), the self-deceptive enhancement scale (6.9%), the image management scale (6.0%) and the emotional dysregulation scale (5.2%). Moreover, 83.33% of all variables showed some missing values and 2.94% of all values were missing. Moreover, 25.86% of the subjects did not fully complete the questionnaire package. In accordance to suggestions by the University of Texas, a missing variable was created to inspect how much missing values occurred in each subject.

Of those who did not fully complete the questionnaire package, 21 subjects showed one missing value, seven subjects showed two missing values and two subjects showed three missing values.

Missing values not at random could impose a significant risk, distorting the data (Allison, 2001; Tabachnick and Fidell, 2007). Therefore, the Little's MCAR test has been conducted as suggested by Tabachnick and Fidell (2007). The result suggested that the missing data are completely at random ($\chi^2$=138.29; df= 146; p>.05). Therefore, the test suggests that missing data should not impose a substantial risk to bias the subsequent results.

#### *4.5.2.2. Handling missing data within this data set.*

The statistical package of SPSS offers two main methods for handling missing values, namely, list-wise deletion and pair-wise deletion. Within list-wise deletion, only those cases that have no missing values are included in respective statistical procedures. In contrast, pair-wise deletion uses all cases showing no missing values concerning a requested pair of variables (Acock, 2005; Graham, 2009; Schlomer et al., 2010). The main advantage of pair-wise deletion is usually, therefore, a higher number of cases which can be used for analysing the data (Allison, 2001). Hence, the power of the study is expected to be higher when using pair-wise deletion (ibid).

However, pairwise-deletion shows some problems even if the missing data are completely at random. All of those problems revolve around the inconsistent and varying sample size. First, the comparison of correlations is impeded because the sample size for each correlation varies (Schlomer et al., 2010). Moreover, a positive correlation matrix cannot be guaranteed because of the varying sample size (Acock, 2005; Allison, 2001; Graham, 2009). Several multivariate statistical procedures cannot be conducted when the correlation matrix is negative (Acock, 2005; Allison, 2001; Graham, 2009; Schlomer et al., 2010). Finally, the results could become biased because of the inconsistent sample size (Acock, 2005; Allison, 2001; Graham, 2009). Several multivariate statistical analyses require the number of cases for calculating degrees of freedom (Acock, 2005) and standard errors (Allison, 2001). In case of pair-wise deletion, the computer software will either base its calculations on the maximum number of cases or on the minimum number of cases (Allison, 2001). Therefore, either the measured effect could be an overestimation or an underestimation depending on the computer software used (Acock, 2005). Imputation is another possibility to deal with missing data within SPSS. Imputation describes a set of different methods to replace missing data based on statistical speculations (Allison, 2001). However, this method also introduces the risk to bias the data even further. For example, marginal mean imputations are "(…) well known to produce biased estimates of variances and covariances (Haitovsky, 1968) and generally should be avoided" (Allison, 2001, p.11).

Within this thesis, missing data will be list-wise excluded because of the reviewed problems associated with pair-wise deletion and the method of imputation.

#### 4.5.3. The quality of data.

To run parametric tests the sample should satisfy some test assumptions (Carlucci and Wright, 2012). Therefore, the total scales and age were inspected concerning their linearity (Benninghaus, 2002; Pallant, 2004), normality (Calucci and Wright, 2012; Pallant, 2004) and concerning significant outliers (Pallant, 2004).

First, total scales and age were inspected graphically through a scatterplot concerning their linearity. Age was not linear distributed. As suggested by Pallant (2004) to identify significant outliers, data were inspected concerning the difference between the mean and the trimmed mean. No significant outliers could be found. Hereupon, the data were inspected concerning their normality. The Kolmogorov-Smirnov test indicated that the self-deceptive enhancement scale, the image management scale, the affiliative humour scale, and age were not normal distributed.

Within correlational statistics, some social scientists argue that in most circumstances one can treat data which do not satisfy the assumption of normal distribution as if they do (Bryman and Cramer, 2009) other statisticians, however, (e.g. Rumsey, 2008) explicitly warn against using parametric test when test assumptions are violated. However, also Rumsey (2008) states that some tests are quite resilient against the violation of presumptions that usually must be met. In other words, these tests can be conducted even if some assumptions for using the test are violated.

Brosius (2008) suggests that parametric tests could still be used if the deviation from the normal distribution is minor. This was tested via a histogram. The histogram showed that the normal distribution was displayed to a meaningful proportion. However, the results of data, which violated the assumption of normal distribution, should still be interpreted in a careful and conservative way (ibid). Therefore, variables with no standard normal distribution will only be considered in depth if they show p-values below .01.

### 4.5.4. Internal reliability.

The internal reliability was tested for the DSQ-40 (Andrews and colleagues, 1993), the DERS total scale, the BIDR and all subscales of the HSQ. The internal reliabilities are illustrated in table 4.

Table 4. *Internal Consistencies and Descriptive Data for relevant Variables*

| Variable | Alpha (α) | Mean (SD) | Range |
|---|---|---|---|
| DSQ-40 (Mature Defence Style) | .49 | 5.52 (1.03) | 2.00-7.75 |
| DSQ-40 (Neurotic Defence Style) | .32 | 4.81 (1.03) | 2.50-7.25 |
| DSQ-40 (Immature Defence Style) | .75 | 4.12 (.91) | 2.04-7.08 |
| BIDR (Image Management) | .77 | 6.01 (3.41) | 0-19 |
| BIDR (Self Deceptive Enhancement) | .66 | 4.85 (2.99) | 0-15 |
| DERS_Total (Emotional Disregulation | .93 | 91.14 (23.28) | 37.00-154.00 |
| HSQ (Affiliative Humour) | .72 | 45.32 (6.40) | 25.00-55.00 |
| HSQ (Self-Enhancing Humour) | .74 | 37.16 (7.93) | 10.00-52.00 |
| HSQ (Aggressive Humour) | .74 | 29.37 (8.59) | 8.00-51.00 |
| HSQ (Self-Defeating Humour) | .75 | 30.90 (8.65) | 8.00-56.00 |

*NOTES.* DSQ-40= Defense Style Questionnaire-40; BIDR= Balanced Inventory of Desirable Responding; DERS= Difficulties in Emotion Regulation Scale; HSQ= Humour Style Questionnaire.

Usually, conservative researchers consider a value of Cronbachs alpha from 0.7 to 0.8 as an indicator for the reliability of a scale (e.g. Brosius, 2006; Bryman and Cramer, 2009). Therefore, the reliability of the self-deceptive enhancement is not optimal. Moreover, the reliability of the mature defence style and the neurotic defence style is questionable.

#### 4.5.5. Correlates.

Correlation analyses were used to investigate how the diverse illusions correlate with each other and how they correlate with emotional dysregulaion. A brief overview on correlations will be given before summarising the results.

##### *4.5.5.1. The theory on correlations.*

Correlational analysis is a method used to describe how two variables relate to each other (Pallant, 2004; Benninghaus, 2002). In other words, correlations answer the question to what extent two variables co-variate (Coolican, 1998). They "(…) describe the strength and direction of the linear relationship between two variables" (Pallant, 2004, p.115). Thus, by using correlations it is possible to indicate, in a rather general way, whether some illusions are correlated with each other. Moreover, it is possible to investigate which illusions correlate with emotional dysregulation. Diverse coefficients have been developed in order to describe the relationship (correlation) between two variables. When working with continuous variables, most researchers suggest using the Pearson correlation coefficient (e.g. Pallant, 2004). This coefficient measures the dynamic process between two variables (Benninghaus, 2002). Thus, the Pearson correlation coefficient describes the direction and the extent to which a variable alters when at the same time another variable changes (Benninghaus, 2004). The coefficient is symmetric and, therefore, no causal predictions from one variable to another variable can be made (ibid).

Before conducting the correlation analyses, it appears to be useful to discuss the difference between test significance and a meaningful effect size of a test. Sometimes it is assumed that having gained significant results equals having

meaningful results. This is, however, not always the case. A significant result only says that the results have not occurred by chance with a probability of usually 95% (Carlucci and Wright, 2012). Thus, "(…) the probability of your results happening solely due to chance is low" (Carlucci and Wright, 1992, p.194). However, a study could gain significant results although its meaning is unimportant (ibid). The meaning of a correlation is measured by the effect size and in the following case by the size of the Pearson correlation coefficient (ibid). That is, the strength of a correlation could be meaningful although one cannot exclude with a probability of 95% that the results have occurred by chance or being significant respectively. Having discussed the theoretical basis a correlation analysis will be conducted next.

#### *4.5.5.2. The correlates within the sample.*

Correlation analyses were carried out between the DSQ-40, the BIDR, the HSQ and the DERS. All variables were z-standardised as suggested by, for example, Benninghaus (2002) and Miles (2012). The results are displayed in table 5.

As expected, the use of a mature defence style was negatively and significantly correlated with emotional dysregulation. In contrast, emotional dysregulation was significantly and positively correlated with an immature defence style. A neurotic defence style was positively correlated with emotional dysregulation. However, the correlation was not significant.

Self-enhancing humour was significantly correlated with a mature defence style. In accordance with the hypotheses, self-defeating humour was significantly correlated with a neurotic defence style and an immature defence style. In contrast to predictions, affiliative humour was not correlated with a mature defence style. An aggressive humour style was significantly correlated with an immature defence style. Both positive humour styles namely affiliative humour and self-enhancing humour were significantly and inversely correlated with emotional dysregulation. However, the correlation between affiliative humour and emotional dysregulation showed p-values above .01. The affiliative humour scale was not normally distributed and, therefore, the results concerning this scale should be read with

caution. Finally, self-defeating humour was significantly correlated with emotional dysregulation.

Furthermore, self-deceptive enhancement was significantly correlated with a mature defence style. Self-deceptive enhancement was significantly and inversely correlated with a neurotic and an immature defence style. Moreover, self-deceptive enhancement was significantly and inversely correlated with emotional dysregulation. Image management was significantly and inversely correlated with an immature defence style, aggressive humour and emotional dysregulation. However, the latter two correlations showed p-values above .01. The image management scale was not normally distributed and, therefore, the latter two results should be read with caution.

Finally, it was explored whether the variables of age and sex were correlated with any scale used to test the hypotheses. Because age was not normally, distributed only correlations showing p-values below .01 will be listed for the Pearson's Correlation coefficient. Age was significantly and inversely correlated with self-defeating humour ($r= -.39$; $p<.01$; $N=86$) and aggressive humour ($r= -.28$; $p<.01$; $N=86$). Moreover, age was significantly correlated with image management ($r= .29$; $p<.01$; $N=86$). Sex was not correlated significantly with any scale used to test the hypothesis.

Table 5. *Correlates DSQ-40, HSQ, BIDR and DERS*

| Scale | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| *DSQ-40* | | | | | | | | | | |
| 1. Mature Defense Style | - | | | | | | | | | |
| 2. Neurotic Defense Style | .01 | - | | | | | | | | |
| 3.Immature Defense Style | .14 | .42** | - | | | | | | | |
| *HSQ* | | | | | | | | | | |
| 4. Affiliative Humour | .08 | -.13 | -.16 | - | | | | | | |
| 5. Self-Enhancing Humour | .40** | .03 | .06 | .33** | - | | | | | |
| 6. Aggressive Humour | .04 | .04 | .26* | .10 | .27* | - | | | | |
| 7. Self-Defeating Humour | -.01 | .23* | .27* | .28** | .26* | .44** | -- | | | |
| *BIDR* | | | | | | | | | | |
| 8. Self-deceptive Enhancment | .25** | -.28** | -.21* | .21* | .23* | .06 | -.06 | - | | |
| 9. Image Management | .18 | -.13 | -.32** | .05 | .05 | -.36** | -.15 | .29** | - | |
| *DERS* | | | | | | | | | | |
| 10. Emotional Disregulation Total | -.33** | .18 | .39** | -.21* | -.37** | .14 | .29** | -.41** | -.24* | - |

*NOTES.* N= 86 (listwise exclusion). All correlations are Pearson's r coefficients. DSQ-40= Defense Style Questionnaire-40; HSQ= Humor Style Questionnaire; BIDR= Balanced Inventory of Desirable Responding; DERS= Difficulties in Emotion Regulation Scale; *p<.05; **p<.001 (2-tailed).

#### 4.5.6. Multiple regressions.

The Pearson correlation coefficient is not based on calculations that determine the proportion of shared variance (Benninghaus, 2002). Therefore, it is not possible to determine the improvement in prediction of one variable based on another variable (Benninghaus, 2002; Miles, 2012). This improvement of prediction based on one or more variables is determined by using a regression analysis. Moreover, it is possible to determine how much the dependent variable changes when the independent variable alters at one measurement unit (Brosius, 2008).

Therefore, a standard multiple regression was carried out to determine how much defence styles, humour styles and self-deception contribute explaining emotional dysregulation. Variables not normally distributed and having p-values below .01 were not considered to be suitable for the regression model.

A mature defence style, an immature defence style, self-enhancing humour, self-defeating humour and self-deceptive enhancement were all entered into a regression model to explain emotional dysregulation. The model was checked for significant outliers, multicollinearity, normality and linearity. The model had a $R^2$ of .46 (N=88). Therefore, the model explained 46% of the observed variance. A mature defence style ($\beta$= -.15; $p>.05$) predicted not significantly emotional dysregulation. However, immature defences ($\beta$= .30; $p<.01$), self-defeating humour ($\beta$= .30; $p<.01$), self-deceptive enhancement ($\beta$= -.20; $p<.05$) and self-enhancing humour ($\beta$= -.34; $p<.01$) predicted significantly emotional dysregulation.

### 4.6. Discussion

The study examines which forms of illusions may be considered as adaptive and which forms of illusions may be considered as rather maladaptive. Here, two strategies are used. First, the study examines whether some forms of illusions are correlated with emotional dysregulation and whether some forms of illusions are correlated with emotional regulation. Illusions, which protect people from emotional dysregulation, may be considered adaptive. In contrast, illusions correlated with emotional dysregulation may be considered maladaptive. Second,

it was investigated how the diverse forms of illusions are correlated with each other. In other words, the study examines whether the illusions of defensiveness, humour as special form of defensiveness and self-enhancement correlate differently with each other. These inter-correlations may be able to shed light on the potential adaptive or maladaptive nature of some forms of illusion.

First, a mature defence style was significantly and inversely correlated with emotional dysregulation. In contrast, an immature defence style was significantly correlated with emotional dysregulation. Although it was not significant, a neurotic defence style was positively correlated with emotional dysregulation. The results support the idea that various defence styles affect differently emotional dysregulation (Vaillant, 1995). However, only an immature defence style predicted significantly emotional dysregulation. Therefore, the data suggest that mature and neurotic defences are not highly important for emotional dysregulation. This result is in line with research connecting especially immature defences to affective psychological problems such as depression (Bond, 1992; Ryad et al., 2009; Vaillant, 1992; Vaillant and Vaillant, 1992), anxiety (Andrews et al., 1993; Ryad et al., 2009), PTSD (Brodaty et al., 2004; Elklit and Blum, 2010) and personality disorders (Bond, 1992; Vaillant, 1992).

Positive humour (affiliative humour and self-enhancing humour) was significantly and inversely correlated with emotional dysregulation while self-defeating humour was significantly correlated with emotional dysregulation. However, only self-enhancing humour and self-defeating humour predicted significantly emotional dysregulation. As suggested by Martin (2003) self-enhancing humour appears to be an internal resource of a person in order to regulate their emotions. Moreover, self-enhancing humour is closely related to the mature defence mechanism of humour, which Freud has described (ibid). In contrast, it has been speculated that self-defeating humour is a form of denial (Martin et al., 2003). Therefore, self-defeating humour may be conceptualised as special form of immature defensiveness.

Self-deceptive enhancement and image management were significantly and inversely correlated with emotion dysregulation. Here, the results underline the

assumption by Taylor (1989/ 1983) that self-enhancement may have positive functions. Self-enhancement could facilitate emotion regulation through exaggerated beliefs in oneself. This enhanced view in the importance of oneself and in positive traits within oneself could possibly create a tolerance towards negative emotions (cf. Taylor, 1989).

Second, the inter-correlations between the illusions are inspected in order to evaluate their potential adaptive or maladaptive character. A mature defence style was significantly correlated with self-enhancing humour and self-deceptive enhancement. Therefore, the illusions of mature defensiveness, self-enhancing humour and self-deceptive enhancement may be categoriesed as adaptive. A neurotic defence style and an immature defence style were significantly correlated with self-defeating humour. Therefore, the listed illusions may have the potential to be maladaptive when used for a longer period.

In summary, mature defensiveness, self-enhancing humour and self-deception are correlated and are significantly inversely correlated with emotional dysregulation. Therefore, the listed illusions may be conceptualised as adaptive. Furthermore, neurotic defensiveness, immature defensiveness and self-defeating humour were correlated. Moreover, an immature defence style and self-defeating humour were significantly correlated with emotion dysregulation. Therefore, the latter illusions may be considered as rather maladaptive.

### 4.7. Limitations

The study has several limitations. First, the sample was a convenient student sample and is, therefore, not representative of the general population. However, as Heiervang and Goodman (2011, p.70) points out "(…) selection bias is much more likely to affect point estimates such as prevalence than patterns of association". Therefore, reduced representativeness and potential selection bias may not substantially reduce the value of this research (cf. Butler et al., 2002; Heiervang and Goodman, 2011; Loewenthal, 1996). Furthermore, the sample size was rather small, which results in a lower power of the study. Therefore, the probability of doing a type two error is increased (Weiß, 2008).

Moreover, some variables showed a violation of assumptions for parametric testing. Therefore, all results below a p-value of .01 including both scales of the BIDR and the scale of affiliative humour should be read with caution. The research used a cross-sectional design in which no causal inferences can be made. Finally, the study is prone for mono-operation bias.

In conclusion, the previous study supports the assumptions concerning illusions covered in section 1.3. There may be two sorts of illusions. First, some illusions could be able to facilitate well-being. Those illusions were assumed to fall into a broad category of positive illusions incorporating suggestion by Taylor (1989/1983) and theories by Vaillant (1995). The second form of illusions could fall under the broad category of negative illusions that mainly incorporate ideas by Vaillant (1995) about neurotic and immature defensiveness. Finally, the construct validity of the DSQ-40 was supported by the research because the three defence styles correlated with emotional dysregulation in a predicted way when using the theory after Vaillant (1995). In addition, the inspected inter-correlations supported the validity of the DSQ-40.

The results gained within the previous study do also support assumptions about when reports of posttraumatic growth could be illusory and when they could constitute real transformational posttraumatic growth (see section 1.4.). Therefore, the conceptualisation of real posttraumatic growth and illusory reports of posttraumatic growth can be used with more confidence within the next studies.

## 5. Negative Change in Illusory and Real Posttraumatic Growth

Self-reported posttraumatic growth may not always reflect real posttraumatic growth but instead illusory posttraumatic growth. Several researchers already suggest that reports of posttraumatic growth are not always valid (e.g. Cheng et al., 2006; Davis and McKearney, 2003; Hall et al., 2009; Hobfoll et al., 2007; Ford et al., 2008; Frazier et al., 2009; Frazier and Kaler, 2006; Goorin, 2011; Luszczynska et al., 2012; McFarland and Alvaro, 2000; Wortman, 2004; Zoellner and Maercker, 2006). However, it is still not well understood which psychological processes in particular could cause invalid reports of posttraumatic growth. Moreover, the description of the nature of real posttraumatic growth and the testing of theories is impeded because reports of posttraumatic growth may incorporate two separate phenomena namely real posttraumatic growth and illusory posttraumatic growth.

The subsequent study has two main aims. First, it is attempted to investigate whether defence mechanisms are correlated with reports of posttraumatic growth. If so, it will be concluded that sometimes reports of posttraumatic growth could be illusory. However, also other possibilities will be discussed. Second, it is investigated whether the level of defensiveness moderates the correlation between reports of posttraumatic growth and well-being. Within this study, well-being or the opposite of it is measured by negative change following adversity. The aim for doing this moderation analysis is, among others, to separate real posttraumatic growth from illusory posttraumatic growth in order to investigate whether those two psychological phenomena relate differently to well-being. Real posttraumatic growth and illusory reports of posttraumatic growth will be separated by using the level of defensiveness as the indicator for real or illusory posttraumatic growth. In other words, the level of defensiveness will serve as auxiliary construction to differentiate real from illusory posttraumatic growth. Here, low levels of neurotic defensiveness or immature defensiveness or high levels of mature defensiveness will serve as an indicator for real posttraumatic growth. In contrast, high levels of neurotic defensiveness, immature defensiveness or low levels of mature defensiveness will serve as an indicator for illusory

posttraumatic growth. In this way, it could even be possible to describe some features for real posttraumatic growth and illusory posttraumatic growth separately.

The idea that defence mechanisms may sometimes be the reason for reporting posttraumatic growth is neither new nor intriguing. However, as far as the author knows, no study to date has investigated this correlation with well-established questionnaires. Moreover, no study to date has used the DSQ-40 as tool to separate real posttraumatic growth from illusory posttraumatic growth.

### 5.1. Introduction

Trauma by its very nature breaks through the defences of an individual who is then overwhelmed by the new information and emotions (Horowitz, 1985). A trauma entails much new information that is not congruent with prior schemas that are held by an individual about their world or their perception about themselves (e.g. Horowitz et al., 1995; Janoff-Bulman, 1992). This strike against the person's schemas can be experienced as highly distressing (Janoff-Bulman, 1992) and could produce anxiety. In other words, the person may realise that old ways of living are not possible anymore (Joseph, 2011). In order to cope with the information and the arising anxiety the concerned person may use defence mechanisms again (Horowitz, 1985). Unexpected change of reality described by Vaillant (1995) is a good framework for understanding the cause of using defence mechanisms following a trauma.

Therefore, it is argued that defence mechanisms are unconsciously/ automatically used by individuals to protect themselves against unbearable information and stress that goes beyond their scope of coping (Vaillant, 1995). However, some defensive strategies could become maladaptive for the psychological functioning[8] (e.g. Horowitz et al., 1995; Vaillant, 1992). If, for

[8] However, the use of defence mechanisms in a state of a high stressful situation is assumed (e.g. Janis, 1985; Lazarus, 1985; Horowitz, 1985; Bonanno, 1995) to be, to some degree, an adaptive and/or first-aid response for managing new information. Furthermore, to process traumatic experiences the trauma survivor needs again a sense of safety that could be provided by avoidance and defence mechanisms. In a normal process this avoidant state will be unsoldered by an intrusive state until the memory or the information is processed (Horowitz et al., 1995).

example, people who were exposed to a trauma rely too heavily or too long on maladaptive defences their use could become counterproductive and could hinder trauma processing (cf. Horowitz et al., 1995). Moreover, the development of real transformational posttraumatic growth depends on openness to internal and external experiences (Joseph, 2004). In other words, learning from adversity is only possible when such adverse experiences and emerging implications are allowed, to some degree, to enter awareness (Joseph, 2004). Openness to internal and external experiences may also be a requirement allowing people to process adversity (Joseph, 2004). However, neurotic and immature defensiveness may be at best described as an antithesis to openness to experience as they may hinder the awareness either internal and/or external reality. Moreover, the use of some maladaptive defence mechanisms could resemble posttraumatic growth although those reports probably may be better described as illusory.

The next paragraph describes how real posttraumatic growth may develop and how it may differ from illusory reports of posttraumatic growth. Through low levels of defensiveness (Joseph, 2004) or high levels of mature defensiveness (cf. Vaillant, 1995), trauma survivors process and accommodate their experience in a constructive way. New experiences are allowed to enter awareness and could, hereupon, shape the self-structure of the person in accordance to the experience. Moreover, the changed reality is experienced and, therefore, coping which has the potential to change external and internal reality could be facilitated.

Real posttraumatic growth was defined by low levels of neurotic defensiveness or immature defensiveness or by high levels of mature defensiveness. In contrast, illusory posttraumatic growth was defined by high levels of neurotic defensiveness or immature defensiveness or by low levels of mature defensiveness. In accordance to suggestions made by, for example, Joseph (2011), Janoff-Bulman (2009), Calhoun and Tedeschi, 2009, Tedeschi and Calhoun (2004) real transformational posttraumatic growth may be usually correlated with awareness for negative change following adversity. This may not necessarily be the case for illusory reports of posttraumatic growth (cf. Maercker and Zoellner, 2004; Zoellner and Maercker, 2006). Cheng and colleagues (2006) supported these

theoretical assumptions within a prospective study. They investigated whether people who only reported positive changes (reports of posttraumatic growth) following the SARS epidemic and people who reported a mixture of positive and negative changes following adversity differ in their correlation with defensiveness. They found that positive changes (reports of posttraumatic growth) were correlated with defensiveness when only positive changes were reported. In contrast, defensiveness was not correlated with the report of positive changes (reports of posttraumatic growth) when the participants indicated a mixture of positive as well as negative changes. The awareness for negative change following adversity, therefore, may not be present for illusory posttraumatic growth.

However, until now it is not entirely clear whether, in fact, reports of posttraumatic growth are correlated with defensiveness. Moreover, it is not clear whether real transformative posttraumatic growth and illusory reports of posttraumatic growth differ in their correlation with negative change following adversity. Although Cheng and colleagues (2006) already indicated that real posttraumatic growth may be correlated with awareness for negative change their study took a different perspective and used different methods. Moreover, it is worth confirming the results by Cheng and colleagues in order to make the theoretical conclusions more robust.

Therefore, the following study attempts to clarify whether reports of posttraumatic growth are in fact correlated with defensiveness. Moreover, real and illusory posttraumatic growth will be separated by defining real posttraumatic growth as either low in defensiveness or high in mature defensiveness. Illusory posttraumatic growth will be defined as high in defensiveness or low in mature defensiveness. Hereupon, it will be investigated whether real posttraumatic growth differs from illusory posttraumatic growth concerning negative change following adversity.

Four hypotheses will guide this research project.

1. Reports of posttraumatic growth are inversely correlated with a mature defence style.

2. Reports of posttraumatic growth are inversely correlated with a neurotic defence style.

3. Reports of posttraumatic growth are positively correlated with an immature defence style.

4. The level of each defence style moderates the correlation between negative change following adversity and reporting posttraumatic growth.

**5.2. Procedure**

A questionnaire battery was created and submitted to the ethical board of the School of Sociology and Social Policy. The information sheet and consent form can be found within appendix 12. This information sheet and consent form will also serve as a sample. All information sheets, consent forms, questionnaire batteries and ethical approvals are archived and can be obtained from the University of Nottingham. The ethical board approved the study in January 2012. The ethics form is partly attached within appendix 14. If more detail is requested, see above. In addition, the School of Sociology and Social Policy stores the whole and complete ethic forms for six years. Data were collected between the 23/01/2012 and 13/03/2012. Students were given the prepared questionnaire package and asked to give their written informed consent as provided by the School of Sociology and Social Policy. After data collection, an ID-number were assigned to each student in order to anonymise the data. Following the anonymisation, the data were entered into SPSS twice as, for example, suggested by Carlucci and Wright (2012b). This procedure was chosen to discover any entered mistakes (ibid). The total response rate of this study was 46.97%.

**5.3. Subjects**

In total, 116 under- and postgraduate students of the University of Nottingham were conveniently recruited. However, 23 subjects (11.62%) did not

meet the inclusion criteria and were excluded. Subjects were excluded when they had not experienced a trauma or adverse event, when they refused to give an informed consent, when they were not students or when they filled out the questionnaire twice. The remaining participants were 93 students.

### 5.4. Measures

To answer the research questions, four self-report questionnaires were used. All four questionnaires will be described in the subsequent section

#### 5.4.1. The Defense Style Questionnaire-40 (DSQ-40) (Andrews and colleagues, 1993).

To measure defence mechanisms, the Defense Style Questionnaire-40 by Andrews and colleagues (1993) was used. This 9-point Likert scaIe contains 40 items assessing 20 defence mechanisms and three defence styles. Therefore, the DSQ-40 separates defence mechanisms according to the level of maturity. Three maturity levels are differentiated namely a mature defence style, a neurotic defence style and an immature defence style. The DSQ-40 was also used as auxiliary construction to separate real transformational posttraumatic growth from illusory posttraumatic growth. For a detailed review of the questionnaire, please refer to 4.4.1. The questionnaire is attached in appendix 1.

#### 5.4.2. Posttraumatic Growth Inventory (PTGI), Tedeschi and Calhoun (1996).

In order to measure posttraumatic growth, Tedeschi and Calhoun (1996) generated from existing literature a self-report questionnaire. On a six-point Likert Scale, posttraumatic growth is measured within five dimensions by 21 items. The measured dimensions of posttraumatic growth are relating to others, new possibilities, personal strength, spiritual change, and appreciation of life (ibid). The dimension of “relating to others” is, for example, captured by items such as: (6) “I more clearly see that I can count on people in times of trouble” or the dimension of new possibilities is, for example, captured by items such as: (3) “I

developed new interests". Moreover, Tedeschi and Calhoun (1996) propose that each factor might indicate posttraumatic growth and should be regarded separately (Calhoun and Tedeschi, 2004). However, a study conducted by Joseph, Linley and Harris (2005) suggests that the PTGI is rather one-dimensional than multi-dimensional. Therefore, within this thesis only the total scale of the PTGI will be used to analyse the data. The PTGI does not give any indication for negative change following adversity and assumes that participants have experienced a stressful event.

Tedeschi and Calhoun (1996) reported that the PTGI has a satisfactory internal reliability of $\alpha$=0.90, although the value of $\alpha$ of the subscales decreases. Furthermore, they reported a test-retest reliability of r=0.71. Tedeschi and Calhoun (1996) reported within a student sample a total mean of 40.96. The range of the total scale of the PTGI lies between 0 and 105. Throughout the thesis, the PTGI will be included because it is the most widely used self-report questionnaire in order to measure posttraumatic growth (Frazier et al., 2009; Joseph and Linley, 2008c). The whole questionnaire can be found within appendix 5.

### 5.4.3. Changes in Outlook Questionnaire (CiOQ), Joseph and colleagues (1993).

Joseph, Williams and Yule (1993) generated through an open-ended question a self-report measurement that assesses on a six-point Likert Scale 11 positive changes following adversity (reports of posttraumatic growth) and 15 negative changes following adversity. The range of the positive change scale lies between 11 and 66 and the range of the negative change scale lies between 15 and 90 (Linley, Joseph, Cooper, Harris and Meyer, 2003). The positive and negative change scale covers questions about future perspective, finding meaning, acceptance of what has happened, valuing of life/relationships and changes in attitudes. The positive change scale includes items such as: (5) "I don't take life for granted anymore". The negative change scale includes items such as: (1) "I don't look forward to the future anymore".

The CiOQ was chosen as it is a questionnaire of changes following adversity (reports of posttraumatic growth) that measures positive as well as negative changes and avoids, therefore, a one sided view on changes following adversity. Moreover, the correlation between positive as well as negative change following adversity can be examined. Moreover, by measuring negative change following adversity it can be investigated whether real posttraumatic growth and illusory reports of posttraumatic growth relate differently with negative change following adversity. Joseph and colleagues (1993) found in their study a positive scale mean of 46.97 (SD=9.12) and a negative scale mean of 33.52 (13.59). The whole questionnaire can be found in appendix 6.

### 5.4.4. Traumatic events.

A questionnaire was developed to describe the nature of the traumatic event that the subjects had experienced. This questionnaire is partly an adaption to a scale used by the American Psychological Association (2011). The adapted part of the measurement is described next. First, nine specific traumatic events were listed. Subjects could then indicate if they had experienced one of the listed events by either ticking Yes or No. If the subjects experienced a stressful event that was not listed, they could tick a box "other stressful events". Moreover, if the subjects did not experience a stressful event at all they could tick a box indicating that they have not experienced any stressful event. In addition, time elapsed since the traumatic event was assessed.

To measure the amount of stress to which the students were exposed a 6-point Likert scale with three items was developed. Here, trauma severity (primary appraisal) and current distress were measured. Therefore, the scale measured first how stressful the event has been experienced at the time of occurrence and second how stressful the event is still experienced. To generate the items, the criteria for trauma within the Diagnostic Statistical Manual (DSM-IV) were used. The items for trauma severity and the items for current distress were added up separately to calculate total scales. Both scales have a range between three and eighteen. The whole scale can be found within appendix 7.

## 5.5. Results

### 5.5.1. Description of the sample.

The sample consisted of 58.1% females and 41.9% males and had a mean age of 22.09 (SD=3.47). Furthermore, the majority of the sample was White (68%) followed by Asian/Asian British (19%). All other ethnic backgrounds represented the sample by less than 5% (Mixed heritage, Arab, Other background). Two per cent of the sample preferred not to answer this question. The religious affiliation was diverse with 42 % stated to be Non-religious, 31% stated to be Christians and 5% stated to be Muslims. All other religious affiliations represented the sample by less than 5% (Buddhism, Hinduism, Other religious affiliation and Sikh). Four per cent of the sample preferred not to answer the question of their religious affiliation.

Furthermore, the sample consisted of 73.1% undergraduate students and 25.8 % postgraduate students. Students were asked to indicate what kind of trauma they had experienced. The majority of students (53.8%) had experienced a loss of a loved one and 6.45% had experienced multiple traumas. Serious illness and violence were experienced in each case by 9.7%. In average, the trauma has occurred 4.57 (SD=4.5) years ago. The following table summarises the characteristics of the sample.

Table 6. *Description of the Sample*

| | N | % | Mean (SD) | Range |
|---|---|---|---|---|
| **Participants** | 93 | 80.17 | | |
| **Gender** | 93 | 100 | | |
| Female | 54 | 58.1 | | |
| Male | 39 | 41.9 | | |
| **Age** | 84 | 90.32 | 22.09 (3.47) | 18-35 |
| **University Function** | 92 | 98.92 | | |
| Undergraduates | 68 | 73.10 | | |
| Postgraduates | 24 | 25.80 | | |
| **Nature of Trauma** | 93 | 100 | | |
| Loss of a Loved one | 50 | 53.80 | | |
| Serious Illness | 9 | 9.70 | | |
| Violence/Crime | 9 | 9.70 | | |
| Serious Accident | 3 | 3.20 | | |
| Violent Conflict | 1 | 1.10 | | |
| Forced Migration | 2 | 2.20 | | |
| Multiple Traumas | 6 | 6.45 | | |
| Other Traumatic Incident | 8 | 11.83 | | |
| **Years elapsed since the Trauma** | 88 | 94.62 | 4.57 (4.5) | 0.01-21 |

### 5.5.2. Analysis of missing data.

Missing data could produce misleading results. Therefore, missing data are analysed for all variables included into the data analysis. For a more detailed discussion on missing data, please refer to section 4.5.2.

First, the percentage of missing data for each variable was investigated. The percentage of missing values was minor. However, six of eleven variables showed missing values above 5% namely: age (9.7%), the PTGI total score

(7.5%), the immature defence style (5.4%), the mature defence style (5.4%), the positive change scale of the CiOQ (5.4%) and "years elapsed since the trauma" (5.4%).

Ten per cent of the variables showed some missing values and 4.59% of all values within the data set were missing. Moreover, 27.96% of the subjects did not fully complete the questionnaire package. In accordance to suggestions by the University of Texas, a missing variable was created to inspect how much missing values occurred in each subject. Of those who did not fully complete the questionnaire 16 subjects showed one missing value, three subjects showed two missing values, three subjects showed three missing values and four subjects showed four missing values.

Missing values not at random could impose a significant risk to distort the data (Allison, 2001; Tabachnick and Fidell, 2007). Therefore, the Little's MCAR test has been conducted as suggested by Tabachnick and Fidell (2007). The result suggested that the missing data are completely at random ($\chi^2$=141.03; df= 149; p>.05). Therefore, the test suggests that missing data should not impose a substantial risk to bias the subsequent results.

Although pair-wise exclusion would increase the sample size Allison (2001) explicitly warns against using pairwise exclusion as it has the potential to bias the results significantly. Therefore, within the study missing data will be list-wise excluded (please refer to section 4.5.2 for a detailed discussion).

### 5.5.3. The quality of data.

To run parametric tests, the sample needs to satisfy some test assumptions (Carlucci and Wright, 2012). Therefore, the total scales and age were inspected concerning their linearity (Benninghaus, 2002; Pallant, 2004), normality (Calucci and Wright, 2012; Pallant, 2004) and concerning significant outliers (Pallant, 2004).

First, the variables were inspected graphically through a scatterplot concerning their linearity. The variables age and "years elapsed since the trauma" were not normally distributed. As suggested by Pallant (2004) to identify

significant outliers, data were inspected concerning the difference between the mean and the trimmed mean. No significant outliers could be found. Hereupon, the data were inspected concerning their normality. The Kolmogorov-Smirnov test indicated that the positive scale of the CiOQ, the negative scale of the CiOQ, trauma severity, current distress, age and the variable "years elapsed since the trauma" were not normally distributed.

Brosius (2008) suggested that parametric tests could still be used if the deviation from the normal distribution is minor. This was tested via a histogram. The histogram showed that the normal distribution was displayed to a meaningful proportion for all variables besides age and years elapsed since the trauma. Therefore, a non-parametric test will be used concerning the variables age and years elapsed since the trauma. Moreover, the results of the data, which violated the assumption of normal distribution, should still be interpreted in a careful and conservative way (ibid). For a more detailed discussion please refer to section 4.5.3.

### 5.5.4. Internal reliability.

The internal reliability was tested for the PTGI total scale, the CiOQ positive change scale, the CiOQ negative change scale, the 3 defence styles of the DSQ-40, the trauma severity scale and the current distress scale. The internal reliabilities are displayed in table 7.

Table 7. *Internal Consistencies and Descriptive Data for relevant Variables*

| Variable | Alpha (α) | Mean (SD) | Range |
|---|---|---|---|
| DSQ-40 (Mature Defence Style) | .61 | 5.49 (1.10) | 2.88-7.63 |
| DSQ-40 (Neurotic Defence Style) | .41 | 4.69 (1.06) | 2.25-7.75 |
| DSQ-40 (Immature Defence Style) | .75 | 3.86 (.90) | 2.17-5.92 |
| PTGI (Total Scale) | .94 | 41.18 (24.43) | 0-101 |
| CiOQ-P | .86 | 41.65 (10.07) | 14-59 |
| CiOQ-N | .90 | 29.26 (12.43) | 15-70 |
| Current Distress Scale | .76 | 8.00 (3.63) | 3-18 |
| Trauma Severity Scale | .65 | 12.54 (3.34) | 5-18 |

*NOTES.* DSQ-40= Defense Style Questionnaire; PTGI= Posttraumatic Growth Inventory; CiOQ-P= Positive change Scale of the Changes in Outlook Questionnaire; CiOQ-N= Negative change Scale of the Changes in Outlook Questionnaire.

Usually, conservative researchers consider a value of Cronbachs alpha from 0.7 to 0.8 as an indicator for the reliability of a scale (e.g. Brosius, 2006; Bryman and

Cramer, 2009). Therefore, the reliability of a mature defence style is more moderate. The reliability of a neurotic defence style is low.

### 5.5.5. Correlates.

Correlation analysis was conducted in order to find out whether reports of posttraumatic growth are correlated with defensiveness (please refer to section 4.5.5. for a detailed discussion on correlations). Correlations were carried out between the two posttraumatic growth scales (CiOQ, PTGI), the DSQ-40, the trauma severity scale and the current distress scale. All variables were z-standardised as suggested by, for example, Benninghaus (2002) and Miles (2012). For a full list of the correlations, see table 8.

A mature defence style was significantly correlated with the PTGI total scale and CiOQ-P. In addition, a neurotic defence style and an immature defence style were significantly correlated with the PTGI. A neurotic defence style was significantly correlated with the CiOQ-P.

Negative change following adversity was significantly correlated with an immature defence style, trauma severity and current distress. Current distress was significantly correlated with an immature defence style. In addition, trauma severity was significantly correlated with an immature defence style. Current distress and trauma severity correlated significantly with each other.

Finally, it was explored whether the variables age, sex and years elapsed since the trauma were correlated with any scale used for testing the hypotheses. Age was significantly correlated with current distress ($rho=.28$; $p<.05$, $N=67$) and trauma severity ($rho=.32$; $p<.01$, $N=67$). Moreover, females were more likely to report higher current distress than males ($rho=.31$; $p<.01$, $N=67$). No other tested correlation was significant.

Table 8 *Correlates PTGI, CiOQ and DSQ-40*

| Scale | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| ***PTGI*** | | | | | | | | |
| 1. PTGI_Total Scale | - | | | | | | | |
| ***CiOQ*** | | | | | | | | |
| 2. CiOQ-P | .66** | - | | | | | | |
| 3. CiOQ-N | .20 | .21 | - | | | | | |
| ***DSQ-40*** | | | | | | | | |
| 4. Mature Defence Style | .35** | .26* | .07 | - | | | | |
| 5. Neurotic Defence Style | .43** | .31** | .17 | .38** | - | | | |
| 6. Immature Defence Style | .34** | .21 | .58** | .33** | .40** | - | | |
| ***Distress*** | | | | | | | | |
| 7. Current Distress Scale | .06 | .11 | .53** | .17 | .17 | .32** | - | |
| 8. Trauma Severity Scale | .18 | .15 | .37** | .14 | .13 | .35** | .49** | - |

*NOTES*. N= 75. All Correlations are Pearson's r coefficients. PTGI= Posttraumatic Growth Inventory; CiOQ= Changes in Outlook Questionnaire; CiOQ-P= posititive change scale of the Changes in Outlook Questionnaire; CiOQ-N= negative change scale of the Changes in Outlook Questionnaire; DSQ-40= Defence Style Questionnaire-40; *p<.05; **p<.01 (2-tailed).

### 5.5.6. Regression analysis.

The Pearson correlation coefficient is not based on calculations that determine the proportion of shared variance (Benninghaus, 2002). Therefore, it is not possible to determine the improvement in prediction of one variable based on another variable (Benninghaus, 2002; Miles, 2012). This improvement of prediction based on one or more variables is determined by using a regression analysis.

Multiple regressions were carried out to examine whether defence styles predict self-reported posttraumatic growth. Within the first model, the PTGI total

scale served as dependent variable while each defensive style served as independent variable. The independent variables entered were, therefore, a mature defence style, a neurotic defence style and an immature defence style. Data were inspected for linearity, normality, multicollinearity and significant outliers. Missing values were list-wise excluded. The model had a $R^2$ of .24 (N=80). Therefore, the defence styles entered explained 24% of self-reported posttraumatic growth. However, only, a neurotic defence style predicted significantly reports of posttraumatic growth ($\beta$=0.28, $R^2$=.24, $p< .05$).

The second model examined whether a mature defence style and a neurotic defence style predicted significantly reports of posttraumatic growth measured by the CiOQ-P. The CiOQ-P total scale served as a dependent variable. Data were inspected concerning their linearity, normality, multicollinearity and significant outliers. Missing values were list-wise excluded. The model had a $R^2$ of .11 (N=81). Therefore, 11% of the CiOQ-P was explained by a mature defence style and a neurotic defence style. However, only, a neurotic defence style predicted significantly reports of posttraumatic growth ($\beta$=0.23, $R^2$=.11, $p< .05$).

#### 5.5.7. Moderation analyses.

Moderation analyses were conducted to investigate whether the level of defensiveness affects the correlation between reports of posttraumatic growth and negative change following adversity. A potential moderation may be important because reports of posttraumatic growth could have a different meaning in different people (cf. Frazier, Tix and Barron, 2004). All defence styles were considered as potential moderator variables.

The moderation analyses were also used to test whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with negative change following adversity. Within this study, negative change following adversity was used as a dimension of well-being or a better frame might be the absence of well-being. Real posttraumatic growth and illusory posttraumatic growth could behave differently concerning their function and consequences. In other words, real posttraumatic growth and illusory posttraumatic growth could

differ in their nature (characteristics) and possible implications. Therefore, treating reports of posttraumatic growth as a coherent construct could have unexpected side effects in therapy (cf. Frazier et al., 2004). In the words of Frazier and colleagues, (2004, p. 116) “If moderators are ignored in treatment studies, participants may be given a treatment that is inappropriate or perhaps even harmful for them”. This statement may be also true for correlational studies because also correlational studies are sometimes used to inform clinical practice.

It was hypothesised that those who report low levels of neurotic or immature defensiveness or high levels of mature defensiveness would show the highest correlation between reports of posttraumatic growth and negative change following adversity. It was, furthermore, hypothesised that those who report high levels of neurotic or immature defensiveness or low levels of mature defensiveness would show the weakest correlation between reports of posttraumatic growth and negative change following adversity.

No hierarchical regression was conducted, as the causal direction of the correlation between posttraumatic growth and negative change was not specified. Through a median split the sample was divided into a low defensive group and high defensive group. For each group, the correlation between posttraumatic growth and negative change was tested. Hereupon, the two groups (low defensive vs. high defensive) were compared for significant differences. Low defenders were defined by scoring below the median while high defenders were defined by scoring equal or above the median. The differences between the groups can be found in table 9. under the column where significance levels are displayed (z (p)).

No defence style moderated significantly the correlation between reports of posttraumatic growth and negative change following adversity. Although the group differences were not significant, the effect size of the differences was meaningful. The correlation between reports of posttraumatic growth and negative change following adversity was highest within the low defensive group and lowest within the high defensive group (please see table 9.).

Table 9. *Correlation between Reports of Posttraumatic Growth and Negative Change moderated by Defensiveness*

| | Negative Change following Adversity | | |
|---|---|---|---|
| | Low Defensive Group | High Defensive Group | Z (p) |
| *DSQ-40* | | | |
| **Mature Defence Style** | | | |
| PTGI | .33* (N=37) | .11 (N=41) | z= .98; (p>.05) |
| CiOQ-P | .27 (N= 37) | .08 (N=41) | z= .83; (p>.05) |
| **Neurotic Defence Style** | | | |
| PTGI | .32* (N=39) | -.00 (N=41) | z=1.42; (p>.05) |
| CiOQ-P | .35* (N=39) | -.01 (N=36) | z= 1.61; (p>.05) |
| **Immature Defence Style** | | | |
| PTGI | .33* (N=39) | .04 (N=41) | z= 1.30; (p>.05) |
| CiOQ-P | .42** (N=39) | -.00 (N=41) | z= 1.92; (p>.05) |

*Notes*. All correlations are Spearmans rho coefficients. PTGI= Posttraumatic Growth Inventory; CiOQ-P= Positive change Scale of the Change in Outlook Questionnaire; DSQ-40= Defense Style Questionnaire-40; *p<.05; **p<.01 (list-wise, 2-tailed).

### 5.6. Discussion

Posttraumatic growth measured by the PTGI correlated significantly with all defence styles. A mature defence style and a neurotic defence style correlated significantly with the positive change scale of the CiOQ. The results suggest that self-reported posttraumatic growth is correlated with defensiveness. When entered into a regression model, only a neurotic defence style predicted significantly posttraumatic growth measured by the PTGI and the CiOQ-P. The results suggest that neurotic defences are uniquely correlated with reports of posttraumatic growth measured by the PTGI and the CiOQ-P.

Four interpretations of the results appear to be possible. First, reports of posttraumatic growth could sometimes be illusory. Here, especially, the PTGI appears to be prone for illusory reports of posttraumatic growth. The reason could be that the PTGI does not include items, which assess negative change following adversity (Park and Lechner, 2009). Second, people who report posttraumatic growth may sometimes be still distressed. Hereupon, defence mechanisms could be used to cope with distress. In this case, reports of posttraumatic growth and the use of defence mechanisms could be independent of each other. However, this possibility may be less likely because reports of posttraumatic growth were not correlated with current distress when measured by the PTGI and were only slightly correlated with distress when measured by the CiOQ-P. Another explanation could be that reports of posttraumatic growth and neurotic defensiveness are both positively correlated with another variable that has not been investigated. Finally, Jayawickreme and Blackie (2014) suggest that reports of posttraumatic growth could be rather reflecting a personality trait. If so, the correlation between reports of posttraumatic growth and defensiveness could only reflect a certain personality structure.

Although not significant, the moderation analysis was, nevertheless, able to show some meaningful trends. The correlation between reports of posttraumatic growth and negative change following adversity was highest within the low defensive group and lowest within the high defensive group. One aim of this thesis is to explore whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with well-being. Moderation analysis is conducted within the thesis to differentiate real posttraumatic growth from illusory posttraumatic growth through the level of defensiveness. Real posttraumatic growth was defined by low levels of defensiveness (neurotic or immature defensiveness) or by high levels of mature defensiveness. Illusory reports of posttraumatic growth were defined by high levels of neurotic or immature defensiveness or by low levels of mature defensiveness. By using this conceptualisation, it was concluded that real posttraumatic growth, measured by low neurotic or low immature defensiveness, could tend to co-exist with the

experience of negative change following adversity. In contrast, illusory posttraumatic growth could be almost independent of negative change following adversity.

The results of the moderation analyses are in line with a psychoanalytical view and a person-centred view, in which low defensiveness allows the concerned person to face and to experience external and internal reality (Rogers, 1959; Vaillant, 1995). Accommodation of the adverse experience may be possible through an awareness of internal and external reality (cf. Joseph, 2011; Vaillant, 1995). In this way, real posttraumatic growth may emerge (cf. Joseph, 2011). In other words, people who report real posttraumatic growth may experience both simultaneously namely real posttraumatic growth and negative changes following adversity as similarly suggested by, for example, Calhoun and Tedeschi (2009), Janhoff-Bulman (2009) and Joseph (2011). In contrast, processes that block, to some extent, internal and external experience, could coin illusory posttraumatic growth (high levels of neurotic and immature defensiveness). Here, reports of posttraumatic growth could rather indicate assimilation processes as described by Joseph and colleagues (2012) and Joseph (2011).

The results of the previous study are also in line with a prospective study conducted by Cheng and colleagues (2006). Their results suggest that reports of only positive change (posttraumatic growth) were correlated with defensiveness and lower social support[9]. In contrast, the report of positive as well as negative changes following adversity was inversely correlated with defensiveness and positively correlated with increased social support and enhanced self-esteem (ibid).

Real posttraumatic growth was also conceptualised by high levels of mature defensiveness. According to Vaillant (1995), mature defences allow, although in softened way, a concerned person to see inner and outer reality and to accommodate experience. Although not significant, the moderation analysis could

[9] Sometimes the correlation between reports of posttraumatic growth and defensiveness could also indicate low levels of social support. If so, reports of posttraumatic growth correlated with defensiveness may not indicate illusory posttraumatic growth but instead only low levels of social support. However, this possibility has not been investigated within the thesis.

suggest that reports of posttraumatic growth are not or only slightly correlated with negative change following adversity when high levels of mature defensiveness are used. In contrast, posttraumatic growth was correlated with the experience of negative change following adversity at low levels of mature defensiveness. Two interpretations of the results could be possible. First, using mature defensiveness is a way of coping that hinders negative change following adversity but allows at the same time for real posttraumatic growth. If this were the case, real posttraumatic growth could occur without experiencing negative change when high levels of mature defensiveness are used. Second, the conceptualisation of real posttraumatic growth may be wrong concerning mature defensiveness. Mature defences could cloud internal and external reality. If this were the case, high levels of mature defensiveness could hinder the accommodation of the experience and, therefore, the development of real posttraumatic growth.

### 5.7. Limitations

This study has several limitations. Because of using list-wise deletion, the number of participants dropped to 75. Hence, it was only possible to detect significant correlations of r=.22 or higher. The study used a convenient sample. Therefore, the study is not representative (cf. Shadish et al., 2002) and it cannot be excluded that selection bias has occurred (Burnett, 2009). However, as Heiervang and Goodman (2011, p.70) point out "(…) selection bias is much more likely to affect point estimates such as prevalence than patterns of association". Therefore, reduced representativeness and potential selection bias may not substantially reduce the value of this research (cf. Butler et al., 2002; Heiervang and Goodman, 2011; Loewenthal, 1996). Moreover, the study has been cross-sectional and used correlational statistics. Therefore, no causal inferences can be drawn (Shadish et al., 2002).

Furthermore, the study may be prone to mono-operation bias as only self-report questionnaires were used. This could threaten the construct validity of the study (Shadish et al. 2002). Furthermore, the DSQ-40 has a low reliability concerning the neurotic and mature defence style. Therefore, the statistical

conclusion validity of this study could be impaired. The internal reliability of the scales was calculated by using only four items. The number of items used, however, affects the internal reliability (Loewenthal, 1996; Zeigler-Hill and Pratt, 2007). Moreover, the DSQ-40 shows satisfactory to very good test-retest reliability (Andrews et al., 1993).

The CiOQ, the current stress scale and the trauma severity scale showed violations of assumptions for parametric testing. Moreover, non-parametric moderation analyses using, for example, a median split reduce artificially the information of data (Frazier et al., 2004). According to Frazier and colleagues (2004) this method results in lower power to detect significant differences and leads, therefore, to a higher probability of doing Type II error. They also suggest that dichotomisation could produce spurious effects. Therefore, doing a Type I error could also increase.

In conclusion, the results indicate that sometimes reports of posttraumatic growth could be illusory. Moreover, although the moderation analysis was not significant potentially important trends were explored. Real posttraumatic growth (low levels of neurotic and immature defensiveness) could in tendency co-exist with negative change following adversity. Such a tendency could not be discovered for illusory posttraumatic growth (high levels of neurotic and immature defensiveness).

However, because the study was rather exploratory, further research is needed. First, future research could include a longitudinal research design in order to investigate whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with negative change following adversity over time. Second, to be more confident of the results, similar studies using different scales or the same scales could be carried out. Third, one could investigate the correlation between reports of posttraumatic growth and illusions from a different angle. This will be done within the next study. Here, the perspective on illusions will slightly change. The previous study explored how self-reported posttraumatic growth correlates with three clusters of defensiveness. The next study will explore how reports of posttraumatic growth correlate with a particular defence mechanism,

namely humour. Therefore, the next study explores real posttraumatic growth and illusory posttraumatic growth from a new angle.

## 6. An Internet Survey on Humour and Reports of Posttraumatic Growth

The previous chapter suggests that defence mechanisms are correlated with self-reported posttraumatic growth. Therefore, reports of posttraumatic growth may sometimes be illusory. Although not significant, the level of neurotic defensiveness and immature defensiveness affected the correlation between reports of posttraumatic growth and negative change following adversity. Here, real posttraumatic growth, measured by low levels of neurotic and immature defensiveness, was correlated with the experience of negative change following adversity. In contrast, illusory posttraumatic growth, measured by high levels of neurotic and immature defensiveness, was not correlated with the experience of negative change following adversity.

The results need to be replicated and to be validated by another study in which other measurements are used. This will be done within the next study. Moreover, the subsequent study intends to change the perspective slightly. The study will only focus on the defence mechanism of humour. According to Freud (2009), humour serves especially as a defence mechanism against negative affect. In addition, Vaillant (1995b) understands humour as an adaptive psychological function to deal with conflicting emotions and ideas. Erickson and Feldstein (2007) state that humour reduces negative affect and, therefore, enables people to confront life stress. Through humour and other mature defences, adversity can be endured, reality can be experienced and the ego is, nevertheless, protected. Overall, humour may play an important role in dealing with adversity and/or trauma and in the development of real posttraumatic growth. However, some forms of humour may also be conceptualised as maladaptive and rather a form of denial (Freud, 2006; Martin et al., 2003).

The next chapter first reviews the literature concerning humour and its correlation with self-reported posttraumatic growth. A possible correlation between humour, self-reported posttraumatic growth and self-enhancing strategies is then discussed. Afterwards, the research aims and hypotheses are listed. Finally, the online survey and its results are presented and discussed.

## 6.1. Introduction

Humour is considered a mature defence mechanism mitigating stress and adverse experiences (Freud, 2009; Vaillant, 1995b). Moreover, the use of humour may enable people to regulate negative affect (Freud, 2009; Vaillant, 1995). Several studies support the assumption that humour has the potential to mitigate psychological problems or adverse psychological states such as anxiety (Kuiper and Borowicz-Sibenik, 2005; Lebowitz, Sooyeon, Diaz and Emery, 2011), depression (Cheung and Yue, 2012; Kuiper and Borowicz-Sibenik, 2005; Martin et al., 2003; Thorson, Powell, Sarmany-Schuller and Hampes, 1997) and avoidance coping (Thorson et al., 1997). Other researchers suggest that humour is correlated with mental toughness (Veselka, Schermer, Martin and Vernon, 2010) and empathy (Hampes, 2010).

However, not all forms of humour may be categorised as mature defence mechanism. Martin and colleagues (2003) suggest that humour might have an adaptive side as well as a side resembling more the immature defence style of denial. Therefore, real posttraumatic growth may be correlated with adaptive humour. Adaptive humour styles are conceptualised as a mature defence mechanism within this thesis. In contrast, illusory posttraumatic growth may be correlated with maladaptive humour. Maladaptive humour styles are conceptualised as an immature defence mechanism within this thesis.

Self-reported posttraumatic growth shows in various studies a positive correlation with humour (e.g. Schroevers and Teo, 2008; Peterson, Park, Pole, Andrea and Seligman, 2008). However, several studies have found no correlation or no long-term effect between reports of posttraumatic growth and humour (e.g. Butler, Blasey, Garlan, McCaslin and Azarow, 2005; Park and Fenster, 2004; Park et al., 1996; Scrignaro, Barni and Magrin, 2010). In the same vein, the previous study did not find an independent correlation between reports of posttraumatic growth and mature defences consisting among others of humour. The conflicting results could perhaps be explained by the measurements used. None of the authors has used a humour measurement but humour was only a dimension of a higher construct like cognitive coping in “Coping Orientation to Problems Experienced”

(COPE), character strength in the "Values in Action-Inventory of Strength (VIA-IS) and mature defences in the DSQ-40.

In other words, the correlation between self-reported posttraumatic growth and humour has never been investigated with a measurement that is only constructed to measure humour. As mentioned above, humour is a multidimensional phenomenon and includes adaptive as well as maladaptive components. While adaptive humour can be conceptualised as mature defence mechanism maladaptive humour may be conceptualised as immature defence mechanism. The assumption made is based on a study conducted by Erickson and Feldstein (2007). Within their study, affiliative humour and self-enhancing humour were correlated with mature defensiveness while aggressive humour and self-defeating humour were correlated with immature defensiveness.

Within the subsequent study, it is attempted to investigate whether reports of posttraumatic growth are in fact correlated with defensiveness through the differentiation between adaptive humour as mature defence mechanism and maladaptive humour as immature defence mechanism. Moreover, it could also be possible to describe the correlation between real posttraumatic growth and negative change following adversity by separating real posttraumatic growth from illusory posttraumatic. The level of adaptive humour styles and maladaptive humour styles will be used as indicators of real posttraumatic growth and illusory posttraumatic growth. Real posttraumatic growth should be correlated with low levels of maladaptive humour and high levels of adaptive humour. In contrast, illusory reports of posttraumatic growth should be related to high levels of maladaptive humour styles and low levels of adaptive humour styles. This kind of investigation can be carried out with the Humor Style Questionnaire (HSQ).

In summary, the subsequent study attempts to investigate whether humour as a mature defence mechanism (adaptive humour styles) is correlated with reports of posttraumatic growth. Moreover, it will be examined whether certain forms of humour (maladaptive humour styles) which resemble rather immature defence mechanisms are correlated with reports of posttraumatic growth. In doing so it could be possible to replicate the findings within the previous study, namely that

reports of posttraumatic growth may be sometimes illusory. If so, it will be investigated whether real posttraumatic growth (high levels of adaptive humour or low levels of maladaptive humour) differs from illusory posttraumatic growth (low levels of adaptive humour or high levels of maladaptive humour) concerning their correlation with negative change following adversity.

To my knowledge, the type and perspective of the subsequent study has not been taken elsewhere. Finally, the subsequent study also tests whether reports of posttraumatic growth are correlated with self-enhancement. Several researchers suggest that this is not the case (Bossick, 2008; Park and Lechner, 2006). However, these results may be worth to replicate in order to be more confident in the assumption that reports of posttraumatic growth do not arise through the self-enhancement or positive illusions after Taylor (1989/ 1983). Moreover, it will be investigated whether the level of self-enhancement affects the correlation between reports of posttraumatic growth and negative change following adversity.

The hypotheses guiding the research are as follows:

1. Affiliative humour and self-enhancing humour are positively correlated with reports of posttraumatic growth but inversely with negative psychological changes.
2. Aggressive humour and self-defeating humour are inversely correlated with reports of posttraumatic growth and positively with negative psychological change.
3. Self-deception is neither correlated with reports of posttraumatic growth nor negative changes nor with any dimension of humour.
4. The level of adaptive and maladaptive humour styles and the level of self-enhancement moderate the correlation between reports of posttraumatic growth and negative change following adversity.

### 6.2. Procedure

Initially, it was important to decide whether the upcoming online survey should be open or closed. A closed survey refers to the procedure in which only

certain people are invited to take part into the survey (Eysenbach, 2005). Therefore, the sample frame is defined. The sample frame can be approached by email or by mail invitations. The term open or public survey, in contrast, refers to web surveys that are placed, for example, on web-pages and are open to everyone who comes along (Eysenbach, 2005). The latter method often faces critique concerning its scientific value since response rates are difficult to calculate, the sample frame is not defined and selection bias could occur (Eysenbach, 2005). Therefore, a closed survey is used in the following study. The sample was initially defined as students and staff members of the School of Sociology and Social Policy at the University of Nottingham, but was extended to members of the University of Nottingham at a later stage.

The survey was created with the Bristol Online Surveys tool. The material included in the online survey consisted of an informed consent form to which the respondents had to agree, the Changes in Outlook Questionnaire, the Posttraumatic Growth Inventory, the Balanced Inventory of Social Desirable Responding, the Humor Style Questionnaire and an adapted version of the Trauma Events Questionnaire. The survey also included some demographic data in order to describe the sample. Demographic data, which were collected, were age, gender, relationship status, education, religion, mother tongue, ethnicity and trauma occurrence. A sample of the information sheet and consent form is attached within appendix 12. All scales used were checked for copyright issues and researchers were contacted when copyrights issues had been unclear. All approached researchers agreed to the use of their scales. The Ethics Board of the School of Sociology and Social Policy approved the study on the 12th December 2012 (see appendix 15). On 23rd January 2013, the same Ethics Board approved several amendments.

To forward the survey invitation to potential participants several Departments and Schools of the University of Nottingham were approached. Initially, the web-moderator of the School of Sociology and Social Policy approved verbally on the 23rd of November 2012 to use the email list of the School

to forward the survey invitations to the potential participants. The first email request was forwarded on eighth of January 2013.

The potential respondents could log into the survey by using the following link https://www.survey.bris.ac.uk/nottingham/humor. Two reminders were sent to the students and staff members of the School of Sociology and Social Policy in order to raise the response rate. The first reminder was forwarded at 10th of January 2013 and, therefore, two days after launching the survey. This period is in accordance with the recommendation by Fan and Yan (2010). The second reminder was posted at 15 January 2013. Only two reminders were forwarded because it was attempted to reduce a possible response reluctance caused by too many reminders (Cook, Heath and Thompson, 2000). Moreover, van Horn, Green and Martinussen (2009) argue that more than two reminders do not increase the response rate significantly.

Following the second reminder, it had been noticed that the sample size was still too low. The reason for the low sample size could have been the sample frame that was restricted to members of the School of Sociology and Social Policy. Therefore, the sample frame was extended and other forms of gaining participants such as the distribution of flyers and snowball sampling were conducted. Moreover, nine other institutes and departments of the University of Nottingham were approached in order to gain support. Five departments agreed to forward the survey invitation to their students, namely the Psychology Department, the Maths Department, the Business School, the Faculty of Work, Health and Organisation and parts of the School of Education.

Furthermore, eight societies at the University of Nottingham were approached; however, no society was willing to forward the survey invitation. Moreover, 45 students who have been willing to participate in the study about defence mechanisms and posttraumatic growth in 2012 received a feedback email, which included an email link to the study about humour and posttraumatic growth. Finally, 32 flyers were conveniently distributed among students at the University of Nottingham. The online survey finally closed at 30 March 2013.

### 6.3. Subjects

Around 2900 students and members of the University of Nottingham received an invitation email concerning the online survey including a link to access the survey. Of those 2900 potential participants, 84 completed the online survey. However, 11 (13.09%) of the 84 participants were excluded because they did not meet the inclusion criteria of having experienced a traumatic event or having the intention to fill out the questionnaire seriously. A conservative interpretation of the total response rate is 2.51%. However, the response rate could actually be higher since only people who have experienced a trauma were invited to take part in the survey. Although this response rate is very low it may not distort the data in a correlational study substantially since such a study design is less concerned about the prevalence of a phenomenon but about the association between two or more psychological constructs (cf. Butler et al., 2002; Heiervang and Goodman, 2011).

### 6.4. Measures

To test the hypotheses five self-report questionnaires were used. These questionnaires are listed and discussed below.

#### 6.4.1. Adapted version of theTraumatic Events Questionnaire (TEQ); (Vrana and Lauterbach, 1994).

The study used an adapted form of the Traumatic Events Questionnaire by Vrana and Lauterbach (1994). This questionnaire was chosen because it is widely used in order to assess traumatic events. Moreover, several questionnaires that assess traumatic events are not free and were, therefore, too expensive. Finally, and probably most importantly, Vrana and Lauterbach agreed that their questionnaire could be used for free. The Traumatic Events Questionnaire is originally an 11-item questionnaire, which assesses the occurrence and the nature of one or several traumatic events. These items were included within the adapted version of the Traumatic Events Questionnaire. Moreover, the original measurement does not include an item to negate the experience of a trauma. This possibility was included

within the checklist of diverse traumatic events. Hence, within the thesis, the questionnaire was extended to twelve items. This decision has been made because of two reasons. The possibility to negate the experience of a trauma is important because of two reasons. First, if the respondent can only decide between diverse traumatic events they could be influenced to state the experience of a trauma even so they never thought before of having experienced a trauma. In that way, the researcher could create a reality (Wirklichkeit) which does not mirror reality. The second reason to include this item was more practical in nature. Because the study tried to gain only participants who have experienced a trauma this item serves as a kind of filter to make the analyses of the data easier.

While the Traumatic Events Questionnaire allows participants to state that they have experienced more than one traumatic event this version asked the respondents to decide which event they consider as most traumatic. This decision was made to simplify the data analysis. Moreover, the completion of the PTGI was alleviated because the subjects were supposed to answer the items by referring to a specific event.

The Traumatic Events Questionnaire also includes seven questions, which evaluate the context in which the trauma has occurred. These seven questions evaluate how often the traumatic event has happened and how old the person has been at the time the trauma had occurred. Three questions evaluate on a 7-point Likert scale how traumatic the event has been (trauma severity). One question assesses on a 7-point Likert scale how the trauma still affects the respective person (current distress). Only the four last questions were included into the online survey. This decision was made because the researcher tried to hold the survey as simple as possible. Finally, the subjects were asked how much time had elapsed since the trauma experience. The questionnaire is attached in appendix 8.

### 6.4.2. Posttraumatic Growth Inventory (PTGI); (Tedeschi and Calhoun, 1996).

The PTGI was used to assess self-reported posttraumatic growth. The PTGI has already been described (see 5.4.2). The questionnaire is attached in appendix 5.

#### 6.4.3. Changes in Outlook Questionnaire (CiOQ); (Joseph, Williams and Yule, 1993).

The CiOQ was used to assess positive change following adversity (posttraumatic growth) and negative change following adversity. The CiOQ has already been described (see 5.4.3). The questionnaire is attached in appendix 6.

#### 6.4.4. The Humor Style Questionnaire (HSQ) (Martin and colleagues, 2003).

The HSQ was used to assess sense of humour as a personality trait. The HSQ has already been described (see 4.4.2). The questionnaire is attached in appendix 2.

#### 6.4.5. Balanced Inventory of Desirable Responding (BIDR); (Paulhus, 1984).

The BIDR was used to assess self-deception. The BIDR has already been described (see 4.4.3). The questionnaire is attached in appendix 3.

### 6.5. Results

#### 6.5.1. Description of the sample.

The sample consisted of 79.5% females and 20.5% males and had a mean age of 31.93 (SD=11.89; R=44). The majority of the sample was Caucasian (82.2%) followed by Asian (6.8%). African/Black represented the sample by 5.5%. Five per cent of the sample stated that they prefer not to specify their ethnicity. Forty-six per cent of the respondents were Non-religious, 30.1% were Christians and 6.8% stated their religion was not listed in the possible answer boxes of the survey. All other assessed religious affiliations represented the sample by less than 5% (Muslim, Buddhist, Hindu and Sikh). Eight per cent of the sample stated that they prefer not to specify their religious affiliation.

Moreover, the sample consisted of 52.1% postgraduate students, 35.6% undergraduate students and 12.3% staff members. In addition, 31.5% of the sample had a postgraduate degree. Twenty-seven per cent of the respondents had some college degree, 26% of the respondents hold a graduate degree and 11% of

the participants had a doctorate. All other assessed educational degrees represented the sample by less than 3% (Other, High School). Forty-six per cent of the respondents stated they were single, 26% married, 13.7% cohabiting and 8.2% stated that none of the answer possibilities describes their relationship status. Four per cent of the sample stated being divorced and 1.4% of the respondents stated that they would prefer not to answer the question concerning their relationship status. Eighty-three per cent of the sample stated, furthermore, that their first language is English while 16.4% of the sample stated that English is not their first language.

The nature of the experienced trauma was also investigated in the online survey and is listed within table 10.

The mean of years elapsed since the traumatic event had occurred is 8.76 years (SD=8.32; R=35). Trauma severity (primary appraisal) had a mean of 3.58 (SD=1.29). That is, the participants rated the trauma severity in average as moderately traumatic. Current stress associated with the traumatic experience had a mean of 3.18 (SD=1.57). That is, the subjects rated their current distress caused by the trauma experience as moderately traumatic. One missing value emerged in this category because the participant preferred not to answer the question. This missing value was the only one within the whole data set. Because of the negligible amount of missing values, no missing data analysis was carried out.

In table 10 the demographic information are summarised on the next page.

Table 10. *Description of the Sample*

| | N | % | Mean (SD) | Range |
|---|---|---|---|---|
| **Participants** | **73** | | | |
| **Age** | 73 | | 31.93 (11.89) | 18-62 |
| **Sex** | **73** | | | |
| Female | 58 | 79.5 | | |
| Male | 15 | 20.5 | | |
| **Nature of Trauma** | **73** | | | |
| News of serious injury or death of someone close | 20 | 27.4 | | |
| Other Event | 10 | 13.7 | | |
| Physical or sexual abuse in Childhood | 9 | 12.3 | | |
| Serious Injury or danger to lose life | 8 | 11 | | |
| In abusive relationship as an Adult | 7 | 9.6 | | |
| Serious accident, large Fire or Explosion | 6 | 8.2 | | |
| Experience of a Trauma they cannot tell about | 4 | 5.5 | | |
| Experience of Crime | 4 | 5.5 | | |
| Other (below the 5% hurdle) | 5 | 6.8 | | |
| **Years elapsed since trauma** | **72** | 98.63 | 8.76 (8.32) | 0-35 |
| **First Language** | **73** | | | |
| English | 61 | 83.6 | | |
| Not English | 12 | 16.4 | | |
| **University Function** | **73** | | | |
| Undergraduate students | 26 | 35.6 | | |
| Postgraduate students | 38 | 52.1 | | |
| Staff members | 9 | 12.3 | | |

### 6.5.2. The quality of the data.

To run parametric tests, the sample should satisfy some test assumptions (Carlucci and Wright, 2012). Therefore, the total scales and age were inspected concerning their linearity (Benninghaus, 2002; Pallant, 2004), normality (Calucci and Wright, 2012; Pallant, 2004) and concerning significant outliers (Pallant, 2004).

The variables, age, years elapsed since the trauma, current distress and trauma severity were not linearly distributed. However, all other variables were linearly distributed. As suggested by Pallant (2004) to identify significant outliers, data were inspected concerning the difference between the mean and the trimmed mean. No significant outliers could be found. Hereupon, the data were inspected concerning their normality. The Kolmogorov-Smirnov test suggested that both scales of the CiOQ, the Self-deceptive Enhancement Scale of the BIDR, the trauma severity scale and the affiliative humour scale were not normally distributed. Moreover, the variables age, years elapsed since the trauma and current distress caused by the traumatic experience were not normal distributed.

Brosius (2008) suggests that parametric tests could still be used if the deviation from the normal distribution is minor. This was tested via a histogram. The histogram showed that the normal distribution was displayed to a meaningful proportion for all variables besides age and years elapsed since the trauma, negative change following adversity and current distress. Therefore, Spearman's rank order correlation coefficient will be used concerning the variables, which violated the assumption of normality to a substantial degree. Spearman's rank order correlation coefficient is a non-parametric alternative to the Pearson correlation coefficient (Pallant, 2004). For a more detailed discussion on the quality of data, please refer to section 4.5.3.

### 6.5.3. Internal reliability.

The internal reliability was calculated for the total scale of the PTGI, the positive scale of the CiOQ, the negative scale of the CiOQ, the two scales of the BIDR and all subscales of the HSQ. The internal reliabilities are illustrated in table 11.

Table 11. *Internal Consistencies and Descriptive Data for relevant Variables*

| Variable | Alpha (α) | Mean (SD) | Range |
|---|---|---|---|
| CiOQ (Positive Change Scale) | .83 | 44.12 (8.62) | 13-61 |
| CiOQ (Negative Change Scale) | .89 | 33.17 (12.60) | 15-66 |
| PTGI (Total Scale) | .93 | 51.64 (24.01) | 1-100 |
| BIDR (Image Management) | .74 | 6.53 (3.58) | 0-17 |
| BIDR (Self-Deceptive Enhancement) | .65 | 4.45 (2.65) | 0-11 |
| HSQ (Affiliative Humour) | .78 | 46.80 (6.39) | 22-56 |
| HSQ (Self-Enhancing Humour) | .82 | 38.27 (8.62) | 15-55 |
| HSQ (Aggressive Humour) | .67 | 26.49 (7.28) | 12-45 |
| HSQ (Self-Defeating Humour) | .80 | 29.93 (9.32) | 9-49 |

*NOTES.* CiOQ= Changes in Outlook Questionnaire; PTGI= Posttraumatic Growth Inventory; BIDR= Balanced Inventory of Desirable Responding; HSQ= Humour Style Questionnaire.

Usually, conservative researchers consider a value of Cronbachs alpha from 0.7 to 0.8 as an indicator for the reliability of a scale (e.g. Brosius, 2006; Bryman and Cramer, 2009). Therefore, the reliability of the Self-deceptive enhancement scale of the BIDR is rather moderate.

### 6.5.4. Correlates.

Correlation analysis was conducted in order to find out whether reports of posttraumatic growth are correlated with humour and self-enhancing strategies

(please refer to section 4.5.5. for a detailed discussion on correlations). Correlations were carried out between the PTGI, CiOQ, HSQ and BIDR. All variables were z-standardised as suggested by, for example, Benninghaus (2002) and Miles (2012). The correlations are listed in table 12. Noteworthy is that only significant correlations of .22 or above could be discovered.

As expected, self-enhancing humour was significantly correlated with reports of posttraumatic growth measured by the CiOQ-P. However, self-enhancing humour was not significantly correlated with reports of posttraumatic growth as measured by the PTGI. Self-enhancing humour was significantly and inversely correlated with negative change following adversity. Contrary to the hypotheses affiliative humour and aggressive humour were neither significantly correlated with reports of posttraumatic growth nor with negative change following adversity. As expected, self-defeating humour was significantly correlated with negative change following adversity. However, self-defeating humour was not correlated with reports of posttraumatic growth measured by the PTGI and by the CiOQ-P.

Neither the positive change scale of the CiOQ nor the PTGI were significantly correlated with the BIDR.

Finally, it was explored whether the variables age, sex, years elapsed since the traumatic event, and trauma severity as well as current distress were correlated with any total score testing the hypotheses within the study. Age was significantly correlated with years elapsed since the trauma ($rho=.27$; $p<.05$; $N= 73$) and affiliative humour ($rho= -.25$; $p<.05$; $N= 73$). Moreover, females were more likely to report higher levels of current distress than males ($rho=.40$; $p<.01$; $N= 72$). The variable years elapsed since the traumatic incident was significantly correlated with current distress ($rho= -.35$; $p<.01$; $N= 72$) and current distress was significantly correlated with the negative change scale of the CiOQ ($rho= .45$; $p<.01$; $N= 72$). Trauma severity (Primary appraisal) was not significantly correlated with any total scale used for hypotheses testing.

Table 12. *Correlates PTGI, CiOQ, HSQ, BIDR and Trauma Severity*

| Scale | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| ***PTGI*** | | | | | | | | | |
| 1. PTGI_Total | - | | | | | | | | |
| ***CiOQ*** | | | | | | | | | |
| 2. CiOQ-P | .61** | - | | | | | | | |
| 3. CiOQ-N | -.19 | -.24* | - | | | | | | |
| ***HSQ*** | | | | | | | | | |
| 4. Affiliative Humour | .08 | .14 | **-.17** | - | | | | | |
| 5. Self-Enhancing Humour | .17 | .38** | **-.40**** | .39** | - | | | | |
| 6. Aggressive Humour | -.18 | -.17 | **-.15** | -.03 | -.03 | - | | | |
| 7. Self-Defeating Humour | -.02 | .03 | **.23*** | .07 | -.05 | .26* | - | | |
| ***BIDR*** | | | | | | | | | |
| 8. Self-Deceptive Enhancement | **.**01 | .05 | **-.21** | .20 | .32** | -.16 | -.29* | - | |
| 9. Image Management | .07 | .20 | **.04** | .13 | .05 | -.31** | -.13 | .33** | - |

*NOTES*. N= 73. Correlations in bold are Spearman's rho. All other correlations are Pearson's r coefficients. PTGI= Posttraumatic Growth Inventory; CiOQ= Changes in Outlook Questionnaire; CiOQ-P= Changes in Outlook Questionnaire Positive Scale; CIOQ-N= Changes in Outlook Questionnaire Negative Scale; HSQ= Humor Style Questionnaire; BIDR= Balanced Inventory of Desirable Responding; *p<.05; **p>.01 (two-tailed).

This thesis attempts, among others, to investigate whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with well-being. Moderation analyses are used throughout the thesis in order to separate real posttraumatic growth from illusory reports of posttraumatic growth.

### 6.5.5. Moderation Analyses.

Moderation analyses were conducted to investigate whether the level of humour and the level of self-enhancing strategies affect the correlation between reports of posttraumatic growth and negative change following adversity. All humour styles, self-deceptive enhancement and impression management were considered as potential moderator variables. These moderation analyses were also used to test whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with negative change following adversity. Please refer to section 5.5.7 for a more detailed discussion on why moderation analyses were used within the thesis.

Affiliative humour and self-enhancing humour were conceptualised as a mature defence mechanisms. Therefore, using high levels of affiliative or self-enhancing humour was assumed indicative for real posttraumatic growth. Aggressive humour and self-defeating humour were assumed immature defence mechanisms. Therefore, using high levels of aggressive or self-defeating humour was assumed indicative for illusory reports of posttraumatic growth. Self-deceptive enhancement and impression management were assumed positive illusions after Taylor (1989/ 1983). High levels of self-deceptive enhancement and impression management were assumed indicative for a rather benign form of illusory posttraumatic growth.

It was hypothesised that those who report low levels of aggressive humour and self-defeating humour or high levels of affiliative humour and self-enhancing humour would show the highest correlation between reports of posttraumatic growth and negative change following adversity. It was further hypothesised that those who report high levels of self-deceptive enhancement and impression management would show the weakest correlation between reports of posttraumatic growth and negative change following adversity.

Through a median split, the sample was divided into a low humour group and a high humour group as well as low self-deceptive group and a high self-deceptive group. The low humour group and low self-deceptive group were defined by scoring below the median split. The high humour group and high self-

deceptive group were defined by scoring equal or above the median split. For each group the correlation between reports of posttraumatic growth and negative change following adversity was tested. Hereupon, the two groups (low humour vs. high humour) were compared for significant differences. The differences between the groups are displayed in the third column labeled z (p) within table 13. The same was done for the two self-deceptive groups, namely, for the low self-deceptive group and for the high self-deceptive group. The level of any humour style did not moderate significantly the correlation between posttraumatic growth and negative change following adversity (please see table 13.). The level of self-deception moderated significantly the correlation between negative change following adversity and posttraumatic growth measured by the CiOQ-P.

Table 13. *Correlation between Reports of Posttraumatic Growth and Negative Change moderated by Humour*

| **Negative Change following Adversity** | | | |
|---|---|---|---|
| | Low Humour Group | High Humour Group | z (p) |
| *HSQ* | | | |
| **Affiliative Humour** | | | |
| PTGI | -.10 (N=34) | -.24 (N=39) | z= .58 (p>.05) |
| CiOQ-P | -.22 (N=34) | -.27 (N=39) | z= .21 (p>.05) |
| **Self-enhancing Humour** | | | |
| PTGI | -.29 (N=34) | -.03 (N=39) | z= -1.09 (p>.05) |
| CiOQ-P | -.36* (N=34) | -.02 (N=39) | z= -1.45 (p>.05) |
| **Aggressive Humour** | | | |
| PTGI | -.13 (N=34) | -.28 (N=39) | z= .64 (p>.05) |
| CiOQ-P | -.16 (N=34) | -.39* (N=39) | z= 1.02 (p>.05) |
| **Self-defeating Humour** | | | |
| PTGI | -.29 (N=36) | -.12 (N=37) | z= .72(p>.05) |
| CiOQ-P | -.11 (N=36) | -.49** (N=37) | z= 1.74 (p>.05) |
| **Negative Change following Adversity** | | | |
| | Low Self-deception | High Self-deception | z (p) |
| **Self-deceptive Enhancement** | | | |
| PTGI | -.29 (N=29) | -.03 (N=44) | z= -1.07 (p>.05) |
| CiOQ-P | -.40* (N=29) | -.12 (N=44) | z= 2.17 (p<.05) |
| **Impression Management** | | | |
| PTGI | .04 (N=28) | -.31 (N=45) | z= 1.42 (p>.05) |
| CiOQ-P | -.12 (N=28) | -.32 (N=45) | z= .83 (p>.05) |

*NOTES.* All correlations are Spearmans rho coefficients. PTGI= Posttraumatic Growth Inventory; CiOQ-P= Positive change Scale of the Change in Outlook Questionnaire; HSQ= Humour Style Questionnaire; *p<.05; **p<.01 (list-wise deletion, 2-tailed).

**6.6. Discussion**

Self-enhancing humour was significantly correlated with reports of posttraumatic growth measured by the CiOQ-P. The non-significant correlation between self-enhancing humour and posttraumatic growth as conceptualised by Tedeschi and Calhoun (1996) runs contrary to expectations. These results can be explained in several ways. First, the sample size was too small to detect a significant correlation below r = .22. Second, reports of posttraumatic growth measured by the PTGI and reports of posttraumatic growth measured by the CiOQ-P could capture two different and partly independent sides of posttraumatic growth (Joseph and Linley, 2008c). Contrary to the hypotheses, affiliative humour, aggressive humour and self-defeating humour were not correlated with reports of posttraumatic growth measured by the PTGI and the CiOQ-P. The results suggest that reports of posttraumatic growth are not correlated with defensiveness when measured by the PTGI. Reports of posttraumatic growth measured by the CiOQ-P were correlated with the mature defence mechanism of self-enhancing humour.

The results appear to be in contrast to the results gained in chapter 5, in which reports of posttraumatic growth were significantly correlated with all defence styles. However, the previous study focused on various defences clustered into defence styles and not on humour in particular. In addition, the previous study suggested that only a neurotic defence style was uniquely correlated with reports of posttraumatic growth. Affiliative humour and self-enhancing humour may be categorised as mature defence style while aggressive humour and self-defeating humour may be categorised as immature defence style. This assumption is based, among others, on a study by Erickson and Feldstein (2007). The results of their study suggested that affiliative humour and self-enhancing humour were correlated with mature defensiveness while aggressive humour and self-defeating humour were correlated with immature defensiveness. Therefore, it may not be highly surprising that self-reported posttraumatic growth measured by the PTGI was not correlated with any humour style.

As expected, no significant correlation was discovered between self-enhancing strategies and reports of posttraumatic growth. Self-enhancing

strategies were assumed to constitute positive illusions after Taylor (1989/ 1983). Therefore, it was concluded that positive illusions might usually not influence reports of posttraumatic growth.

Moreover, the correlation between reports of posttraumatic growth and negative change following adversity was not significantly moderated by any humour style. However, some interesting tendencies concerning self-enhancing humour were noticeable and could warrant further preliminary exploration. The correlation (non-significant) between negative change following adversity and reports of posttraumatic growth was negative at low levels of self-enhancing humour. Low levels of self-enhancing humour could indicate illusory reports of posttraumatic growth. Therefore, potentially illusory reports of posttraumatic growth were again characterised by the perception of positive change following adversity without awareness for negative change. Cheng and colleagues (2006) come to similar results in their study about the SARS epidemic in Hong Kong.

Here, the experience of only positive change (posttraumatic growth) was correlated with defensiveness. The correlation (non-significant) between negative change following adversity and posttraumatic growth was low and meaningless at high levels of self-enhancing humour. High levels of self-enhancing humour could indicate that real posttraumatic growth could have taken place. These results could again suggest that mature defence mechanisms protect people from negative change following adversity and enable them at the same time to accommodate their experience and to develop real posttraumatic growth (Vaillant, 1995). The correlation between reports of posttraumatic growth, measured by the CiOQ-P, and negative change following adversity was significantly moderated by the level of self-deceptive enhancement. Posttraumatic growth and negative change following adversity were only slightly inversely correlated within the high self-enhancement group. In contrast, negative change following adversity and reports of posttraumatic growth were moderately inversely correlated within the low self-enhancement group. The results could suggest that negative change following adversity and posttraumatic growth are less likely to co-exist in case of real posttraumatic growth (indicated by low levels of self-deceptive enhancement) than

in case of illusory reports of posttraumatic growth (indicated by high levels of self-deceptive enhancement).

In total, with exception of self-enhancing humour, the correlation between reports of posttraumatic growth and humour was non-significant. Although some interesting tendencies concerning self-enhancing humour were preliminarily explored, the correlation between reports of posttraumatic growth and negative change following adversity was not affected by the level of any humour style. Taking the results together, it is suggested that the defence mechanism of humour may not remarkably influence reports of posttraumatic growth and its implications.

### 6.7. Limitations

The study has several limitations. First, the sample was gained via an internet link. Therefore, people who barely use the internet could have missed the survey. Furthermore, a convenient sample of people who are affiliated to the University of Nottingham was gained. Therefore, the results are not representative. However, this study was rather exploratory in nature investigating how reports of posttraumatic growth correlate with the defence mechanism of humour and self-enhancing strategies. As Heiervang and Goodman (2011, p.70) point out "(…) selection bias is much more likely to affect point estimates such as prevalence than patterns of association". Therefore, reduced representativeness and potential selection bias may not substantially reduce the value of this research (cf. Butler et al., 2002; Heiervang and Goodman, 2011; Loewenthal, 1996).

Moreover, the study was cross-sectional and used correlational statistics. Therefore, no causal inferences can be drawn (Shadish et al., 2002). Furthermore, the sample size was rather low, which decreases the strength of the results. Significant correlations below the value of .22 could not be discovered. Therefore, the probability of doing a type II error is increased (Weiß, 2008). The small sample size could have had an adverse effect for detecting significant differences between the groups concerning the moderation analyses.

Moreover, non-parametric moderation analyses reduce artificially the information of data (Frazier et al., 2004). According to Frazier and colleagues

(2004) this method results in lower power to detect significant differences and leads, therefore, to a higher probability of doing a Type II error. Moreover, they also suggest that dichotomisation could produce spurious effects. Therefore, doing a Type I error could be increased. In this way, potential otherwise significant differences between the groups could have been overseen. Moreover, the response rate of this study was very low (2.9%) which affects the generalizability of the research.

In addition, the self-deceptive enhancement scale of the BIDR and the aggressive humour scale of the HSQ had only a moderate reliability. Moreover, the study was prone to mono-operation bias. Within the adapted Traumatic Events Questionnaire, participants were asked to rate and name their most distressing event experienced. Because of this procedure, it is not possible to identify multiple traumas and this may have caused a significant loss of information. Therefore, this data reduction can be considered as detrimental for the study and may constitute a profound disadvantage of the adapted form of the Traumatic Events Questionnaire. The results of the study indicate several future research directions. First, the previous study did only marginally support the assumption that reports of posttraumatic growth are correlated with defence mechanisms. However, only humour was used to infer defensiveness. Therefore, further studies are needed to measure the concept of defensiveness and its correlation with reports of posttraumatic growth in more breadth. In addition, further studies may be necessary in order to explore preliminarily whether reports of posttraumatic growth could incorporate two separate psychological processes namely real posttraumatic growth and illusory posttraumatic growth.

Although some tendencies could be discovered in the previous studies, real posttraumatic growth and illusory posttraumatic growth did not differ significantly from each other concerning well-being measured by negative change following adversity. Moreover, it is still not entirely clear whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with well-being besides negative change following adversity. For example, it could be that real posttraumatic growth and illusory posttraumatic growth differ significantly from

each other within other well-being domains. Therefore, the subsequent two studies investigate again whether reports of posttraumatic growth are correlated with defensiveness. Moreover, it will be investigated whether illusory posttraumatic growth and real posttraumatic growth differ in their correlation with posttraumatic stress (cognitive processing) and emotional dysregulation (emotional processing).

## 7. Posttraumatic Stress and Reports of Posttraumatic Growth

The study within chapter 5 indicated that reports of posttraumatic growth are sometimes correlated with defensive processes. The correlation between reports of posttraumatic growth and defensiveness indicates that sometimes those reports could not be valid or real but instead illusory. That is, self-reported posttraumatic growth may incorporate two phenomena, namely, real posttraumatic growth and illusory posttraumatic growth. Both phenomena could have different psychological implications. Although not significant, the study within chapter 5 could suggest that real posttraumatic growth is sometimes positively correlated with negative change following adversity. In contrast, illusory posttraumatic growth could lack this correlation with negative change following adversity.

Within the subsequent studies, it is tested whether real reports of posttraumatic growth and illusory reports of posttraumatic growth differ in their correlation with posttraumatic stress (cognitive processing) and emotional dysregulation (emotional processing). The model in chapter 1.4.suggests that real reports of posttraumatic growth are not correlated with posttraumatic stress and emotional dysregulation. Furthermore, the model proposed that illusory reports of posttraumatic growth are correlated with posttraumatic stress and emotional dysregulation.

### 7.1. Introduction

Several theories have been developed to explain the correlation between posttraumatic growth and posttraumatic stress. The main presumption, which unites most theories, is that following a trauma the fundamental assumptions or the self-structure of an individual are shattered (Janoff-Bulman, 2009; Joseph and Linley, 2006; Tedeschi and Calhoun, 1996). That is, fundamental assumptions, which were held prior to the trauma, are no longer coherent with the adverse experience (Joseph, 2009). In other words, the traumatic experience is in conflict with the assumptions of the self and the worldview that guided the person's way of living prior trauma. The traumatic experience may often be incomprehensible by using the "classification" system of fundamental assumptions, which were built

prior trauma. Therefore, people may be inclined to change their fundamental assumptions in accordance to the experience made (e.g. Joseph and Linley, 2005). This change of fundamental assumptions is a learning process (e.g. Joseph, 2011) in which the person understands the trauma and what has happened to them (e.g. Joseph and Linley, 2005). It is assumed that real posttraumatic growth arises when fundamental assumptions have been reconstructed (e.g. Joseph, 2004).

Several researchers consider posttraumatic stress as a functional process in which the person attempts to find meaning in their experience (Horowitz et al, 1995; Joseph and Linley, 2005). Therefore, posttraumatic growth arises through a meaning-making process that is characterised by posttraumatic stress. Posttraumatic stress is coined by intrusive and avoidant states (Horowitz et al., 1995). Intrusive states are a sign that the concerned person attempts to understand (process) an aspect of the trauma (ibid). Avoidant states are present when the person needs to protect oneself from overwhelming states of stress or information (ibid). In other words, avoidant states are used to process the trauma bit by bit without being overwhelmed by the remembered event (ibid).

According to the theory proposed by Joseph (2004), Joseph and Linley (2005) and Joseph (2009) posttraumatic growth occurs when the trauma or parts of the trauma are understood and have been accommodated positively. Here, the person oscillates between intrusive and avoidant states until they have worked through the experience (Horowitz, 1986; Horowitz et al., 1995). “When a baseline is reached and intrusive and avoidant states are no longer present, this is explained as resulting from either cognitive assimilation of the traumatic memory or a revision of existing schemas to accommodate the new information” (Joseph and Linley, 2005, p. 272). According to these assumptions, intrusive and avoidant states (posttraumatic stress) may have diminished to a critical degree if their function is indeed making sense out of the experience and rebuilding fundamental assumptions (posttraumatic growth)[10]. Therefore, although real posttraumatic

[10] The assumptions described here on the development of posttraumatic growth do not mean that posttraumatic growth is a rigid outcome of a reconstructed self-structure (Joseph and Linley, 2008). Posttraumatic growth may also be a process that develops further over time (cf. O’Leary and Ickovics, 1995; Joseph and Linley, 2008).

growth may be set in motion by posttraumatic stress (cognitive processing) as, for example, suggested by Dekel, Ein-Dor and Solomon (2012) in the long run real posttraumatic growth and posttraumatic stress should be inversely correlated (Joseph, 2011)[11]. This assumption is also suggested in model 1.4 (figure 1.).

However, empirical studies do not coherently support the idea that reports of posttraumatic growth are inversely correlated with posttraumatic stress or trauma processing respectively. Several studies found a negative correlation between reports of posttraumatic growth and posttraumatic stress (e.g. Fontana and Rosenheck et al., 1998; Hall et al., 2008; McMillen, Smith and Fisher, 1997). Other studies failed to find any correlation between reports of posttraumatic growth and posttraumatic stress (e.g. Cordova et al., 2007; Frazier, Conlon and Glaser, 2001; Joseph et al., 1993; Salsman, Segerstrom, Brechting, Carlson and Andrykowski, 2009; Widows, Jacobsen, Booth-Jones and Fields, 2005). Other studies found a positive correlation between reports of posttraumatic growth and posttraumatic stress (e.g. Bayer-Topilsky, Itzhaky and Dekel, 2013; Dekel and Nuttman-Schwartz, 2009; Helgeson, Reynolds and Tomich, 2006; Nishi et al., 2010).

Moreover, several studies suggested that the correlation between reports of posttraumatic growth and posttraumatic stress is curvilinear (e.g. Butler et al., 2005; McCaslin et al., 2009; Colville and Cream, 2009; Kleim and Ehlers, 2009; Solomon and Dekel, 2007). The found quadratic correlation suggests that posttraumatic stress and reports of posttraumatic growth are correlated positively up to a certain point. The correlation between posttraumatic stress and reports of posttraumatic growth turns negative when scores on posttraumatic stress exceed this critical point (Joseph, 2011).

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[11] Several theories argue that distress and posttraumatic growth may sometimes or even often co-exist (e.g. Calhoun and Tedeschi, 2013; Joseph, 2011; Janoff-Bulman, 2009). However, it may be useful to differentiate between distress/pain and posttraumatic stress. When doing so, many authors agree, with varying degree and by using different viewpoints, that posttraumatic growth arises when automatic intrusive states and avoidant states have reduced (e.g. Joseph and Linley, 2005; Janoff-Bulman, 2009). Calhoun and Tedeschi (2013) do not incorporate explicitly avoidant states within their theoretical assumptions about the development of posttraumatic growth. They assume that automatic intrusive states transform into deliberate forms of making sense of the trauma before posttraumatic growth emerges (ibid). Automatic intrusive states, however, are a domain of posttraumatic stress. Thus, also this viewpoint assumes that one domain of posttraumatic stress has reduced when posttraumatic growth arises.

Some clarity concerning the correlation between posttraumatic stress and reports of posttraumatic growth has emerged because of a meta-analyses conducted by Shakespeare-Finch and Lurie-Beck (2014). Within their meta-analyses, they included 42 studies examining the correlation between reports of posttraumatic growth and posttraumatic stress. The results suggested that, in general, reports of posttraumatic growth are correlated with posttraumatic stress. The meta-analyses supported both, namely, a linear as well as a quadratic correlation between posttraumatic stress and reports of posttraumatic growth. Differences between those two solutions were minor[12].

According to several theories, posttraumatic growth arises when the trauma has been successfully or almost successfully processed (Joseph, 2004; Joseph and Linley, 2005). In other words, posttraumatic growth arises when posttraumatic stress has reduced or is not existent anymore. This theoretical assumption implicates a negative correlation between reports of posttraumatic growth and posttraumatic stress. However, the reviewed studies on reports of posttraumatic growth and posttraumatic stress implicate a positive correlation between reports of posttraumatic growth and posttraumatic stress. Therefore, the studies appear to suggest that the theory about posttraumatic growth needs to be adapted. In other words, the often observed positive correlation between reports of posttraumatic growth and posttraumatic stress (cognitive processing) indicates that posttraumatic growth does not arise through successful or almost successful trauma reconciliation or positive accommodation.

Three theories have been suggested to reconcile the theory of posttraumatic growth with the seemingly contradictory results. These three theories will be described in the next section. The latter theory was suggested in the model within chapter 1.4. First, several researchers have suggested that intrusive and avoidant states are below the cut-off point for diagnosing posttraumatic stress disorder when the report of posttraumatic growth occurs together with posttraumatic stress

[12] Therefore, a discussion whether the positive correlation between reports of posttraumatic growth and posttraumatic stress is quadratic or linear could be considered as rather irrelevant and a matter of mathematical brilliancy. What appears to be the case is that reports of posttraumatic growth are correlated positively with posttraumatic stress.

(Joseph, 2011). In other words, people who report posttraumatic growth may experience posttraumatic stress but not PTSD (Butler et al., 2005; Joseph, 2011).

However, Dekel and colleagues (2012) suggested in a longitudinal study conducted over a period of 17 years that those who were diagnosed with PTSD and those who endorsed subclinical PTSD had higher rates of self-reported posttraumatic growth than those who did not show posttraumatic stress. Moreover, also Colville and Cream (2009) suggested that people who score between around 17 and 48 point on the Impact of Event Scale (IES) report the highest scores on posttraumatic growth. Other authors suggested that IES scores higher than 25 implicate potential severe posttraumatic stress (Fischer and Corcoran, 2007).

Shakespeare-Finch and Lurie-Beck (2014) suggested in their meta-analysis that, in general, reports of posttraumatic growth are correlated positively with posttraumatic stress. Both a linear and quadratic association between posttraumatic stress and reports of posttraumatic growth were supported by their analysis. Therefore, the reviewed studies appear to suggest that self-reported posttraumatic growth is sometimes rather indicative for an on-going struggle with highly distressing psychological states than real posttraumatic growth after the theory suggested implicitly or explicitly by Calhoun and Tedeschi, (2013/ 2009), Tedeschi and Calhoun (1996), Janoff-Bulman (2009), Joseph (2004) Joseph and Linley (2005).

Other researchers (e.g. Bluvstein, Moravchick, Sheps, Schreiber and Bloch, 2012; Siegel and Schrimshaw, 2007) have suggested that posttraumatic growth mitigates the negative effect of traumatic stress or the additional negative effect in case of re-victimisation (Kunst, Winkel and Bogaerts, 2010). These assumptions support the idea that reports of posttraumatic growth are rather a coping strategy and illusory. If so, reports of posttraumatic growth are used in order to deal with stress.

In accordance to the model (figure 1.) proposed in chapter 1.4, reports of posttraumatic growth may sometimes be real and sometimes an illusory strategy to deal with traumatic stress as, for example, suggested by Frazier and colleagues (2009), Hall and colleagues (2009), Park and Folkman (1997), Taylor (1983) and

Zoellner and Maercker (2009). The assumption made is that reports of posttraumatic growth could incorporate two separate phenomena, namely, illusory reports of posttraumatic growth and real transformational posttraumatic growth. Illusory reports of posttraumatic growth and real transformational posttraumatic growth could relate differently with posttraumatic stress. It is assumed that the positive correlation between reports of posttraumatic growth and posttraumatic stress could potentially be explained by illusory posttraumatic growth. This assumption will be tested within the subsequent two studies.

In accordance with the model suggested in section 1.4, it will be investigated whether the correlation between reports of posttraumatic growth and posttraumatic stress (cognitive processing) and emotional dysregulation (emotional processing) is changing depending on the level of defensiveness. In other words, it will be examined whether real posttraumatic growth is in fact correlated with successful or almost successful trauma processing as suggested by Janoff-Bulman (2009), Joseph (2004), Joseph and Linley (2006/ 2005) and Tedeschi and Calhoun (1996) and as suggested within the theoretical model (figure 1.) of real posttraumatic growth within chapter 1.4.

Within the subsequent chapter, posttraumatic stress is used as a proxy for unresolved cognitive trauma processing while emotional dysregulation is used as a proxy for unfinished emotional trauma processing. The assumption that emotional dysregulation is a proxy of unresolved emotional processing is taken since emotional dysregulation resembles hyperarousal states. Rachman (1980) considers hyperarousal symptoms as a sign for unsuccessful emotional processing and Joseph and colleagues (2012) have considered hyperarousal states as potential barriers for affective-cognitive processing. A negative correlation between real posttraumatic growth and emotional dysregulation (emotional processing) and posttraumatic stress (cognitive processing) is expected to be discovered if real posttraumatic growth is, in fact, correlated with successful emotional trauma processing.

*Hypotheses and Aims of the studies*

The subsequent two studies have two aims. First, it is again investigated whether reports of posttraumatic growth are correlated with defence mechanisms and humour as special form of defensiveness. The results of this study could confirm the conclusions gained in chapter 5, namely, that reports of posttraumatic growth could sometimes be illusory. Illusory reports of posttraumatic growth could be indicated by (a) a positive correlation between reports of posttraumatic growth and a neurotic defence style or by (b) a positive correlation between reports of posttraumatic growth and an immature defence style or by (c) a positive correlation between reports of posttraumatic growth and negative humour styles. Finally, illusory posttraumatic growth and real transformational posttraumatic growth, as defined within the thesis, should differ in their correlation with well-being when, in fact, reports of posttraumatic growth incorporate two separate psychological processes.

Second, the studies test parts of the model on reports of posttraumatic growth proposed in Chapter 1.4 (figure 1.). Therefore, it is tested whether the correlation between reports of posttraumatic growth, posttraumatic stress and emotional dysregulation is moderated by defensiveness. In other words, the question under investigation is whether illusory posttraumatic growth and real posttraumatic growth differ in their correlation with posttraumatic stress (cognitive processing) and emotional dysregulation (emotional processing). According to the model proposed in chapter 1.4, real posttraumatic growth is defined by low levels of neurotic or immature defensiveness or by high levels of mature defensiveness. In contrast, illusory posttraumatic growth is defined by high levels of neurotic or immature defensiveness or by low levels of mature defensiveness.

The hypotheses are as follows:

1. Reports of posttraumatic growth are positively correlated with all defence styles and positive humour styles.
2. Reports of posttraumatic growth are correlated inversely with posttraumatic stress (cognitive processing) and emotional dysregulation (emotional processing).

3. The correlation between reports of posttraumatic growth, posttraumatic stress and emotional dysregulation is moderated by the level of all defence styles. The expected moderation is: the lower the level of maladaptive defensiveness the lower the correlation between reports of posttraumatic growth and posttraumatic stress as well as emotional dysregulation. Moreover, the higher the level of mature defences the lower the correlation between reports of posttraumatic growth and posttraumatic stress and emotional dysregulation.
4. The correlation between posttraumatic growth and posttraumatic stress and emotional dysregulation is moderated by the level of humour.

## 7.2 Study 1: Reports of Posttraumatic Growth and Trauma Processing among NGO Members and People in Helping Professions

The first study investigates whether reports of posttraumatic growth are correlated with defence styles, posttraumatic stress as well as emotional dysregulation. The sample consisted of NGO workers and people in helping professions. The sample was chosen because NGO workers are often exposed to traumatic events or adversity (e.g. Armstrong, Shakespeare-Finch and Shochet, 2014; Bride, 2007; Cardozo et al., 2005; Connorton, Perry, Hemenway and Miller, 2012, Shah, Garland and Katz, 2007; Jones, Müller and Maercker, 2006) and may be prone to develop posttraumatic stress (e.g. Armstrong et al., 2014; Connorton et al., 2012; Shah et al., 2007; Jones, 2006) as well as posttraumatic growth (Armstrong et al., 2014; Brockhouse, Msetfi, Cohen and Joseph, 2011; McCormack and Joseph, 2013; Kirby, Shakespeare-Finch and Palk, 2011; Paton, 2009; Lev-Wiesel, Goldblatt, Eisikovits and Admi, 2009).

### 7.2.1. Procedure.

An internet survey was created with the Bristol Online Survey tool. The Ethics Board of the School of Sociology and Social Policy initially approved the study on the 14/03/13 (see appendix 16). Several amendments were approved on the 30/08/13. In total, 20 NGO's around the globe were contacted to take part within the survey. Four of those contacted NGOs agreed forwarding the survey to their

employees or their members. Moreover, a link was forwarded to a group of therapists. Initially, an invitation email including the link to access the survey was forwarded to the NGOs. Hereupon, one reminder was sent. Data were collected between 13/05/2013 and the 01/12/13. Subjects received information concerning the study and gave their informed consent. A sample of the information sheet and consent form is attached in appendix 12.

The online survey consisted of demographic data to describe the sample and of six self-report measurements.

### 7.2.2. Measures.

#### *7.2.2.1. Adapted version of the Traumatic Events Questionnaire (TEQ); (Vrana and Lauterbach, 1994).*

An adapted version of the TEQ was used to assess the occurrence and nature of a traumatic event. Initially, participants were asked to indicate only the experience they consider as most traumatic. However, a range of participants also indicated more than one traumatic event. Hereupon, the possibility of multiple traumas was also included within the analysis. The adapted version of the TEQ has already been described (see 6.4.). The questionnaire is attached in appendix 8.

#### *7.2.2.2. Posttraumatic Growth Inventory (PTGI); (Tedeschi and Calhoun, 1996).*

The PTGI was used to measure posttraumatic growth. The PTGI has already been described (see 5.4.2). The questionnaire is attached in appendix 5. Within the previous chapters the CiOQ was included, among others, to explore the correlation between reports of posttraumatic growth and negative change following adversity. Within this chapter, negative change following adversity is not the object of the research. In addition, to hold the survey as simple as possible reports of posttraumatic growth were only measured by the PTGI. Therefore, the CiOQ was not included within the survey.

#### *7.2.2.3. The Humour Style Questionnaire (HSQ); (Martin and colleagues, 2003).*

The HSQ was used to measure sense of humour as personality trait. Within the next two studies, affiliative humour and self-enhancing humour will be summed up within a positive humour scale. In the same vein, aggressive humour and self-defeating humour will be summed up within a negative humour scale. In this way, the study will be simplified and the interpretation of the results could be facilitated. The HSQ has already been described (see 4.4.2.). The questionnaire is attached in appendix 2.

#### *7.2.2.4. Defense Style Questionnaire-40 (DSQ-40); (Andrews and colleagues, 1993).*

To measure defence mechanisms, the Defense Style Questionnaire-40 by Andrews and colleagues (1993) was used. The DSQ-40 has already been described (see 4.4.1.). The questionnaire is attached in appendix 1.

#### *7.2.2.5. Difficulties in Emotion Regulation Scale (DERS); (Gratz and Roemer, 2004).*

The DERS was used to measure emotional difficulties. The DERS has already been described (see 4.4.4.). The questionnaire is attached in appendix 4.

#### *7.2.2.6. Impact of Event Scale (IES); (Horowitz, Wilner and Alvarez, 1979).*

Horowitz and colleagues (1979) developed the IES through qualitative interviews in therapy. The IES is a 15 item self-report measurement assessing posttraumatic stress or cognitive processing respectively on a 4-point Likert scale. The IES consists of two subscales namely the intrusion and the avoidance subscale. The intrusion subscale consists of seven items while the avoidance subscale includes eight items. The score of the intrusive subscale ranges from 0 to 35. The score of the avoidance subscale ranges from 0 to 40. By adding up the two subscales, a total scale of posttraumatic stress (cognitive processing) is gained. Intrusion states

are, for example, captured by items such as “I thought about it when I didn’t mean to” and avoidant states are captured by items such as “I avoided letting myself get upset when I thought about it or was reminded of it”. The IES total score ranges from 0 to 75. Horowitz and colleagues (1979) reported means for 66 outpatients in California. They report a mean of 21.4 for the intrusive subscale and a mean of 18.2 for the avoidance subscale. For the IES total scale, they reported a mean of 39.5. The internal reliability is good ranging for the intrusion subscale from 0.72 to 0.92 and for the avoidance subscale from 0.65 to 0.90 (Sundin and Horowitz, 2002). In addition, Horowitz and colleagues (1979) reported good internal reliability for the IES total scale ($\alpha$=0.86). Moreover, they (ibid) report satisfactory split-half reliability, test-retest reliability and sensitivity. Therefore, the scale is able to differentiate between therapy users and non-therapy users. Finally, Sundin and Horowitz (2002) report satisfactory validity for the IES. The questionnaire is attached in appendix 9. This measurement was included into the survey as it is widely used and validated. Moreover, the IES was especially developed in order to measure intrusive and avoidant states.

#### 7.2.3. Subjects.

The link for the online survey was forwarded to members and employees of four NGOs and a group of therapists. Around 250 potential participants received the survey invitation and 32 subjects took part in the survey. Of those 32 subjects, two were excluded because they did not experience a traumatic event. The total response rate was around 12%. However, the actual response rate could be higher as only people who have experienced a trauma were invited to take part in the survey.

#### 7.2.4. Results.

##### *7.2.4.1. Description of the sample.*

The sample consisted of 73.3% females and 26.7% males and had a mean age of 45.41 (SD=10.86). In average (mean), the subjects have been working for the NGO for 8.25 years (SD=10.65). English was the first language for 53.3% of the

sample while English was not the first language for 46.7% of the sample. The majority of the sample was from the United Kingdom (50%) followed by Germany (33.3%). All other nationalities represented the sample by less than 10% (Netherlands, Ireland, Kenya and Switzerland). Forty-six per cent of the respondents were Christians and 36.7% were Non-religious. All other religious affiliations represented the sample by less than 10% (Preferred not to answer the question, Buddhist, Sikh, Other).

Forty percent of the sample had a postgraduate degree, 20% hold some college and 16.7% hold a graduate degree. All other degrees represented the sample by less than 10% (Preferred not answer the question, Doctorate, Vocational Secondary Education, Other). Sixty per cent of the respondents stated they are married. In each case, 13.3% stated that they are cohabiting or single. All other relationship circumstances represented the sample by less than 10% (Preferred not to answer the question, Divorced, Other)

The nature of the experienced trauma was also investigated in the online survey. Forty-three per cent stated they have been a victim of crime. Physical or sexual abuse in childhood, being in an abusive relationship as an adult, receiving news of mutilation and serious injury or violent or unexpected death of someone close as well as being seriously injured or in danger to lose life was represented by the sample in each case by 36.7%. Thirty-three per cent of the sample reported having experienced an event, which was not explicitly listed. Witnessing a crime or an accident and having witnessed a serious industrial, farm or car accident or large fire or explosion was represented by the sample in each case by 30%. Unwanted sexual contact as an adult and having experienced a trauma that one cannot talk about represented the sample in each case by 23.3%. Having been in a natural disaster was represented by the sample by less than 10%.

The majority of the sample have experienced one trauma (30%) and 20% have experienced four traumas. Moreover, 16.7% of the sample experienced three traumas, 13.3% experienced seven traumas and 10% experienced two traumas. All other frequencies were represented by the sample by less than 10% (five traumas and nine traumas). In addition, the number of traumatic events experienced by the

subjects had a mean of 3.36 (SD=2.26). Years elapsed since the traumatic event had occurred had a mean of 12.63 years (SD=11.70). Trauma Severity had a mean of 3.73 (SD=1.26). That is, the participants rated their experience in average as moderate traumatic. Current stress had a mean of 2.10 (SD=1.34). That is the majority of the participants reported that the traumatic event is not experienced as very traumatic anymore.

Table 14. *Description of the Sample*

| | N | % | Mean (SD) | Range |
|---|---|---|---|---|
| **Participants** | 30 | | | |
| **Age** | 30 | | 45.41 (10.86) | 27-64 |
| **Sex** | 30 | | | |
| Female | 22 | 73.3 | | |
| Male | 8 | 26.7 | | |
| **Number of Traumas** | 30 | | 3.36 (2.26) | 1-9 |
| **Years elapsed since trauma** | 27 | 90 | 12.63 (11.70) | 0.5-50 |
| **First Language** | 30 | | | |
| English | 16 | 53.3 | | |
| Not English | 14 | 46.7 | | |
| **Years working for NGO** | 24 | 80 | 8.25 (10.65) | 0.1-39 |

#### *7.2.4.2. Missing data analysis.*

The number of missing values was minor. Only nine missing values occurred for the whole data set and 99.82% of all values showed no missing values. Furthermore, 98.83% of the variables showed no missing values and 73.33% of the participants fully completed the survey. However, the missing values were imbalanced distributed. All missing data occurred within two variables namely, "years elapsed since the trauma has occurred" and "years working within the NGO". Here, 11% of values concerning the variable "years elapsed since the trauma" were missing. Moreover, 20% of the values concerning the variable "years working within the NGO" were missing. Therefore, the data and results including the two variables may be biased. However, no variable of a scale used for the testing the hypotheses were impacted. Therefore, although the demographic description of the sample could be biased concerning the two listed variables the results concerning hypothesis testing are not affected.

Only non-parametric tests will be used because the sample size has been low. Non-parametric tests do not rely on certain test assumptions such as the sample distribution (Pallant, 2004). Therefore, the data were not checked for assumptions which have the potential to influence the results when using parametric tests.

#### *7.2.4.3. Internal reliability.*

The internal reliability was calculated for the total scale of the PTGI, the scales of the DSQ-40, the scales of the IES, the scales of the HSQ and the total scale for the DERS. The internal reliabilities are illustrated in table 15.

Table 15. *Internal Consistencies and Descriptive Data for relevant Variables*

| Variable | Alpha (α) | Mean (SD) | Range |
|---|---|---|---|
| *DSQ-40* | | | |
| Mature Defence Style | .68 | 5.50 (1.24) | 2.50-7.88 |
| Neurotic Defence Style | .52 | 4.73 (1.12) | 2.38-7.25 |
| Immature Defence Style | .73 | 3.50 ( .83) | 1.58-4.75 |
| PTGI (Total Scale) | .91 | 52.16 (24.19) | 7-94 |
| *IES* | | | |
| Intrusion Scale | .88 | 14.86 (9.75) | 1-35 |
| Avoidance Scale | .77 | 10.86 (8.28) | 0-30 |
| IES (Total Scale) | .90 | 25.73 (16.94) | 1-65 |
| HSQ Positive Humour Scale | .89 | 79.36 (14.94) | 45-106 |
| HSQ Negative Humour Scale | .75 | 49.60 (12.03) | 30-74 |
| DERS (Total Scale) | .91 | 74.13 (16.18) | 44-113 |

*NOTES.* N=30*;* DSQ-40= Defence Style Questionnaire; PTGI= Posttraumatic Growth Inventory; IES= Impact of Event Scale; HSQ= Humor Style Questionnaire; DERS=Difficulties in Emotion Regulation Scale.

Usually, conservative researchers consider a value of Cronbachs alpha from 0.7 to 0.8 as an indicator for the reliability of a scale (e.g. Brosius, 2006; Bryman and Cramer, 2009). Therefore, the reliability of the mature defence scale and the neurotic defence scale is rather moderate. However, only four items were used to calculate the inter-item consistencies of a neurotic defence style and mature defence style. Cronbach's alpha, however, is affected by the numbers of items used (Zeigler-Hill and Pratt, 2007).

#### *7.2.4.4. Correlates.*

Correlation analysis was conducted in order to find out whether reports of posttraumatic growth are correlated with defensiveness and humour as special form of defensiveness. All variables included in the analysis were z-standardised as suggested by, for example, Benninghaus (2002) and Miles (2012). Because the sample size was small, the non-parametric correlation coefficient Spearman's rho was used. The correlations are listed in table 16.

Contrary to expectations, reports of posttraumatic growth were inversely correlated with all defence styles. However, because of the low sample size the correlations were non-significant. Moreover, reports of posttraumatic growth were significantly and inversely correlated with emotional dysregulation. That is, the more posttraumatic growth is reported the lesser the likelihood to experience emotional dysregulation. Although not significant, reports of posttraumatic growth were also correlated inversely with avoidant states, intrusive states and the IES total scale. Although not significant, positive humour correlated positively with the report of posttraumatic growth while negative humour correlated inversely with self-reported posttraumatic growth.

A neurotic and an immature defence style correlated positively and significantly with emotional dysregulation. However, a neurotic and an immature defence style showed only a minor or no correlation with posttraumatic stress. Contrary to expectations, a mature defence style correlated neither with emotional dysregulation nor with posttraumatic stress. Although not significant, a mature defence style was only correlated with the avoidance scale of the IES. Positive humour defined as a mature defence style correlated significantly and inversely with emotional dysregulation. Negative humour defined as an immature defence style did not correlate with posttraumatic stress and only slightly with emotional dysregulation (non-significant).

Finally, it was explored whether the variables age, sex, total number of traumas, years elapsed since the trauma as well as current distress and trauma severity were correlated with any total score used for hypotheses testing. Age was significantly correlated with positive humour ($rho = -.43$; $p < .05$; $N = 27$) and years

elapsed since the trauma (rho= .44; p<.05; N= 27). Moreover, males were more likely to report current distress than females (rho= -.39; p<.05; N= 27). Trauma severity was correlated with the total numbers of traumas experienced (rho=.57; p<.01; N=27). The variables current distress, years elapsed since the trauma and total number of traumas did not correlate with any other variables under consideration besides the variables already listed above. It should be borne in mind that the variable years elapsed since the trauma showed 11% missing values. Therefore, results concerning this variable could be biased.

Table 16. *Correlates DSQ-40, PTGI, HSQ, IES and DERS*

| Scale | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| ***DSQ-40*** | | | | | | | | | | |
| 1. Mature Defence Style | - | | | | | | | | | |
| 2. Neurotic Defence Style | .18 | - | | | | | | | | |
| 3. Immature Defence Style | .20 | .40* | - | | | | | | | |
| 4. **PTGI** (Total Scale) | -.23 | -.27 | -.34 | - | | | | | | |
| ***HSQ*** | | | | | | | | | | |
| 5. Positive Humour | .31 | .25 | .16 | .16 | - | | | | | |
| 6. Negative Humour | -.22 | .23 | .22 | -.20 | .26 | - | | | | |
| ***IES*** | | | | | | | | | | |
| 7. Intrusive Scale | .04 | -.12 | -.07 | -.04 | -.23 | -.09 | - | | | |
| 8. Avoidance Scale | .19 | -.00 | .19 | -.28 | -.07 | .05 | .73** | - | | |
| 9. IES (Total Scale) | .08 | -.05 | .05 | -.15 | -.19 | -.03 | .93** | .91** | - | |
| 10. **DERS** (Total Scale) | .03 | .49** | .38* | -.37* | -.40* | .10 | .22 | .38* | .35 | - |

*Notes.* N=30. All Correlations are Spearman's rho coefiicients. DSQ-40= Defense Style Questionnaire-40; PTGI= Posttraumatic Growth Inventory; HSQ= Humor Style Questionnaire; IES= Impact of Event Scale; DERS= Difficulties in Emotion Regulation Strategies; *p<.05;**p<.001 (two-tailed).

### 7.2.5. Discussion.

Although not significant, reports of posttraumatic growth were inversely correlated with all defence styles. Although not significant, positive humour, conceptualised as a particular form of mature defensiveness, was positively correlated with reports of posttraumatic growth. In contrast, negative humour, conceptualised as a particular form of immature defensiveness, was inversely correlated (non-significant) with reports of posttraumatic growth. Although the correlations were not significant the effect size was meaningful. Therefore, the results may indicate a direction or tendency worth to take into considerations. Therefore, within this sample reports of posttraumatic growth appear to be real. In tendency, the more posttraumatic growth is reported the less defensiveness is displayed. Hence, posttraumatic growth appears, in fact, to be a different phenomenon as defensiveness. These negative correlation between reports of posttraumatic growth and defensiveness were in contradiction to the results gained in study 5 within the thesis.

In addition, emotional dysregulation was significantly and inversely correlated with self-reported posttraumatic growth. Although not significant, reports of posttraumatic growth were inversely correlated with posttraumatic stress. Within this sample, real posttraumatic growth could be considered as an outcome[13] of successful cognitive processing (posttraumatic stress).

In conclusion, within this sample, reports of posttraumatic growth appear to be real. Reports of posttraumatic growth were inversely correlated with posttraumatic stress (non-significant) as well as emotional dysregulation (significant). Here, reports of posttraumatic growth appear to be correlated with successful trauma processing. It could be speculated that the differences between the study within chapter 5 and the current study may be caused by variables that make the two samples unique in their characteristics.

[13] The term “outcome” as used here means that the concerned person actually changed in some way and developed new attitudes and schemas and it does not mean that these outcomes are rigid and do not develop further over time (cf. O’Leary and Ickovics, 1995; Joseph and Linley, 2008).

For example, the current sample was in average older, married and higher in religiosity. Moreover, more females took part in this survey and the sample was in average higher educated. Finally and probably most importantly, the mean of the variable "years elapsed since the trauma" was significantly higher in this sample than in the sample of study 5. Luszczynska and colleagues (2012) and Zoellner and Marcker (2006) already suggest that reports of posttraumatic growth could be illusory when reported immediately after the traumatic event. Reports of posttraumatic growth may be real when more time has elapsed since the traumatic event (ibid). However, whether those variables may have caused the diverging results between the two studies is rather speculative and further studies need to be conducted in order to test the proposed possibilities.

#### 7.2.6. Limitations.

The study has several limitations. First, the sample size was low. Having only 30 participants substantially raises the probability to reject a hypothesis although it is true (Weiß, 2008). Significant correlations below the value of .36 could not be discovered. Moreover, the sample was gained via an internet link and people who have difficulties accessing the internet could have missed out the survey. Moreover, the response rate of this study was not high (12%) which could affect the power of the research. Furthermore, the research used a cross-sectional research design in which no causal inferences can be made. In addition, the reliabilities of the mature defence scale and the neurotic defence scale was moderate to unsatisfactory. However, only four items were used to calculate the inter-item consistencies of a neurotic defence style and mature defence style. However, the number of items affects Cronbach's alpha (Loewenthal, 1996; Zeigler-Hill and Pratt, 2007). In addition, the adapted version of the TEQ asked participants initially only to state their most traumatic experience. However, several participants stated more than one traumatic experience. These responses were later taken into account within the analysis. Therefore, it is likely that the variable "number of traumas experienced" underestimates the true number of

traumas experienced within the sample. Finally, the study was prone to mono-operation bias.

The sample size of the previous study was too low to conduct moderation analyses. Therefore, it was not possible to test whether the correlation between reports of posttraumatic growth and posttraumatic stress and emotional dysregulation is affected by the level of defensiveness. In other words, it was not possible to investigate whether real posttraumatic growth and illusory posttraumatic growth, as defined within the thesis, differ in their correlation with posttraumatic stress and emotional dysregulation. Because of this limitation, another study examining the same variables appeared to be useful.

## 7.3. Study 2: Reports of Posttraumatic Growth and Trauma Processing

The previous study contradicted the results presented in chapter 5. Although not significant, reports of posttraumatic growth and defence mechanisms were correlated inversely. The results could be caused by the unique characteristics of the sample or by the low sample size. Therefore, a second study was conducted with a larger sample size. Again, the aim of the study was to investigate whether reports of posttraumatic growth are correlated with defence styles, posttraumatic stress (cognitive processing as well as emotional dysregulation (emotional processing). A positive correlation between reports of posttraumatic growth and either a neurotic defence style, an immature defence style or negative humour could indicate that such reports are sometimes illusory.

Moreover, it will be tested whether the correlation between posttraumatic growth and posttraumatic stress (cognitive processing) and emotional dysregulation (emotional processing) is moderated by the level of any defence style and humour. Because of the low sample size, these moderation analyses have not been possible within the previous study. Through these moderation analyses, it is attempted to investigate whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with posttraumatic stress as well as emotional dysregulation. Real posttraumatic growth was defined by low levels of a neurotic defence style or by low levels of an immature defence style or by high levels of a mature defence style. In contrast, illusory posttraumatic growth was defined by high levels of neurotic or immature defensiveness or by low levels of mature defensiveness.

### 7.3.1. Procedure.

Two strategies were used to gain a sufficient sample size. First, through snowball-sampling, people received an email-link to access a survey placed in the internet. The internet survey was created with the Bristol Online Survey tool. The Ethics Board of the School of Sociology and Social Policy approved the study on the 30/08/13 (see appendix 17). To raise the sample size, the sample frame was kept wide and defined as people who have experienced a traumatic event. Data were

collected between 01/09/13 and 01/12/13 for the internet survey. Second, a questionnaire battery was created and conveniently distributed at a large East Midlands University. Data were collected between the 17/09/13 and 27/09/13. All participants were informed about the purpose of the study and were asked to give their informed consent. A sample of an information sheet and consent form can be found in appendix 12.

The information provided by the participants was as soon as possible anonymised. Therefore, every participant received an identification number and the consent form including personal details was separated from the questionnaire battery. All personal data were not entered into SPSS but kept separately. Following the anonymisation, the data were entered into SPSS twice as, for example, suggested by Carlucci and Wright (2012b). This procedure was chosen to discover entering mistakes (ibid). Hereupon, data were checked for accuracy. This procedure has already been described (see 4.2).

Both survey modes collected data consisting of demographic data to describe the sample and of six self-report measurements.

### 7.3.2. Measures.

#### *7.3.2.1. Adapted version of the Traumatic Events Questionnaire (TEQ); (Vrana and Lauterbach, 1994).*

The study used an adapted form of the Traumatic Events Questionnaire by Vrana and Lauterbach (1994). This adapted version of the TEQ has already been described (see 7.2.2. and 6.4.). The questionnaire is attached in appendix 8.

#### *7.3.2.2. Posttraumatic Growth Inventory (PTGI); (Tedeschi and Calhoun, 1996).*

The PTGI was used for measuring reports of posttraumatic growth. The PTGI has already been described (see 5.4.2.). The questionnaire is attached in appendix 5.

#### *7.3.2.3. The Humour Style Questionnaire (HSQ); (Martin and colleagues, 2003).*

The HSQ was used for measuring humour as personality trait. The HSQ has already been described (see 4.4.2.). The questionnaire is attached in appendix 2.

#### *7.3.2.4. Defense Style Questionnaire-40 (DSQ-40); (Andrews and colleagues, 1993).*

To measure defence mechanisms, the Defense Style Questionnaire-40 by Andrews and colleagues (1993) was used. The DSQ-40 has already been described (see 4.4.1.). The questionnaire is attached in appendix 1.

#### *7.3.2.5. Difficulties in Emotion Regulation Scale (DERS); (Gratz and Roemer, 2004).*

Difficulties in emotion regulation were measured by the DERS. The DERS has already been described (see 4.4.4.). The questionnaire is attached in appendix 4.

#### *7.3.2.6. Impact of Event Scale (IES); (Horowitz and colleagues, 1979).*

The IES was used for measuring posttraumatic stress or cognitive processing respectively. The IES consists of two subscales namely the intrusion and the avoidance subscale. The IES has already been described (see 7.2.2). The questionnaire is attached in appendix 9.

### 7.3.3. Subjects.

Around 160 people received an e-mail invitation for the internet survey and 322 people were approached and asked to fill in the pen and paper survey. Of the 482 subjects approached, 132 had experienced a trauma, were willing to fill in the survey and gave their informed consent. The total response rate was, therefore, around 27%.

### 7.3.4. Results.

#### *7.3.4.1. Description of the sample.*

The sample consisted of 59.8% females and 40.2% males and had a mean age of 24.69 (SD=6.87). English was the first language for 48.5% of the sample while English was not the first language for 51.5% of the sample. Thirty-eight percent of the respondents were Non-religious, 35.6% were Christians and 9.1% were Muslims. All other religious affiliations represented the sample below 5% (Buddhist, Hindu, Sikh, Other). Moreover, 4.5% of the sample preferred not to state their religious affiliations.

A graduate degree was the highest degree for 34.8% of the sample and 19.7% of the sample stated that a postgraduate degree is their highest degree. Eighteen percent of the sample stated that a high school degree is their highest degree and 16.7% had some college. All the other highest degrees represented the sample by less than 5% (Doctorate, Vocational Secondary Education, Other). Less than 1% of the sample preferred not to answer the question about their highest degree. Moreover, the sample consisted of 75.8% students and 20.5% were employed. All other groups represented the sample by less than 5% (Unemployed, Other). Seventy-two percent of the respondents stated they were single, 14.4% of the subjects reported, they were married and 8.3% stated to be cohabiting. All other groups represented the sample less than 5% (Other, in relationship, Separation).

The nature of the experienced trauma was also investigated in the survey (see table 17). Almost half of the sample experienced one trauma (n=58; 43.9%) and 35 subjects experienced (26.5%) two traumas. Moreover, 10.6% of the sample (n=14) experienced three traumas, 7.6% of the sample (N=10) experienced four traumas and 3.8% experienced five traumas. In addition, the number of traumatic events experienced had a mean of 1.92 (SD=1.13). Years elapsed since the traumatic event had occurred had a mean of 6.63 years (SD=6.89). Trauma Severity had a mean of 3.01 (SD=1.26). That is, the participants rated their experience in average as moderate traumatic. Current stress had a mean of 2.11

(SD=1.26). That is the participants reported that the traumatic event is not experienced as highly traumatic anymore.

Table 17. *Description of the Sample*

| | N | % | Mean (SD) | Range |
|---|---|---|---|---|
| **Participants** | 132 | | | |
| **Age** | 132 | | 24.69 (6.87) | 18-56 |
| **Sex** | 132 | | | |
| Female | 79 | 59.8 | | |
| Male | 53 | 40.2 | | |
| **Profession** | 132 | | | |
| Student | 100 | 75.8 | | |
| Employed | 27 | 20.5 | | |
| Unemployed | 4 | 3.00 | | |
| Other | 1 | .8 | | |
| **Number of Traumas** | 122 | 92.42 | 1.92 (2.00) | 1-5 |
| **Nature of Trauma** | | | | |
| Message of serious injury or death of someone close | 62 | 47 | | |
| Witnessing or involvement in an accident | 43 | 32.6 | | |
| Serious injury or danger to lose life | 30 | 22.7 | | |
| Witnessing of mutilation, serious injury, violent death | 28 | 21.2 | | |
| Crime | 17 | 12.9 | | |
| Natural disaster | 16 | 12.1 | | |
| Other event | 15 | 11.4 | | |
| Not able to talk about it | 15 | 11.4 | | |
| Abusive relationship (Adult) | 14 | 10.6 | | |
| Child abuse | 9 | 6.8 | | |
| Unwanted sexual contact (Adult) | 4 | 3 | | |
| **Years elapsed since trauma** | 112 | 84.84 | 6.63 (6.89) | 0-33 |
| **First Language** | 132 | | | |
| English | 64 | 48.5 | | |
| Not English | 68 | 51.5 | | |

#### *7.3.4.2. Missing value analysis.*

Missing data could produce misleading results. Therefore, missing data are analysed for all variables included into the data analysis (see 4.5.2 for a detailed discussion on missing value analysis).

First, the percentage of missing data for each variable was investigated. The percentage of missing data within the data set was minor. However, seven of 15 variables showed missing values above 5% namely: years elapsed since the trauma (15.2%), the positive humour scale (8.3%), number of traumas (7.6%), the PTGI total score (6.8%), the immature defence style (6.8%), trauma severity (5.3%) and current distress (5.3%). Three of 15 variables were included within hypotheses testing and could be able to bias the results. Therefore, the missing data were analysed further.

Eighty-six per cent of the variables showed missing values and 4.74% of all values within the data set were missing. Moreover, 37.12% of the subjects did not fully complete the questionnaire package. In accordance to suggestions by the University of Texas, a missing variable was created to inspect how much missing values occurred in each subject. Of those who did not fully complete the questionnaire 27 subjects showed one missing value, nine subjects showed two missing values, eight subjects showed three missing values, three subjects showed four missing values, one subject showed five missing values and one subject showed eight missing values. .

Missing values not at random could impose a significant risk to distort the data (Allison, 2001; Tabachnick and Fidell, 2007). Therefore, the Little's MCAR test has been conducted as suggested by Tabachnick and Fidell (2007). The result suggested that the missing data are completely at random ($\chi^2$=76.33; df =86; p>.05). Therefore, the test suggests that missing data should not impose a substantial risk to bias the subsequent results.

Although the Little's MCAR test suggested that the missing data are completely at random one needs to decide how to deal with missing values within the own data set. Although pair-wise exclusion would increase the sample size Allison (2001) explicitly warns against using pair-wise exclusion as it has the

potential to bias the results significantly. Therefore, within the study missing data will be list-wise excluded (see 4.5.2 for a detailed discussion).

#### *7.3.4.3. The quality of data*

To run parametric tests the sample should satisfy some test assumptions (Carlucci and Wright, 2012). Therefore, the total scales and age were inspected concerning their linearity (Benninghaus, 2002; Pallant, 2004), normality (Calucci and Wright, 2012; Pallant, 2004) and concerning significant outliers (Pallant, 2004).

First, the variables were inspected graphically through a scatterplot concerning their linearity. The variables age, current distress, the trauma total scale and "years elapsed since the trauma" were not linearly distributed. As suggested by Pallant (2004) to identify significant outliers, data were inspected concerning the difference between the mean and the trimmed mean. No significant outliers could be found. Hereupon, the data were inspected concerning their normality. The Kolmogorov-Smirnov test indicated that several variables were not normally distributed. Not normally distributed were the variables "years elapsed since the trauma", current distress, trauma severity, affiliative humour, aggressive humour, negative humour, emotional dysregulation, all scales of the IES, the trauma total scale and age. Hereupon, a log transformation was conducted. Following this transformation emotional dysregulation fulfilled the assumption of normal distribution.

In total, several variables must be considered as not normally distributed. Brosius (2008) suggested that parametric tests could still be used if the deviation from the normal distribution is minor. This was tested via a histogram. The histogram showed that the deviation from the normal distribution was minor for the variables trauma severity and negative humour. However, some tests are quite resilient against the violation of presumptions that ideally must be met (Rumsey, 2008). In other words, these tests can be conducted even if some assumptions for using them are violated. This is, for example, the case for regression analysis (Schmidt, 2009) and Pearson's correlations (cf. Miles, 2012). Because the sample

size is sufficient large (N>100) and because of the robustness of tests based on Pearson's correlations and regression analysis parametric tests are used.

#### *7.3.4.4. Internal reliability.*

The internal reliability was calculated for the total scale of the PTGI, the scales of the DSQ-40, the scales of the IES, the scales of the HSQ and the total scale of the DERS. The internal reliabilities are illustrated in table 18.

Table 18. *Internal Consistencies and Descriptive Data for relevant Variables*

| Variable | Alpha (α) | Mean (SD) | Range |
|---|---|---|---|
| *DSQ-40* | | | |
| Mature Defence Style | .48 | 5.71 (1.05) | 2.63-7.88 |
| Neurotic Defence Style | .39 | 4.87 (1.06) | 2.00-7.38 |
| Immature Defence Style | .74 | 4.02 ( .93) | 1.96-6.38 |
| PTGI (Total Scale) | .95 | 45.54 (25.64) | 0-102 |
| *IES* | | | |
| Intrusion Scale | .88 | 10.52 (9.51) | 0-35 |
| Avoidance Scale | .86 | 11.23 (10.08) | 0-40 |
| IES (Total Scale) | .92 | 21.34 (18.15) | 0-70 |
| HSQ (Positive Humour) | .81 | 78.48 (13.71) | 36-105 |
| HSQ (Negative Humour) | .76 | 60.03 (13.20) | 21-90 |
| DERS (Total Scale) | .91 | 83.00 (20.21) | 42-143 |

*NOTES.* DSQ-40= Defence Style Questionnaire; PTGI= Posttraumatic Growth Inventory; IES= Impact of Event Scale; HSQ= Humour Style Questionnaire; DERS=Difficulties in Emotion Regulation Scale.

Usually, conservative researchers consider a value of Cronbachs alpha from 0.7 to 0.8 as an indicator for the reliability of a scale (e.g. Brosius, 2006; Bryman and Cramer, 2009). Therefore, the reliability of the neurotic defence style, the mature defence style and the aggressive humour style is rather unsatisfactory.

#### *7.3.4.5. Correlates.*

Correlation analysis was conducted in order to find out whether reports of posttraumatic growth are correlated with defensiveness and humour as special form of defensiveness. All variables included into the analysis were z-standardised as suggested by, for example, Benninghaus (2002) and Miles (2012). The correlations are listed in table 19.

Only a neurotic defence style was significantly correlated with reports of posttraumatic growth. As expected, reports of posttraumatic growth were significantly correlated with intrusive and avoidant states and the total scale of the IES (posttraumatic stress). Contrary to expectations, reports of posttraumatic growth were not correlated with emotional dysregulation and negative/defensive humour.

Finally, it was explored whether the variables age, sex, the total number of traumas, years elapsed since the trauma, trauma severity and current distress were correlated with any scale used for hypotheses testing. Only significant correlation will be listed. Age was significantly correlated with years elapsed since the trauma ($r=.54$; $p<.01$; $N=83$), an immature defence style ($r= -.28$; $p<.01$; $N=83$), positive humour ($r= -.27$; $p<.05$; $N=83$) and negative humour ($r= -.28$; $p<.01$; $N=83$). Current distress was correlated significantly with trauma severity ($r=.42$; $p<.01$; $N=83$), intrusion states ($r=.54$; $p<.01$; $N=83$), avoidant states ($r=.49$; $p<.01$; $N=83$), overall posttraumatic stress ($r=.54$; $p<.01$; $N=83$), positive humour ($r=-.33$; $p<.01$; $N=83$) and emotional dysregulation ($r=. 42$; $p<.01$; $N=83$).

Trauma severity was correlated significantly with positive humour ($r= -.21$; $p<.05$; $N=83$), the total numbers of trauma ($r=.26$; $p<.05$; $N=83$) and emotional dysregulation ($r=.25$; $p<.05$; $N=83$). The variable “Years elapsed since the trauma” was correlated with positive humour ($r= -.24$; $p<.05$; $N=83$). However, the variable

years elapsed since the trauma showed a high number of missing data. Therefore, any results concerning this scale should be read with caution.

Females were more likely to report current distress (rho=.27; p<.05; N=83), posttraumatic growth (rho=.31; p<.01; N=83), avoidant states (rho=.38; p<.01; N=83), intrusion states (rho=.32; p<.01; N=83) and posttraumatic stress (rho=.38; p<.01; N=83). Moreover, males were more likely to report recent traumatic experiences (rho= -.29; p<.01; N=83).

Table 19. *Correlates DSQ-40, PTGI, HSQ, IES and DERS*

| Scale | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| ***DSQ-40*** | | | | | | | | | | |
| 1. Mature Defence Style | - | | | | | | | | | |
| 2. Neurotic Defence Style | .35** | - | | | | | | | | |
| 3. Immature Defence Style | .14 | .31** | - | | | | | | | |
| 4. **PTGI** (Total Scale) | .16 | .31** | -.02 | - | | | | | | |
| ***HSQ*** | | | | | | | | | | |
| 5. Positive Humour | .46** | .23* | .05 | .00 | - | | | | | |
| 6. Negative Humour | .00 | .07 | .33** | -.09 | .09 | - | | | | |
| ***IES*** | | | | | | | | | | |
| 7. Intrusive Scale | .18 | .20* | .16 | .26** | -.14 | .07 | - | | | |
| 8. Avoidance Scale | .15 | .22* | .30** | .30** | -.15 | .11 | .78** | - | | |
| 9. IES (Total Scale) | .17 | .22* | .24** | .30** | -.16 | .09 | .94** | .94** | - | |
| 10. **DERS** (Total Scale) | -.26** | .05 | .45** | .00 | -.36** | .20* | .31** | .35** | .35** | - |

*NOTES.* N= 102. All Correlations are Pearson's r coefficients. . DSQ-40= Defense Style Questionnaire-40; PTGI= Posttraumatic Growth Inventory; HSQ= Humour Style Questionnaire; IES= Impact of Event Scale; DERS= Difficulties in Emotion Regulation Strategies; *p<.05;**p<.001 (two-tailed).

#### *7.3.4.6. Regression analysis.*

The Pearson correlation coefficient is not based on calculations that determine the proportion of shared variance (Benninghaus, 2002). Therefore, it is not possible to determine the improvement in prediction of one variable on the basis of another variable (Benninghaus, 2002; Miles, 2012). This improvement of prediction on the basis of one or more variables is determined by using a regression analysis. Within a regression analysis, it was investigated whether posttraumatic stress and a neurotic defence style predict reports of posttraumatic growth. Although the IES total scale violated the assumptions of normality regression analysis was used since this test is usually rather resilient even if some assumptions are violated (Schmidt, 2009). The model had a $R^2$ of .15 (N=118). Therefore, the model explained 15% of the observed variance concerning reports of posttraumatic growth. A neurotic defence style ($\beta$=.27; $p<.01$) and the IES total scale ($\beta$=.24; $p<.01$) predicted significantly self-reported posttraumatic growth.

A mediation effect was tested between the variables of the PTGI, IES-total scale and neurotic defence style because all scales correlated positively with each other. The assumption was that the correlation between posttraumatic stress and self-reported posttraumatic growth (independent variable) is mediated by a neurotic defence style. In accordance to Howitt and Cramer (2014) a simple mediation analysis was conducted. The correlation between posttraumatic stress and reports of posttraumatic growth (r (N=118) =.29; 2-tailed $p<.01$) did not significantly change when a neurotic defence style was controlled ($\beta$ =.24, t (N=118) =2.76; 2-tailed $p<.01$). Therefore, the results suggest that the correlation between posttraumatic stress and reports of posttraumatic growth is not mediated by a neurotic defence style.

#### *7.3.4.7. Moderation effects.*

Moderation analyses were conducted to examine whether the correlation between reports of posttraumatic growth and posttraumatic stress as well as emotional dysregulation are moderated by the level of defensiveness. All defence styles, positive humour and negative humour were considered as potential moderator

variables. These moderation analyses were also used to test whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with posttraumatic stress and emotional dysregulation. Please refer to section 5.5.7 for a more detailed discussion on why moderation analyses were used within the thesis.

A mature defence style was assumed indicative of real posttraumatic growth. Therefore, using high levels of mature defensiveness was assumed indicative for real posttraumatic growth. High levels of a neurotic or immature defence style were assumed indicative for illusory reports of posttraumatic growth. Positive humour was conceptualised as a mature defence mechanism. Therefore, using high levels of positive humour was assumed indicative for real posttraumatic growth. Negative humour was conceptualised as an immature defence mechanism. Therefore, using high levels of negative humour was assumed indicative for illusory reports of posttraumatic growth.

It was hypothesised that real transformational posttraumatic growth is inversely correlated with posttraumatic stress and emotional dysregulation. In contrast, it was assumed that illusory reports of posttraumatic growth are positively correlated with posttraumatic stress and emotional dysregulation.

*7.3.4.7.1. Moderation defence styles: reports of growth and posttraumatic stress.*

Hierarchical regressions were conducted to answer the question whether the level of (a) mature defensiveness (b) neurotic defensiveness or (c) immature defensiveness affect the correlation between reports of posttraumatic growth and posttraumatic stress measured by the IES total scale.

In accordance with suggestions by Howitt and Cramer (2014) as well as Frazier and colleagues (2004), all data were z-standardized and an interaction term was created. Posttraumatic stress (total scale) was entered as dependent variable. The independent variables were mature defensiveness, neurotic defensiveness, immature defensiveness and reports of posttraumatic growth. Four blocks were created to test interaction effects for each potential moderator individually. The

blocks entered were: (1) z-values of all the potential moderator variables (mature defensiveness, neurotic defensiveness and immature defensiveness) and z-values for reports of posttraumatic growth (2) interaction term of mature defensiveness and reports of posttraumatic growth (3) interaction term of neurotic defensiveness and reports of posttraumatic growth (4) interaction term of immature defensiveness and reports of posttraumatic growth.

The correlation between reports of posttraumatic growth and posttraumatic stress was not significantly moderated by the level of mature defensiveness ($F(3.82)$ change= 0.59; $R^2$change= .00; $p>.05$; N=113), the level of neurotic defensiveness ($F(3.54)$ change= 1.98; $R^2$change= .01; $p>.05$; N= 113) and the level of immature defensiveness ($F(3.07)$ change= .34; $R^2$change= .00; $p>.05$; N= 113).

The hierarchical regression analysis did not show a significant moderation effect of any defence style. However, it cannot be excluded that extreme low levels of defensiveness and extreme high levels of defensiveness do moderate the correlation between reports of posttraumatic growth and posttraumatic stress. Contrasting extremes could be a way to make it easier to understand the difference between low defensive reports of posttraumatic growth (real posttraumatic growth) and high defensive reports of posttraumatic growth (illusory posttraumatic growth). Therefore, two groups were built by using the 25% quartile and the 75% quartile of the sample as cut-off points. The two groups consisted of (a) those 25% of the sample who scored lowest in defensiveness and (b) those 75% of the sample who scored highest in defensiveness. By creating two groups, it could be possible to make the difference between real posttraumatic growth and illusory posttraumatic growth more obvious.

All these listed arguments made conducting an additional non-parametric moderation analysis reasonable. The aim was again to assess whether the level of defensiveness moderates the correlation between reports of posttraumatic growth and posttraumatic stress measured by the IES total score. The mature defence style, the neurotic defence style and the immature defence style were each categorised into a low defensive group and a high defensive group. Low defenders

were defined as subjects scoring below or equal the 25% quartile. High defenders were defined as subjects scoring above or equal the 75% quartile. Correlations (Spearman's rho) were calculated between the IES total scale and self-reported posttraumatic growth for each group (low defenders vs. high defenders). Afterwards, the correlations were compared to detect potential moderator effects.

Only the level of a neurotic defence style moderated significantly the correlation between reports of posttraumatic growth and posttraumatic stress. The correlation between self-reported posttraumatic growth and posttraumatic stress was strongest at low levels of neurotic defensiveness. In contrast, reports of posttraumatic growth and posttraumatic stress were negative correlated at high levels of neurotic defensiveness. The results are displayed in table 20. The p-values for the group differences can be found in the third column under z (p).

Table 20. *Correlation between Reports of Posttraumatic Growth and Posttraumatic Stress moderated by Defensiveness*

| | PTGI | | |
|---|---|---|---|
| | Low Defenders | High Defenders | z (p) |
| **Mature Defences** | | | |
| IES (Total) | .31 (N=36) | .16 (N=30) | z= .61; (p>.05) |
| **Neurotic Defences** | | | |
| IES (Total) | .56** (N=31) | -.08 (N=27) | z= 2.56; (p<.05) |
| **Immature Defences** | | | |
| IES (Total) | .07 (N=30) | .04 (N=25) | z= .51; (p>.05) |

*NOTES* . All correlations are Spearmans rho coefficients. PTGI= Posttraumatic Growth Inventory; IES= Impact of Event Scale (listwise-deletion, 2-tailed).

*7.3.4.7.2. Moderation defence styles: reports of growth and emotional dysregulation.*

Hierarchical regressions were conducted to answer the question whether the level of (a) mature defensiveness (b) neurotic defensiveness or (c) immature defensiveness affect the correlation between reports of posttraumatic growth and emotional dysregulation (emotional processing).

In accordance to suggestions by Howitt and Cramer (2014) as well as Frazier and colleagues (2004) all data were z-standardized and an interaction term was created. Emotional dysregulation (emotional processing) was entered as dependent variable. The independent variables were mature defensiveness, neurotic defensiveness, immature defensiveness and reports of posttraumatic growth. Four blocks were created to test interaction effects for each potential moderator individually. The blocks entered were: (1) z-values of the potential moderator variable (mature defensiveness, neurotic defensiveness and immature defensiveness) and z-values for reports of posttraumatic growth (2) interaction term of mature defensiveness and reports of posttraumatic growth(3) interaction term of neurotic defensiveness and reports of posttraumatic growth (4) interaction term of immature defensiveness and reports of posttraumatic growth.

The correlation between reports of posttraumatic growth and emotional dysregulation was not significantly moderated by the level of mature defensiveness ($F$ (10.05) change= 1.95; $R^2$change= .01; $p>.05$; $N= 113$), the level of neurotic defensiveness ($F$ (8.31) change= .05; $R^2$change= .00; $p>.05$; $N= 113$) and the level of immature defensiveness ($F$ (7.25) change= .95; $R^2$change= .00; $p>.05$; $N= 113$).

Within the hierarchical regression analysis, no defence style moderated significantly the correlation between reports of posttraumatic growth and emotional dysregulation (emotional processing). However, it cannot be excluded that extremely high levels of defensiveness and extremely low levels of defensiveness do moderate the correlation between reports of posttraumatic growth and emotional dysregulation (emotional processing). Contrasting extremes could be a way to make it easier to understand the difference between low

defensive reports of posttraumatic growth (real posttraumatic growth) and high defensive reports of posttraumatic growth (illusory reports of posttraumatic growth). Therefore, two groups were built by using the 25% quartile and the 75% quartile of the sample. The two groups consisted of (a) those 25% of the sample who scored lowest in defensiveness and (b) those 75% of the sample who scored highest in defensiveness.

Specifically, the mature defence style, the neurotic defence style and the immature defence style were each categorised into a low defensive group and a high defensive group. Low defenders were defined as subjects scoring below or equal the 25% quartile of the sample. High defenders were defined as subjects scoring above or equal the 75% quartile of the sample. Correlations (Spearman's rho) were calculated between the total scale of emotion regulation difficulties and self-reported posttraumatic growth for each group (low defenders vs. high defenders). Afterwards, the correlations were compared to detect potential moderator effects.

The level of defensiveness did not moderate the correlation between reports of posttraumatic growth and emotional dysregulation. The results are displayed in table 21. The p-values for the group differences can be found in the third column under z (p).

Table 21. *Correlation between Posttraumatic Growth and Emotional Dysregulation moderated by Defensiveness*

| | PTGI | | |
|---|---|---|---|
| | Low Defenders | High Defenders | z (p) |
| **Mature Defences** | | | |
| DERS (Total) | -.00 (N=35) | .18 (N=33) | z= -.71; (p>.05) |
| **Neurotic Defences** | | | |
| DERS (Total) | -.23 (N=30) | -.10 (N=29) | z= -.48; (p>.05) |
| **Immature Defences** | | | |
| DERS (Total) | -.00 (n=29) | -.18 (N=28) | z= .65; (p>.05) |

*NOTES* . All correlations are Spearmans rho coefficients. PTGI= Posttraumatic Growth Inventory; DERS= Difficulties in Emotion Regulation Strategies (list-wise deletion, 2-tailed).

*7.3.4.7.3. Moderation of positive and negative humour styles.*

Hierarchical regressions were conducted to answer the question whether the level of positive and negative humour affects the correlation between reports of posttraumatic growth and posttraumatic stress as well as emotional dysregulation.

The first hierarchical regression investigated whether the level of positive humour and negative humour moderates the correlation between posttraumatic stress measured by the IES-total scale and reports of posttraumatic growth. In accordance to suggestions by Howitt and Cramer (2014) as well as Frazier and colleagues (2004) all data were z-standardised and interaction terms were created. The independent variables were positive humour, negative humour and reports of posttraumatic growth. Posttraumatic stress (IES-total scale) was the dependent variable. Three blocks were created to test interaction effects for each potential moderator individually. The three blocks entered were: (1) z-values of the potential moderator variables (positive humour and negative humour) and z-values for reports of posttraumatic growth (2) interaction term of positive humour and reports of posttraumatic growth (3) interaction term of negative humour and reports of posttraumatic growth.

The correlation between reports of posttraumatic growth and posttraumatic stress was neither significantly moderated by the level of positive humour (F (3.40) change= .06; $R^2$change= .00; p>.05; N=110) nor by the level of negative humour (F (3.31) change= 2.73; $R^2$change= .02; p>.05; N=110).

The second model examined whether the level of positive humour and negative humour moderated the correlation between reports of posttraumatic growth and emotional dysregulation (emotional processing). In accordance to suggestions by Howitt and Cramer (2014) and by Frazier and colleagues (2004) all data were z-standardized and an interaction term was created. The independent variables were positive humour, negative humour and reports of posttraumatic growth. Emotional dysregulation (emotional processing) was entered as dependent variable. The dependent variable was reports of posttraumatic growth. Three blocks were created to test interaction effects for each potential moderator individually. The three blocks entered were: (1) z-values of the potential moderator variable (positive humour and negative humour) and z-values for reports of posttraumatic growth (2) interaction term of positive humour and reports of posttraumatic growth (3) interaction term of negative humour and reports of posttraumatic growth.

The correlation between reports of posttraumatic growth and emotional dysregulation was neither significantly affected by the level of positive humour (F (6.32) change= .41; $R^2$change= .00; p>.05; N=112) nor by the level of negative humour (F (5.20) change= .77; $R^2$change= .00; p>.05; N=112).

Within the regression analyses, no humour style significantly moderated the correlation between reports of posttraumatic growth and trauma processing (posttraumatic stress and emotional dysregulation). However, it cannot be excluded that extremely low levels of humour and extremely high levels of humour affect the correlation between reports of posttraumatic growth and trauma processing (posttraumatic stress and emotional dysregulation). Contrasting extremes could be a way to make it easier to understand the difference between low defensive reports of posttraumatic growth (real posttraumatic growth) and high defensive reports of posttraumatic growth (illusory reports of posttraumatic

growth). Therefore, two groups were built by using the 25% quartile and the 75% quartile of the sample. The two groups consisted of (a) those 25% of the sample who scored lowest on humour and (b) those 75% of the sample who scored highest on humour.

Specificially, positive humour and negative humour were each categorised into a low humour group and a high humour group. The low humour group was defined by subjects scoring below or equal the 25% quartile. The high humour group was defined by subjects scoring above or equal the 75% quartile. Correlations (Spearman's rho) were calculated between the IES scales, the emotion regulation difficulties scale and self-reported posttraumatic growth for each group (low humour group vs. high humour group). Afterwards, the correlations were compared to detect potential moderator effects.

The level of humour did not moderate the correlation between reports of posttraumatic growth and posttraumatic stress. The results are displayed in table 22. The p-values for the group differences can be found in the third column under z (p).

Table 22. *Correlation between Reports of Posttraumatic Growth, Posttraumatic Stress and Emotional Dysregulation moderated by Humour*

| | **PTGI** | | |
|---|---|---|---|
| | Low Defenders | High Defenders | z (p) |
| **Positive Humour** | | | |
| IES (Total) | .03 (N=27) | .32 (N=32) | z= -1.09; (p>.05) |
| DERS (Total) | .18 (N=27) | .12 (N=32) | z= .22; (p>.05) |
| **Negative Humour** | | | |
| IES (Total) | .12 (N=29) | .42** (N=37) | z= -1.25; (p>.05) |
| DERS | -.35* (N=29) | .11 (N=37) | z= -1.82; (p>.05) |

*NOTES* . All correlations are Spearmans rho coefficients. PTGI= Posttraumatic Growth Inventory; IES= Impact of Event Scale; DERS= Difficulties in Emotion Regulation Strategies (list-wise deletion, 2-tailed).

### 7.3.5. Discussion.

Only a neurotic defence style was significantly correlated with reports of posttraumatic growth. This result is in line with the study presented within chapter 5. Three interpretations of the results could be possible. First, the results could indicate that reports of posttraumatic growth are sometimes illusory. Second, reports of posttraumatic growth and neurotic defensiveness are both positively correlated with another variable that has not been investigated. Finally, Jayawickreme and Blackie (2014) suggest that reports of posttraumatic growth could be rather reflect a personality trait. If so, the correlation between reports of posttraumatic growth and defensiveness could only reflect a certain personality structure.

Positive humour and negative humour were not correlated with reports of posttraumatic growth. As already indicated in a study by Erickson and Feldstein (2007), the reason may be that positive humour could be conceptualised as a mature defence style while negative humour could be conceptualised as an immature defence style. Since mature defensiveness as well as immature defensiveness were not correlated uniquely with reports of posttraumatic growth, it is reasonable that also no humour style was correlated with reports of posttraumatic growth.

As predicted, self-reported posttraumatic growth was significantly correlated with posttraumatic stress (cognitive processing). Contrary to expectations, self-reported posttraumatic growth was not significantly correlated with emotional dysregulation (emotional processing). Therefore, within this sample reports of posttraumatic growth were not indicative of successful cognitive trauma processing.

Moreover, hierarchical moderation analyses indicated that the correlation between posttraumatic stress, emotional dysregulation and reports of posttraumatic growth were not moderated by the level of defensiveness. However, this relationship changed somewhat when only extreme levels of low defensiveness and extreme levels of high defensiveness were included into the moderation analyses. Here, the correlation between reports of posttraumatic growth and

posttraumatic stress was moderated by the level of neurotic defensiveness. The correlation between reports of posttraumatic growth and posttraumatic stress was positive at extreme low levels of neurotic defensiveness. In contrast, the correlation between reports of posttraumatic growth and posttraumatic stress was negative at extreme high levels of neurotic defensiveness. Within chapter 1.4, real posttraumatic growth was defined by low levels of neurotic defensiveness while illusory reports of posttraumatic growth were defined by high levels of neurotic defensiveness. Therefore, the moderation analyses suggest that real and illusory posttraumatic growth do only slightly differ from each other concerning well-being as measured by posttraumatic stress and emotional dysregulation. Real posttraumatic growth, measured by extreme low levels of neurotic defensiveness, is positively correlated with posttraumatic stress while illusory posttraumatic growth, measured by high neurotic defensiveness, is inversely correlated with posttraumatic stress.

The results are in contrast to predictions in which real posttraumatic growth results from successful cognitive processing indicated by no or low levels of posttraumatic stress (Janoff-Bulman, 2009; Joseph and Linley, 2006). According to the listed theories, posttraumatic stress should not be present anymore or should have reduced to a significant degree when posttraumatic growth is reported. Therefore, the assumption that real posttraumatic growth is not correlated with posttraumatic stress must be rejected within this sample. In contrast, the results suggested that real posttraumatic growth is correlated with posttraumatic stress when extreme low levels of neurotic defensiveness are used. Hence, real posttraumatic growth is not uniquely correlated with trauma reconciliation.

A reasonable explanation may be that both real posttraumatic growth and posttraumatic stress result from shattered fundamental assumptions as, for example, suggested by Dekel and colleagues (2012), Janoff-Bulman (2009) and Joseph (2011). These shattered fundamental assumptions could force an individual to change them. Contrary to theories (e.g. Joseph and Linley, 2005; Joseph, 2004), this change (accommodation) could be independent from successful trauma

reconciliation but could produce a mental state within the person, where the destructed fundamental assumptions are experienced (intrusion and avoidant states). However, at the same time, the loss could be used to build something new (cf. Lev-Wiesel and Amir, 2009). This change could constitute real posttraumatic growth (ibid). In other words, a low defensive person may experience posttraumatic stress states but remains at the same time open to new experiences as well (cf. Joseph, 2004). In this way, new structures could be built (ibid) or disrupted structures could be used more intensively in domains where they are still unbroken. Within the latter assumption the concerned person could develop real posttraumatic growth and at the same time they could experience posttraumatic stress (cognitive processing) which results from the loss of former beliefs or fundamental assumptions.

### 7.3.6. Limitations.

This study has several limitations. First, the sample was gained by two different survey modes. In other words, the sample is not homogeneous and, therefore, not representative. However, this study was rather exploratory in nature investigating how reports of posttraumatic growth correlate with the defence mechanism of humour and self-enhancing strategies. As Heiervang and Goodman (2011, p.70) pointed out "(…) selection bias is much more likely to affect point estimates such as prevalence than patterns of association". Therefore, reduced representativeness and potential selection bias may not substantially reduce the value of this research (cf. Butler et al., 2002; Heiervang and Goodman, 2011; Loewenthal, 1996). Moreover, several variables were not distributed normally. These characteristics could have influenced the correlation analyses and the regression analyses. However, usually correlation analysis (cf. Miles, 2012) and regression analysis (Schmidt, 2009) are robust against the violation of test assumptions. Moreover, the reliability of the neurotic defence style and mature defence style was unsatisfactory. However, only four items calculated both scales and Cronbach's alpha is prone for the number of items used (Loewenthal, 1996; Zeigler-Hill and

Pratt, 2007). However, the DSQ-40 shows satisfactory to very good test-retest reliability (Andrews et al., 1993).

In addition, the adapted version of the TEQ asked participants initially only to state their most traumatic experience. However, several participants stated more than one traumatic experience. These responses were later taken into account within the analyses. Therefore, it is likely that the variable number of traumas experienced underestimates the true number of traumas experienced within the sample.

Frazier and colleagues (2004) suggest that all potential moderator variables should be included in one step/block. This has not been done within the moderation analyses in order to detect moderation effects for each potential moderator individually. This procedure has, therefore, the potential to increase the risk for Type I errors (Frazier et al., 2004). However, because the three defence styles were assumed to affect the correlation in partly opposite directions it seemed to be useful to examine the moderation for every defence style individually

The sample size of the non-parametric moderation analyses was low. This affected the power of the study. Therefore, the probability of doing a type II error is increased. In other words, the probability that one detects no significant correlation, although such a correlation exists is higher for this study (Weiß, 2008). Moreover, non-parametric moderation analyses reduce artificially the information of data (Frazier et al., 2004). According to Frazier and colleagues (2004) this method results in lower power to detect significant differences and leads, therefore, to a higher probability of doing Type II error. Moreover, they also suggest that dichotomisation could produce spurious effects. Therefore, doing a Type I error could increase.

Moreover, the response rate was not high which could result in sample bias as suggested by, for example, Loewenthal (1996). However, this possibility may be rather small because the study was not concerned about absolute levels (prevalence) but was interested in correlations between variables (Loewenthal, 1996). As argued above, potential sample bias may not substantially reduce the value of this research (cf. Butler et al., 2002; Heiervang and Goodman, 2011;

Loewenthal, 1996). In addition, the research used a cross-sectional design in which no causal inferences can be drawn (Shadish et al., 2002). Finally, the study was prone for mono-operation bias.

### 7.4. General Discussion

The two studies within this chapter illustrate a complex picture. Although not significant, within the first study (7.2) reports of posttraumatic growth were inversely correlated with defensiveness. Here, reports of posttraumatic growth appear to be real. Although not significant, reports of posttraumatic growth were inversely correlated with posttraumatic stress (cognitive processing). In addition, reports of posttraumatic growth were correlated significantly and inversely with emotional dysregulation (emotional processing). These results indicate, that reports of posttraumatic growth were not only real but also correlated with successful trauma processing as suggested by, for example, Joseph (2004), Joseph and Linley (2005), Joseph and Linley (2006) and Tedeschi and Calhoun (1996). Therefore, the first study supports the idea that real posttraumatic growth arises through successful cognitive processing (overcoming posttraumatic stress) and the positive accommodation of the adverse experience.

In contrast, within the second study (7.3.) reports of posttraumatic growth were significantly correlated with neurotic defensiveness. Within this study, the results suggest that reports of posttraumatic growth could sometimes be illusory. Another explanation could be that reports of posttraumatic growth and neurotic defensiveness are caused by a confounding variable that was not investigated. Jayawickreme and Blackie (2014) suggest a further explanation. Reports of posttraumatic growth could reflect a personality trait. If so, the correlation between reports of posttraumatic growth and defensiveness could indicate a certain personality structure. Within chapter 7.3, reports of posttraumatic growth were significantly correlated with posttraumatic stress. Here, reports of posttraumatic growth are not correlated with successful cognitive trauma processing.

Within chapter 7.3, the moderation analyses suggested that real posttraumatic growth, defined by low levels of defensiveness, and illusory

posttraumatic growth, defined by high levels of defensiveness, only slightly differ concerning their correlation with well-being measured by posttraumatic stress and emotional dysregulation. However, one moderation analysis indicated that real posttraumatic growth is correlated with posttraumatic stress when extreme low levels of neurotic defensiveness are used. In contrast, illusory reports of posttraumatic growth were inversely correlated with posttraumatic stress when extreme high levels of neurotic defensiveness are displayed. Therefore, the results do not support the idea that reports of posttraumatic growth develop, in one way or another, through successful or almost successful automatic trauma processing as suggested by, for example, Janoff-Bulman (2009), Joseph, (2004), Joseph and Linley (2005), Joseph and Linley (2006) and by the model used within the thesis (section 1.4). In contrast, the results suggest that real transformational posttraumatic growth can co-exist with posttraumatic stress states.

The diverging results of the two studies leave space for some speculations. The idea suggested, here, is that the PTGI is measuring three phenomena. First, reports of posttraumatic growth are sometimes real in such a way that the theories on posttraumatic growth after Janoff-Bulman (2009), Joseph (2004), Joseph and Linley (2006), Tedeschi and Calhoun (1996) and the model proposed within the thesis are supported. Here, trauma processing has been finalised or has decreased significantly. Second, real posttraumatic growth could sometimes be accompanied by posttraumatic stress. Those results suggest that some forms of real posttraumatic growth could co-exist with posttraumatic stress. Here, real posttraumatic growth is not uniquely correlated with successful trauma reconciliation. Several interpretations of the results are possible.

First, real posttraumatic growth does not occur because of successful cognitive processing but because shattered fundamental assumptions force an individual to change some of them to some degree. This forced change may be experienced as highly distressing (posttraumatic stress) as they could contradict other aspects of the self or other aspects of the worldview (cf. Joseph, 2004). However, at the same time this change could be experienced as something positive in some domains (posttraumatic growth) (cf. Lev-Wiesel and Amir, 2009).

Another explanation is that shattered fundamental assumptions are not necessarily rebuilt and that the affected assumptions cause posttraumatic stress. At the same time, the concerned person could increase their reliance on bits and parts of fundamental assumptions, which were not impacted. Hence, the concerned person is still struggling with the consequences of the trauma. Nevertheless, they are experiencing real posttraumatic growth despite experiencing, under some circumstances, at the same time posttraumatic stress.

Moreover, those two forms of real posttraumatic growth could be time dependent. Real reports of posttraumatic growth could co-exist with trauma processing (posttraumatic stress) when the trauma has been experienced not long ago. In contrast, real reports of posttraumatic may be more likely not to co-exist with trauma processing (posttraumatic stress) when the trauma has been experienced a long time ago. That reports of posttraumatic growth and their implications could be time dependent was also suggested by Luszczynska and colleagues (2012), and Zoellner and Maercker (2006/ 2009). In contrast to the assumptions above, the authors suggested that reports of posttraumatic growth could often be illusory shortly after a traumatic event. The authors argue, however, that the illusory side of reports of posttraumatic growth reduces and makes place for real transformational posttraumatic growth when time elapses.

Finally, self-reported posttraumatic growth could sometimes measure illusory posttraumatic growth. At high levels of neurotic defensiveness, the concerned person could experience less posttraumatic stress. However, the traumatic experience may not be processed but assimilated. Here, the development of real posttraumatic growth may be hindered. To what degree illusory posttraumatic growth could have negative consequences is discussed by several researchers such as Hall and colleagues (2009), and Zoellner and Maercker (2006). Both listed researchers assume that sometimes self-reported posttraumatic growth is correlated with defensiveness and that in such cases reports of posttraumatic growth may sometimes have negative consequences for the individual. However, although illusory strategies could have negative effects several researchers also suggested that they serve positive functions especially in high stress situations

(e.g. Taylor, 1983; Westphal and Bonanno; 2007). Illusions may bolster self-esteem (ibid) and may help people to gain time needed without being overwhelmed by distress (Vaillant, 1995).

In conclusion, the studies support the idea that sometimes reports of posttraumatic growth measured by the PTGI are real. However, at other times such reports of posttraumatic growth may be rather illusory. Real posttraumatic growth could be divided into two groups, namely, those who have successfully reconciled their traumatic experience and those in which real posttraumatic growth co-exists with posttraumatic stress. Those two forms of real posttraumatic growth could be time dependent. Real reports of posttraumatic growth could co-exist with trauma processing (posttraumatic stress) when the trauma has been experienced not long ago. In contrast, real reports of posttraumatic growth may be more likely not to co-exist with trauma processing (posttraumatic stress) if the trauma was experienced a long time ago.

The previous studies explored whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with well-being. Well-being was measured by the absence of negative mental states such as negative change following adversity, posttraumatic stress and emotional dysregulation. However, well-being is not only defined by the absence of distress but may also be defined by positive mental states (Joseph, 2011). Therefore, within the next study it will be explored whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with hedonic well-being (positive and negative affect) and psychological well-being. Moreover, it will be explored whether reports of posttraumatic growth are correlated with defensiveness.

## 8. A Study on Posttraumatic Growth and Psychological Well-Being

The previous chapters investigated to what extent the level of defensiveness moderates the correlation between self-reported posttraumatic growth and well-being conceptualised as negative change following adversity, posttraumatic stress as well as emotional dysregulation. The question, to which an answer has been attempted, was whether real posttraumatic growth (low defensive reports of posttraumatic growth) and illusory posttraumatic growth (high defensive reports of posttraumatic growth) correlate differently with negative change following adversity, posttraumatic stress and emotional dysregulation.

Therefore, the focus of the previous studies has been on the correlation between reports of posttraumatic growth and psychological phenomena, which are experienced as distressing. Several researchers have argued (e.g. Janoff-Bulman, 2009; Joseph, 2011; Joseph and Linley, 2008) that one is not able to comprehend the entire human experience by focusing on only adverse mental states. To capture the experience of human beings more thoroughly, research also needs to account for the positive side of human functioning such as well-being, which is not merely defined by the absence of distress (Joseph, 2011). Here, well-being also includes positive mental states (ibid). Moreover, positive well-being states and adverse mental states could be independent from each other (e.g. Ryff et al., 2006). Hence, the experience of adverse mental states may not exclude the possibility to experience positive mental states at the same time.

Within the next chapter, it is attempted to replicate the results gained in the previous chapters, namely, that reports of posttraumatic growth are correlated with defensiveness. Moreover, it is explored when reports of posttraumatic growth are correlated with well-being. More specifically, it is examined whether the level of defensiveness moderates the correlation between reports of posttraumatic growth and well-being. In other words, the question examined within the next chapter is: do real posttraumatic growth and illusory posttraumatic growth correlate differently with positive well-being states?

## 8.1. Introduction

The validity of self-reported posttraumatic growth is called into question by findings which indicate that reports of posttraumatic growth are sometimes defensive or illusory (e.g. Cheng et al., 2006; Frazier et al., 2009; Frazier and Kaler, 2006; Hall et al., 2009; Hobfoll et al., 2007; McFarland & Buehler, 2012; McFarland and Alvaro, 2000; Taylor, 1983). Within this thesis, it is assumed that reports of posttraumatic growth incorporate two phenomena, namely real transformational posttraumatic growth and illusory reports of posttraumatic growth.

It was hypothesised that real posttraumatic growth is defined by low levels of defensiveness or by high levels of mature defensiveness. In contrast, illusory posttraumatic growth is defined by high levels of defensiveness or by low levels of mature defensiveness. By using the level of defensiveness, one could be able to differentiate between real posttraumatic growth and illusory posttraumatic growth. Therefore, defensiveness is considered a potential moderating variable indicating either real reports of posttraumatic growth or illusory reports of posttraumatic growth. Moreover, defensiveness as a moderation variable, used to separate real posttraumatic growth from illusory posttraumatic growth, could be able to explain the divergent results concerning reports of posttraumatic growth and psychological functioning variables concerning well-being such as posttraumatic stress and positive mental states. While real posttraumatic growth was hypothesised to be correlated positively with well-being illusory posttraumatic growth was hypothesised to be correlated inversely with well-being.

The previous study investigated whether the correlation between posttraumatic stress and emotional dysregulation and reports of posttraumatic growth is moderated by defensiveness. The study suggested that real posttraumatic growth and illusory posttraumatic growth did not differ significantly concerning emotional dysregulation. However, real posttraumatic growth, defined by extremely low neurotic defensiveness, was correlated with posttraumatic stress. Nevertheless, it cannot be excluded that posttraumatic stress and well-being co-exist. Therefore, real reports of posttraumatic growth could sometimes be a sign of

posttraumatic stress (cognitive processing) but could function at the same time as an indicator for well-being in another area or on another dimension. Within the subsequent study, it will be investigated whether real posttraumatic growth and illusory reports of posttraumatic growth differ in their correlation with hedonic well-being and psychological well-being.

Well-being has been defined in different ways in psychology and how this term is used within the subsequent study will be described next. Deci and Ryan (2008, p.1) state that well-being "(…) refers to optimal psychological experience and functioning". Two main traditions of understanding well-being in psychology emerged through the debate on well-being (Ryan and Deci, 2001). The most studied and senior tradition of well-being in psychology is termed Hedonism or hedonic well-being respectively. Hedonic well-being is characterized by gaining "(…) the greatest possible amount of pleasure (…) (Vazquez, Hervas, Rahona and Gomez, 2009, p.17) or happiness (Joseph, 2011). Subjective well-being is another term for hedonic well-being coined by Diener (1984) cited by Chen and colleagues (2012). Subjective well-being defines the way in which hedonic well-being is measured, namely by life satisfaction, experience of positive affect and low or no experience of negative affect (ibid). However, Deci and Ryan (2008, p.2) argue that hedonic well-being or happiness is best reflected by positive and negative affect "(…) because life satisfaction is not strictly a hedonic concept. Rather, it involves a cognitive evaluation of the conditions of one's life". They argue, furthermore, that life satisfaction could reasonably be conceptualised as eudaimonic well-being.

The second psychological tradition defines well-being as eudemonia (Chen et al., 2012; Ryan and Deci, 2001; Ryff and Singer, 2008; Vazquez et al., 2009). The eudaimonic view does not focus on happiness or pleasure but instead on human virtues and on "doing what is worth doing" (Ryan and Deci, 2001, p.145). Instead of investigating positive emotions, this research perspective views well-being as living in accordance with intrinsic values, attempting to fulfill one's own potential (Ryan and Deci, 2001) and finding meaning and purpose in life (Ryff, 1989). In contrast to hedonic well-being, psychological well-being may sometimes

focus explicitly on norms[14] and values (Ryff and Singer, 2008). In other words, psychological well-being is concerned about leading a "good" life. Hence, psychological well-being asks the question what constitutes a "good" life (ibid).

The eudaimonic view on well-being has been emphasised by several researchers. For example, Rogers (1959) viewed well-being as an internal tendency to fulfill oneself (actualizing tendency). The self-determination theory by Ryan and Deci (2000) is another example of the eudaimonic view on well-being. Frankl (2010) describes one dimension of eudaimonic well-being, namely an inherent need to find meaning in life that goes beyond oneself. Ryff and Singer (2008) clustered several dimensions of eudaimonic well-being into one overall dimension, which they termed psychological well-being. Those dimensions are autonomy, environmental mastery, personal growth, positive relations with others, purpose in life and self-acceptance. In other words, the concept of psychological well-being by Ryff and Singer (2008) summarises several domains of eudaimonic well-being and may be especially suitable to measure it. However, it does not capture all dimensions of eudaimonic well-being.

Both concepts of well-being in psychology are correlated but capture at the same time two independent sides of well-being (Chen et al., 2012; Gallagher et al., 2009; Linley et al., 2009; Ryan and Deci, 2001). Therefore, both concepts of well-being are measured within the subsequent study.

Several studies have investigated whether reports of posttraumatic growth are correlated with well-being. The majority of studies indicate that reports of posttraumatic growth are correlated with positive affect or hedonic well-being respectively (e.g. Erbes et al., 2005; Hamama and Sharon, 2012; Helgeson et al., 2006; Linley and Joseph, 2004; Park et al., 1996; Schroevers, Kraaij and Garnefski, 2011). In contrast, research concerning the correlation between self-reported posttraumatic growth and psychological well-being is rather sparse.

[14] A norm is „a generally accepted standard of behaviour within a society, community or group" (Colman, 2009, p.513). It is reasonable to assume that the answer and its expression to the question of what constitutes a "good" life could sometimes be influenced by norms that are embraced by a certain group or society. A discussion to what degree this could be the case is beyond the scope of the thesis. For a detailed discussion please refer to Christopher (1999).

Durkin and Joseph (2009) indicated that reports of posttraumatic growth are significantly correlated with psychological well-being while Ruini and colleagues (2013) could not find such a significant correlation in their sample. Moreover, Joseph and colleagues (2012b) developed a scale measuring change in psychological well-being following a trauma. They found a significant correlation between change in psychological well-being following a trauma and reports of posttraumatic growth.

Moreover, Stanton, Bower and Low (2009) reviewed studies of posttraumatic growth concerning a cancer diagnosis. They found four studies which investigated the correlation between reports of posttraumatic growth and psychological well-being. A significant cross-sectional correlation between reports of posttraumatic growth and psychological well-being has been found for three studies. However, no long-term effect was evident in the follow-up study of the only longitudinal study listed (ibid). Moreover, the fourth study could not find any significant correlation between reports of posttraumatic growth and psychological well-being (ibid). The incoherent results of the listed studies, question, to some extent, the intuitive assumption that psychological well-being is caused by reports of posttraumatic growth or the reverse.

The subsequent study investigates whether reports of posttraumatic growth are correlated with defensiveness. This investigation was constructed, among others, to strengthen the results found in chapter 5 and 7.3. This procedure seemed necessary, as the study within chapter 7.2 did not support the idea that reports of posttraumatic growth were sometimes defensive or illusory in nature. Furthermore, the study explores whether reports of posttraumatic growth are correlated with hedonic well-being (measured by positive and negative affect) and psychological well-being. Moreover, the research examines whether the level of defensiveness moderates the correlation between reports of posttraumatic growth and well-being. The latter question investigates, therefore, whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with well-being.

The hypotheses guiding the research are listed below:

1. Reports of posttraumatic growth are positively correlated with defensiveness, psychological well-being and hedonic well-being measured by positive and negative affect.
2. The correlation between negative and positive affect and reports of posttraumatic growth is moderated by the level of defensiveness.
3. The correlation between psychological well-being and reports of posttraumatic growth is moderated by the level of defensiveness.

The best of the author's knowledge, no study has investigated whether the correlation between reports of posttraumatic growth and hedonic well-being measured by positive and negative affect as well as psychological well-being is moderated by the level of defensiveness. Within the next study, the assumption is made that illusory reports of posttraumatic growth (high defensiveness and low mature defensiveness) are correlated with lower reports of well-being. The assumption is made because one may reasonably assume that psychological change or personal growth respectively is difficult to achieve when the respective person wards off external as well internal reality (cf. Fromm, 2005; Joseph, 2004). The impaired possibility for change may also hinder the development of well-being.

**8.2. Procedure**

A questionnaire battery was prepared and submitted to the Ethics Board of the School of Education at the University of Nottingham. The Ethics Board approved the study on 23 September 2013 (see appendix 18).

Data were collected between the 30/09/13 and 21/10/13 at the University of Nottingham. Subjects received information concerning the study and gave their written informed consent. A sample of an information sheet and a consent form is attached in appendix 12. The information provided by the participants was as soon

as possible anonymised. All personal data were not entered into SPSS but kept separately. Following the anonymisation, the data were entered into SPSS twice as, for example, suggested by Carlucci and Wright (2012b). This procedure was chosen to discover entering mistakes (ibid). Hereupon, data were checked for accuracy. This procedure has already been described (see 4.2).

## 8.3. Subjects

Questionnaire batteries were conveniently distributed at the University of Nottingham. Although it was attempted to hold the sample as homogenous as possible, an affiliation to the University was not required to be included in the study. In total, 562 people were approached and asked to complete the questionnaire battery. Two-hundred and six questionnaires were completed and returned. However, 53 of the returned questionnaires were not included into the data analysis because the respective participants had not experienced a trauma. In total, 153 subjects were included into the data analysis. The total response rate was, therefore, 27.22%.

## 8.4. Measures

To answer the research question, five self-report questionnaires were used. These questionnaires are listed and discussed below.

### 8.4.1. The Defense Style Questionnaire-40 (DSQ-40); (Andrews and colleagues, 1993).

To measure defence mechanisms, the Defense Style Questionnaire-40 by Andrews and colleagues (1993) was used. The DSQ-40 has already been described (see 4.4.1.). The questionnaire is attached in appendix 1.

### 8.4.2. The 9-Items Ryff Scale of Psychological Well-Being (RPWB); (Ryff, 1989).

Ryff (1989) generated the Scale of Psychological Well-Being in order to reconceptualise and to ground psychological well-being in existent theoretical

concepts of psychology. The scale is grounded in theories of humanistic psychology, existential psychology, developmental psychology and psychoanalysis. The scale assesses six dimensions of psychological well-being. Each dimension is measured by nine items on a six-point Likert scale. The dimensions contain autonomy, environmental mastery, personal growth, positive relations with others, purpose in life and self-acceptance. The dimension of autonomy is captured by items such as: (8) "I am not afraid to voice my opinions, even when they are in opposition to the opinions of most people". The dimension of environmental mastery is captured by items such as: (3) "In general, I feel I am in charge of the situation in which I live". Ryff and Singer (2008) report satisfactory validity for the 20-item Ryff Scale of Psychological Well-Being. However, Springer, Hauser and Freese (2006) indicated that the dimensions of psychological well-being lack substantial discriminant validity. The latter claim must be taken seriously, as four dimensions (personal growth, purpose in life, self-acceptance and environmental mastery) did not show sufficient discriminant validity.

Nevertheless, the Ryff Scale of Psychological Well-Being (RPWB) is a well-established measurement that brings together various eudaimonic traditions. Those diverse eudaimonic traditions are also incorporated within the Psychological Well-Being – Post-Traumatic Changes Questionnaire (PWB-PTCQ) developed by Regel and Joseph (2010). In contrast to the RPWB, the PWB-PTCQ measures change within psychological well-being. However, the aim of this study is to investigate how reports of posttraumatic growth correlate with psychological well-being as current state. Therefore, the Ryff Scale of Psychological Well-Being will be used. However, only the total scale of psychological well-being will be used because the RPWB has some problems concerning its discriminant validity.

The total scale of psychological well-being ranges from 54 to 324. Higher scores indicate more psychological well-being. It is clear that this solution is rather a temporary workaround to measure another dimension of well-being apart from hedonic well-being. Ryff (1989) has reported that the dimensions of psychological well-being for the 20-item scale possess satisfactory internal reliability ranging

from α= .86 to α= .93. Over a six-week period test-retest reliability was satisfactory for all dimensions ranging from α= .81 to α= .88 (ibid). The questionnaire is attached for reference in appendix 10.

**8.4.3. The Positive and Negative Affect Schedule (PANAS) (past week); (Watson, Clark and Tellegan, 1988).**

The PANAS was used to measure hedonic well-being. It may be necessary to mention that usually life satisfaction is included to measure hedonic well-being (subjective well-being). However, positive and negative affect may capture at best the hedonic viewpoint (Deci and Ryan, 2008). Moreover, especially emotions and their regulation may be affected by the use of certain defence mechanisms. Therefore, the PANAS, a well validated and widely used measurement, was employed to assess positive and negative affect.

Watson and colleagues (1988) generated, from existing questionnaires, a self-report measurement consisting of two subscales assessing positive mood and negative mood. Each subscale consists of ten items on a 5-point Likert scale. Subjects are asked to indicate to what degree they have experienced the listed affects in the last week. Positive affect is measured by items such as: (1) “Interested”, (3) “Excited” and (5) “Strong”. Negative Affect is measured by items such as: (2) “Distressed”, (4) “Upset” and (6) “Guilty”. Each score ranges from ten to fifty. Higher scores on the positive affect scale indicate higher positive affect and higher scores on negative affect scale indicate higher negative affect. The authors reported a mean of 33.3 (SD=7.2) for the PANAS positive affect scale (past view days) and a mean of 17.4 (SD=6.2) for the PANAS negative affect scale in a college student sample (N=1.002).

The authors reported satisfactory internal reliability for both subscales of the PANAS ranging from α= .84 to α= .90. Over a 1-week period test-retest reliability was satisfactory for the positive affect subscale (α= .79) and the negative affect scale (α= .81). Moreover, the authors reported a good factorial validity, convergent and discriminant validity for the scale. The questionnaire is attached, and can be found in appendix 11.

#### 8.4.4. Adapted version of theTraumatic Events Questionnaire (TEQ); (Vrana and Lauterbach, 1994).

An adapted version of the TEQ was used to assess the occurrence and nature of a traumatic event. Initially, participants were asked to indicate only the experience they consider as most traumatic. However, a range of participants also indicated more than one traumatic event. Hereupon, the possibility of multiple traumas was also included within the analysis. The adapted version of the TEQ has already been described (see 6.4.). The questionnaire is attached in appendix 8.

#### 8.4.5. Posttraumatic Growth Inventory (PTGI); (Tedeschi and Calhoun, 1996).

The Posttraumatic Growth Inventory was used to measure reports of posttraumatic growth. The PTGI has already been described (see 5.4.2.). The questionnaire is attached in appendix 5.

### 8.5. Results

#### 8.5.1. Missing value analysis.

Missing data were analysed for all variables included in the data analysis. Missing data analysis has already been discussed in detail (see 4.5.2). First, the percentage of missing data for each variable was investigated. The percentage of missing data within the data set was minor. However, 5 of 12 variables showed missing values above 5% namely: “years elapsed since the trauma” (13.7%), “number of traumas” (11.8%), the immature defence style (7.2%), Ryff’s Psychological Well-being Scale (5.2%) and trauma severity (5.2%).

Ninety-one per cent of all variables had missing values. Four per cent of all values within the data set were missing. Moreover, 33.99% of the subjects did not fully complete the questionnaire package. In accordance to suggestions by the University of Texas, a missing variable was created to inspect how much missing values occurred in each subject. Of those who did not fully complete the questionnaire 34 subjects showed one missing value, nine subjects showed two

missing values, six subjects showed three missing values, two subjects showed six missing values and one subject showed seven missing values.

Missing values not at random could impose a significant risk to distort the data (Allison, 2001; Tabachnick and Fidell, 2007). Therefore, the Little's MCAR test has been conducted as suggested by Tabachnick and Fidell (2007). The result suggested that the missing data are completely at random ($\chi^2$=40.44; df=37; p>.05).

Although the Little's MCAR test suggested that the missing data are completely at random one needs to decide how to deal with missing values within the own data set. Although pair-wise exclusion would increase the sample size, Allison (2001) explicitly warns against using pair-wise exclusion as it has the potential to bias the results significantly. Therefore, within the study missing data will be list-wise excluded (please refer to section 4.5.2 for a detailed discussion).

### 8.5.2. The quality of data.

To run parametric tests the sample should satisfy some test assumptions (Carlucci and Wright, 2012). Therefore, the total scales and age were inspected concerning their linearity (Benninghaus, 2002; Pallant, 2004), normality (Calucci and Wright, 2012; Pallant, 2004) and concerning significant outliers (Pallant, 2004).

First, the variables were inspected graphically through a scatterplot concerning their linearity. "Age", "current distress", the "trauma total scale" and "years elapsed since the trauma" were not linearly distributed. As suggested by Pallant (2004) to identify significant outliers, data were inspected concerning the difference between the mean and the trimmed mean. No significant outliers could be found. Hereupon, the data were inspected concerning their normality. The Kolmogorov-Smirnov test indicated that several variables were not normally distributed. Not normally distributed were the variables years elapsed since the trauma, current distress, trauma severity, the trauma total scale, age and both scales measuring hedonic well-being (PANAS).

In total, several variables must be considered as not normally distributed. Brosius (2008) suggested that parametric tests could still be used if the deviation

from the normal distribution is minor. This was tested via a histogram. The histogram showed that the deviation from the normal distribution was minor for the variables trauma severity and positive affect. The deviation from the normal distribution was not minor for the variable "years elapsed since the trauma", "current distress", "the trauma total scale", "age" and "negative affect". However, some tests are quite resilient against the violation of presumptions that ideally must be met (Rumsey, 2008). In other words, these tests can be conducted, even if some assumptions for using them are violated. This is, for example, the case for regression analysis (Schmidt, 2009) and Pearson's correlations (cf. Miles, 2012). Because the sample size is sufficiently large (N>100) and because of the robustness of tests based on Pearson's correlations and regression analysis parametric tests are used. For a detailed discussion on violations of test assumptions, refer to section 4.5.3.

### 8.5.3. Description of the sample.

The sample consisted of 49.7% females and 50.3% males and had a mean age of 21.12 (SD= 4.94). The majority of the sample was White (71.2%) followed by Asian/Asian British (16.3%) and Black (5.9%). All other ethnic backgrounds represented the sample by less than 5% (Mixed heritage, Arab, Other background, Preferred not to answer the question). Concerning religious affiliation, 51% stated to be Non-religious and 33.3% stated to be Christians. In addition, 5.9% stated to be Muslims. All other assessed religious affiliations were below 5% (Hindu, Jewish, Preferred not to answer the question, Buddhist, Other, Sikh).

Moreover, the sample was asked to indicate the highest educational degree received. Forty-three per cent had some college, 24.2% had a graduate degree and 23.5% hold a High School degree. All other degrees represented the sample below 5% (Postgraduate degree, Other, Doctorate, Preferred not to answer the question). Sixty-nine per cent of the sample were single and 23.5% were in a relationship. Moreover, 5.2% were married and 2% were cohabiting. For 79.1% of the sample English was the first language while 20.9% of the subjects stated that English is not their first language.

The nature of the experienced trauma was also investigated (see table 23). Almost half of the sample have experienced one trauma (43.1%) and 18.3% of the sample indicated that they experienced two traumas. Moreover, 15.7% experienced three traumatic incidents and 5.9% of the sample experienced four traumas. Subjects having experienced more than three traumas represented the sample by 11.2%. The number of traumas had a mean of 2.02 (SD= 1.28) and ranged from one to seven. The mean of the variable years elapsed since the event had occurred was 4.91 (SD= 4.99; range= 0-20). Trauma severity had a mean of 2.98 (SD=1.19; range= 1-6.33). That is the participants rated in average the experience as slightly traumatic. Current stress had a mean of 2.34 (SD= 1.24; range= 1-6). That is, the participants reported that the event is experienced as slightly traumatic by now. On the next page, the demographic information is summarised in table 23.

Table 23. *Description of the Sample*

| | N | % | Mean (SD) | Range |
|---|---|---|---|---|
| **Participants** | 153 | | | |
| **Age** | 153 | | 21.12 (4.94) | 18-52 |
| **Sex** | 153 | | | |
| Female | 76 | 49.7 | | |
| Male | 77 | 50.3 | | |
| **Nature of Trauma** | | | | |
| Message of serious injury or death of someone close | 90 | 58.8 | | |
| Witness or involvement in an accident | 48 | 31.4 | | |
| Serious Injury or danger to lose life | 45 | 29.4 | | |
| Other Event | 26 | 17.0 | | |
| Crime | 21 | 13.7 | | |
| Natural Disaster | 19 | 12.4 | | |
| Witness of mutilation, serious injury, violent death | 17 | 11.1 | | |
| Not able to talk about the experience | 15 | 9.8 | | |
| Child Abuse | 10 | 6.5 | | |
| Abusive Relationship | 10 | 6.5 | | |
| Unwanted sexual contact in adulthood | 5 | 3.3 | | |
| **Years elapsed since trauma** | 132 | | 4.91 (4.99) | 0-20 |
| **Highest Degree** | 152 | | | |
| High School | 36 | 23.5 | | |
| Some College | 66 | 43.1 | | |
| Graduate Degree | 37 | 24.2 | | |
| Postgraduate Degree | 7 | 4.6 | | |
| **First Language** | 153 | | | |
| English | 121 | 79.1 | | |
| Not English | 32 | 20.9 | | |

### 8.5.4. Internal reliability.

The internal reliability was calculated for the total scales of mature defenses, neurotic defenses, immature defenses, the PTGI, the total scale of psychological well-being, positive affect and negative affect. The internal reliabilities are illustrated in table 24.

Table 24. *Internal Consistencies and Descriptive Data for relevant Variables*

| Variable | Alpha (α) | Mean (SD) | Range |
|---|---|---|---|
| DSQ-40 (Mature Defence Style) | .49 | 5.52 (1.08) | 3-8.38 |
| DSQ-40 (Neurotic Defense Style) | .53 | 4.54 (1.18) | 1.75-8.13 |
| DSQ-40 (Immature Defense Style) | .67 | 3.88 (.82) | 1.88-6.63 |
| PTGI (Total Scale) | .93 | 40.19 (23.57) | 0-97 |
| PWB (Total Scale) | .91 | 4.32 (.52) | 2.94-5.50 |
| PANAS (Positive Affect) | .82 | 33.08 (7.28) | 14-47 |
| PANAS (Negative Affect) | .81 | 20.15 (6.95) | 10-45 |

*NOTES.* DSQ-40= Defense Style Questionnaire; PTGI= Posttraumatic Growth Inventory; PWB=Psychological Well-Being; PANAS= Positive and Negative Affect Schedule.

Usually, conservative researchers consider a value of Cronbach's alpha from 0.7 to 0.8 as an indicator for the reliability of a scale (e.g. Brosius, 2006; Bryman and Cramer, 2009). Therefore, the reliability of an immature defence style is moderate. Moreover, the reliability of a mature defence style and a neurotic defence style is unsatisfactory.

### 8.5.5. Correlates.

Correlation analysis was conducted in order to find out whether reports of posttraumatic growth are correlated with defensiveness, psychological well-being and hedonic well-being. All variables included into the analysis were z-standardised as suggested by, for example, Benninghaus (2002) and Miles (2012). Pearson's Product Correlations were calculated for all total scales. The correlations are listed in table 25.

A neurotic defence style and an immature defence style were significantly correlated with reports of posttraumatic growth. Therefore, the more neurotic and immature defences are used the more likely the report of posttraumatic growth Moreover, also hedonic well-being measured by positive affect was significantly correlated with self-reported posttraumatic growth. However, psychological well-being was not significantly correlated with reports of posttraumatic growth.

Finally, it was explored whether the variables age, sex, total numbers of traumas and years elapsed since the trauma, as well as trauma severity and current distress were correlated with any scale used for testing. Age was correlated significantly with years elapsed since the trauma ($r=.31$, $p<.01$; $N=101$). Trauma severity was correlated with total number of traumas experienced ($r=.24$; $p<.05$; $N=101$) and reports of posttraumatic growth ($r=.31$, $p<.01$; $N=101$). Current distress caused by the trauma was correlated with reports of posttraumatic growth ($r=.41$, $p<.01$; $N=101$). Therefore, the more a person is distressed because of their traumatic experience the more likely they will report posttraumatic growth. Females were more likely to report current distress ($rho=.32$, $p<.01$; $N=101$) and posttraumatic growth ($rho=.21$; $p<.05$; $N=101$). Men were more likely to report positive affect ($rho= -.24$; $p<.05$; $N=101$).

Table 25. *Correlates PTGI, DSQ-40, RPWB and PANAS*

| Scale | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| *PTGI* | | | | | | | |
| 1. PTGI_Total Scale | - | | | | | | |
| *DSQ-40* | | | | | | | |
| 2. Mature Defence Style | .14 | - | | | | | |
| 3. Neurotic Defence Style | .44** | .07 | - | | | | |
| 4. Immature Defence Style | .17* | .08 | .42** | - | | | |
| *RPWB* | | | | | | | |
| 5. RPWBS_Total Scale | .04 | .26** | -.15 | -.43** | - | | |
| *PANAS* | | | | | | | |
| 6. Positive Affect | .27** | .20* | .19* | .00 | .48** | - | |
| 7. Negative Affect | .13 | -.10 | .12 | .30** | -.47** | -.08 | - |

*NOTES.* N=130. All correlations are Pearson's r coefficients. PTGI= Posttraumatic Growth Inventory; DSQ-40= Defense Style Questionnaire-40; RPWBS= Ryff's Psychological Well-Being Scale; PANAS= Positive and Negative Affect Schedule, *p<.05; **p<.01(two-tailed).

### 8.5.6. Multiple regressions.

The Pearson correlation coefficient is not based on calculations that determine the proportion of shared variance (Benninghaus, 2002). Therefore, it is not possible to determine the improvement in prediction of one variable based on another variable (Benninghaus, 2002; Miles, 2012). This improvement of prediction based on one or more variables is determined by using a regression analysis. A regression model investigated whether a neurotic defence style, an immature defence style and positive affect predict self-reported posttraumatic growth. The independent variables were chosen because they were significantly correlated with reports of posttraumatic growth. The model had a $R^2$ of .23 (N=134). Therefore, 23% of the variance of self-reported posttraumatic growth was explained by the variables entered. However, only a neurotic defence style ($\beta$=.41, $p<.01$) and positive affect ($\beta$=.18, $p<.05$) predicted significantly self-reported posttraumatic growth. An immature defence style did not predict significantly reports of posttraumatic growth ($\beta$=.01, $p>.05$).

### 8.5.7. Moderation analyses.

Moderation analyses were conducted to investigate whether the level of defensiveness affects the correlation between well-being and reports of posttraumatic growth. All defence styles were considered as potential moderator variables. These moderation analyses were also used to test whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with hedonic well-being and psychological well-being. Section 5.5.7 further details the discussion of why moderation analyses were used within the thesis.
It was hypothesized that only real transformational posttraumatic growth is positively correlated with hedonic well-being and psychological well-being. Real posttraumatic growth was defined by low levels of defensiveness (neurotic or immature defensiveness) or by high levels of mature defensiveness. In contrast, it was assumed that illusory reports of posttraumatic growth are inversely correlated with hedonic well-being and psychological well-being. Illusory reports of

posttraumatic growth were defined by high levels of neurotic or immature defensiveness or by low levels of mature defensiveness.

Hierarchical regressions were conducted to detect moderation effects if the variables under consideration were continuous. In accordance to suggestions by Howitt and Cramer (2014) and by Frazier and colleagues (2004), all data were z-standardised and an interaction term was created.

#### *8.5.7.1. Moderation: Self-reported posttraumatic growth and psychological well-being.*

Within the first model, it was tested whether the correlation between self-reported posttraumatic growth and psychological well-being is affected by the level of (a) mature defensiveness (b) neurotic defensiveness and (c) immature defensiveness. The dependent variable was psychological well-being. The independent variables were mature defensiveness, neurotic defensiveness, immature defensiveness and reports of posttraumatic growth. Four blocks were created to test interaction effects for each potential moderator individually. The blocks entered were: (1) z-values of the potential moderator variables (mature defensiveness, neurotic defensiveness and immature defensiveness) and z-values for reports of posttraumatic growth (2) interaction term of mature defensiveness and reports of posttraumatic growth (3) interaction term of neurotic defensiveness and reports of posttraumatic growth (4) interaction term of immature defensiveness and reports of posttraumatic growth.

The correlation between reports of posttraumatic growth and psychological well-being was not significantly moderated by the level of mature defensiveness (F (10.74) change=.02, $R^2$ change=.00, $p>.05$; N=133), the level of neurotic defensiveness (F (9.01) change=.54, $R^2$ change= .00, $p>.05$; N=133) and the level of immature defensiveness (F (7.79) change= .64; $R^2$change= .00; $p>.05$; N=133).

***8.5.7.2. Moderation: Self-reported posttraumatic growth, positive affect and negative affect.***

The next model investigated whether the correlation between reports of posttraumatic growth and positive affect is moderated by the level of defensiveness. Positive affect was entered as dependent variable. All three defence styles and reports of posttraumatic growth were entered as independent variables. Four blocks were created to test interaction effects for each potential moderator individually. The blocks entered were: (1) z-values of the respective moderation variable (mature defensiveness, neurotic defensiveness and immature defensiveness) and z-values for reports of posttraumatic growth (2) the interaction term of mature defensiveness and reports of posttraumatic growth (3) the interaction term of neurotic defensiveness and reports of posttraumatic growth (4) the interaction term of immature defensiveness and reports of posttraumatic growth.

The level of mature defensiveness moderated significantly the correlation between reports of posttraumatic growth and positive affect ($F$ (3.91) change= 5.12; $R^2$change=.03; $p<.05$; $N=134$). A profile plot was created to interpret the interaction effect. The graph indicates that the correlation between positive affect and reports of posttraumatic growth is strongest at low levels of mature defensiveness. Moreover, the profile plot indicates that the correlation between reports of posttraumatic growth and positive affect is lowest at high levels of mature defensiveness. The graph is displayed below (figure 2.).

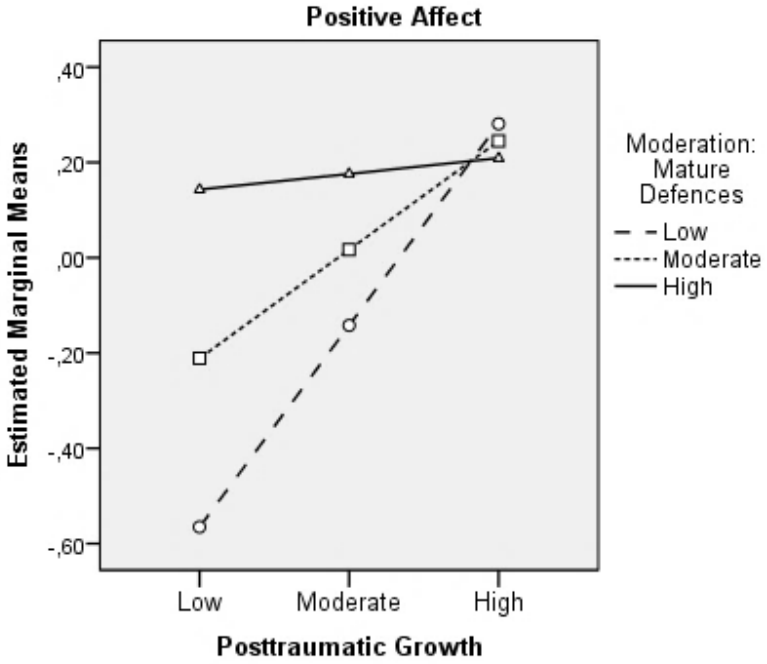


*Figure 2*. Reports of Posttraumatic Growth and Positive Affect moderated by mature Defensiveness

The correlation between reports of posttraumatic growth and positive affect was not significantly moderated by the level of neurotic defensiveness (F (3.23) change=.01, $R^2$ change= .00, p>.05; N=134) and by the level of immature defensiveness (F (2.79) change=.24; $R^2$change=.00; p>.05; N=134).
Another research aim of the study was to investigate whether the level of defensiveness moderates the correlation between reports of posttraumatic growth and negative affect. Therefore, the next model investigated whether the correlation between reports of posttraumatic growth and negative affect was moderated by the level of defensiveness. All three defence styles were included within the moderation analyses. Negative affect was entered as dependent variable. All three defence styles and reports of posttraumatic growth were entered as independent variable. Four blocks were created to test interaction effects for each potential moderator individually. The blocks entered were: (1) z-values of the respective moderation variable (mature defensiveness, neurotic defensiveness and immature defensiveness) and z-values for reports of posttraumatic growth (2) the interaction

term of mature defensiveness and reports of posttraumatic growth (3) the interaction term of neurotic defensiveness and reports of posttraumatic growth (4) the interaction term of immature defensiveness and reports of posttraumatic growth.

The level of mature defensiveness significantly moderated the correlation between reports of posttraumatic growth and negative affect (F (4.37) change= 4.20; $R^2$change=.02; $p<.05$; N=136). A profile plot was created to interpret the interaction effect. The profile plot indicates that the correlation between reports of posttraumatic growth and negative affect is positive at high levels of mature defensiveness. Moreover, the correlation between reports of posttraumatic growth and negative affect is negative at low levels of mature defensiveness. Therefore, within high mature defenders, the more posttraumatic growth is reported the more negative affect is experienced. Within the low mature group the correlation was reversed, namely, the more posttraumatic growth has been reported the less negative affect was experienced. The profile plot is displayed below (figure 3.).

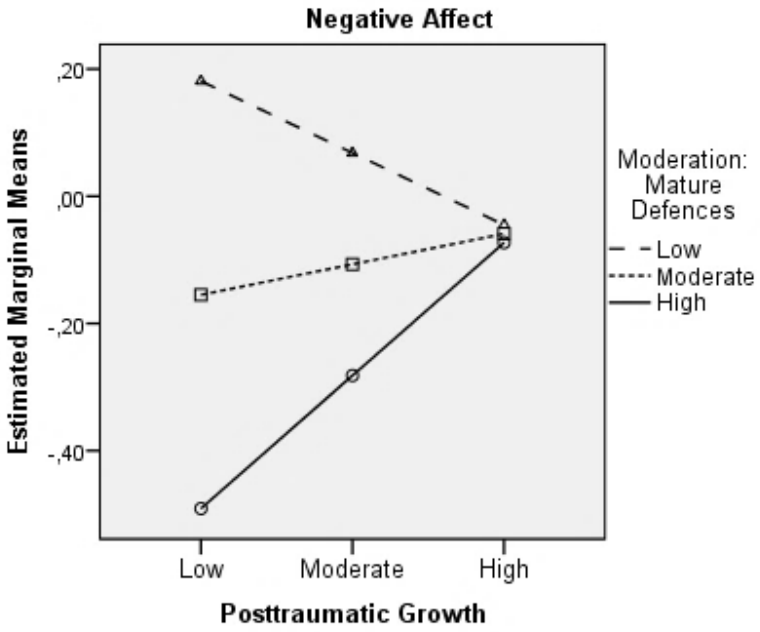


*Figure 3.* Reports of Posttraumatic Growth and Negative Affect moderated by mature Defensiveness

The correlation between reports of posttraumatic growth and negative affect was not significantly moderated by the level of neurotic defensiveness (F (3.64) change= .12; $R^2$change=.00; p>.05; N=136) and by the level of immature defensiveness (F (3.13) change= .19; $R^2$change=.00; p>.05; N=136).

#### *8.5.7.3. Nonparametric moderation effects.*

Although several hierarchical regression analyses were conducted, it cannot be excluded that extreme low defensiveness and extreme high defensiveness show different patterns. Contrasting extremes could be useful in order to demonstrate the differences between low defensive reports of posttraumatic growth (real posttraumatic growth) and high defensive reports of posttraumatic growth (illusory reports of posttraumatic growth). Therefore, two groups were built by using the 25% quartile and the 75% quartile of the sample. The two groups consisted of (a) those 25% of the sample who scored lowest in defensiveness and (b) those 75% of the sample who scored highest in neurotic defensiveness.

Specifically, the mature defence style, the neurotic defence style and the immature defence style were each dichotomised into a low defensive group and a high defensive group. Low defenders were defined as subjects scoring below the 25% quartile. High defenders were defined as subjects scoring above or equal the 75% quartile. Correlations (Spearman's rho) were calculated between reports of posttraumatic growth and psychological well-being (RPWB), positive affect as well as negative affect. Afterwards, the correlations were compared to detect potential moderator effects.

No defence style significantly moderated the correlation between reports of posttraumatic growth and psychological well-being, positive affect as well as negative affect. The results are displayed in table 26. The p-values for the group differences can be found in the third column under z (p).

Table 26. *Correlation between Reports of Posttraumatic Growth, Psychological Well-being and Hedonic Well-being moderated by Defensiveness*

| | **PTGI** | | |
|---|---|---|---|
| | Low Defenders | High Defenders | z (p) |
| *Mature Defences* | | | |
| RPWBS | -.00 (N=38) | .16 (N=35) | z= -.66; (p>.05) |
| Positive Affect | .37 (N=38) | .09 (N=35) | z= 1.21; (p>.05) |
| Negative Affect | -.01 (N=38) | .22 (N=35) | z= -.87; (p>.05) |
| *Neurotic Defences* | | | |
| RPWBS | .18 (N=36) | .07 (N=33) | z= .44; (p>.05) |
| Positive Affect | .37* (N=36) | .09 (N=33) | z= 1.18; (p>.05) |
| Negative Affect | .08 (N=36) | -.15 (N=33) | z= .91; (p>.05) |
| *Immature Defences* | | | |
| RPWBS | .18 (N=33) | .12 (N=32) | z= .91; (p>.05) |
| Positive Affect | .46** (N=33) | .23 (N=32) | z= 1.01; (p>.05) |
| Negative Affect | .11 (N=33) | .23 (N=32) | z= -.47; (p>.05) |

*NOTES.* All correlations are Spearmans rho coefficients. PTGI= Posttraumatic Growth Inventory; RPWBS= Ryff's Psychological Well-Being Scale; PANAS= Positive and Negative Affect Schedule, *p<.05; **p<.01(two-tailed).

**8.6. Discussion**

The study examined whether reports of posttraumatic growth are correlated with defensiveness. Therefore, it was investigated whether reports of posttraumatic growth could sometimes illusory. Furthermore, the study investigated whether reports of posttraumatic growth are correlated with psychological well-being and hedonic well-being. Moreover, the study tested whether the level of defensiveness affects the correlation of self-reported posttraumatic growth and well-being. In other words, the question under investigation was whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with well-being.

Reports of posttraumatic growth were significantly correlated with a neurotic defence style and an immature defence style. However, only a neurotic defence style predicted significantly posttraumatic growth when controlled for each other defence style and positive affect. The results replicate the findings of two studies within this thesis. The results could suggest that self-reported posttraumatic growth is sometimes illusory. Here, especially a neurotic defence style could be correlated with illusory reports of posttraumatic growth. Two further explanations would also be possible. First, a confounding variable could have caused the positive correlation between reports of posttraumatic growth and neurotic defensiveness. Second, Jayawickreme and Blackie (2014) suggest that reports of posttraumatic growth could reflect a personality trait. If so, the correlation between reports of posttraumatic growth and defensiveness could only indicate a certain personality structure.

In the next section, the results concerning the correlation between self-reported posttraumatic growth and psychological well-being are discussed. Surprisingly, psychological well-being and self-reported posttraumatic growth were not significantly correlated. In other words, the results suggest that psychological well-being is not an indicator for reports of posttraumatic growth or the reverse. People experiencing psychological well-being are not more likely to report posttraumatic growth and people reporting posttraumatic growth are not more likely to report psychological well-being. Moreover, defensiveness did not

moderate the correlation of self-reported posttraumatic growth and psychological well-being. That is, real posttraumatic growth and illusory posttraumatic growth do no not differ in their correlation with psychological well-being. In other words, the likelihood of experiencing psychological well-being is neither increased nor decreased when illusory posttraumatic growth or real posttraumatic growth is reported. The model in section 1.4. suggested that real reports of posttraumatic growth were correlated with psychological well-being. This correlation was not assumed for illusory reports of posttraumatic growth. The results do reject these assumptions.

Within the analysis of correlates, reports of posttraumatic growth were significantly correlated with positive affect. Moreover, the level of mature defensiveness moderated the correlation of reports of posttraumatic growth and positive affect. The correlation between reports of posttraumatic growth and positive affect was highest at low levels of mature defensiveness. In contrast, the correlation between reports of posttraumatic growth and positive affect was lowest at high levels of mature defensiveness. The theory introduced within the model 1.4. suggests that real posttraumatic growth is indicated by high levels of mature defensiveness while illusory posttraumatic growth is characterised by low levels of mature defensiveness. By using this framework, the results indicate that illusory posttraumatic growth is positively correlated with reports of positive affect when low levels of mature defensiveness are used. In contrast, the positive correlation between real posttraumatic growth and positive affect is minor when high levels of mature defences are used. The results are in contrast to the model 1.4. (figure 1.). Here, it was assumed that only real posttraumatic growth is correlated with positive affect.

Within the analysis of correlations, reports of posttraumatic growth were correlated with negative affect. However, the correlation was not significant. Within the moderation analyses, the correlation between reports of posttraumatic growth and negative affect was moderated by the level of mature defensiveness. At high levels of mature defensiveness, increases of posttraumatic growth were accompanied by increases in negative affect. At low levels of mature

defensiveness, increases of reports of posttraumatic growth were accompanied by decreases in negative affect. The theory introduced within the section 1.4. suggests that real posttraumatic growth is indicated by high levels of mature defensiveness while illusory posttraumatic growth is indicated by low levels of mature defensiveness.

By using this framework, the results suggest that higher levels of illusory posttraumatic growth significantly decrease the likelihood to report negative affect. In contrast, higher levels of real transformational posttraumatic growth increase the likelihood to report negative affect. The results are in contrast with model 1.4. (figure 1.). Illusory reports of posttraumatic growth were accompanied by reduced negative affect.

In conclusion, the significant correlation between reports of posttraumatic growth and neurotic as well as immature defensiveness could suggest that those reports are sometimes illusory. However, also a confounding variable could have caused this positive correlation. Moreover, illusory reports of posttraumatic growth are correlated with increases in hedonic well-being while this is not the case for real posttraumatic growth. Therefore, the model (figure 1.) proposed in section 1.4. must be rejected. However, in general illusory posttraumatic growth showed lower levels in hedonic well-being when compared to real transformational posttraumatic growth. Therefore, high levels of illusory posttraumatic growth could be required to gain the same amount of hedonic well-being when compared to the lowest point of hedonic well-being in real transformational posttraumatic growth. Such high levels of illusions (low mature defensiveness) could come for a high price such as social liabilities (Westphal and Bonanno, 2007) and low functioning levels over time (cf. Vaillant, 1995).

### 8.7. Limitations

This study has several limitations. First, it is prone to mono-operation bias (Shadish et al., 2002). Furthermore, the study has used a University-sample and is, therefore, not representative. However, the main aim of the study was to explore, preliminarily, how diverse concepts correlate with each other. As Heiervang and

Goodman (2011, p.70) pointed out "(…) selection bias is much more likely to affect point estimates such as prevalence than patterns of association". Therefore, reduced representativeness and potential selection bias may not substantially reduce the value of this research (cf. Butler et al., 2002; Heiervang and Goodman, 2011; Loewenthal, 1996). Moreover, the study used a cross-sectional design. Causal inferences are, therefore, not possible (ibid). The DSQ-40 shows satisfactory to very good test-retest reliability (Andrews et al., 1993); however, the mature defence style and the neurotic defence style have some problems concerning their internal consistency. Although the low numbers of items used could explain those problems (Loewenthal, 1996; Zeigler-Hill and Pratt, 2007) it is important to bear those issues in mind.

In addition, the adapted version of the TEQ asked participants initially only to state their most traumatic experience. However, several participants stated more than one traumatic experience. These responses were later taken into account within the analyses. Therefore, it is likely that the variable number of traumas experienced underestimates the true number of traumas experienced within the sample.

Frazier and colleagues (2004) suggest that all potential moderator variables should be included in one step/block. This has not been done within the moderation analyses in order to detect moderation effects for each potential moderator individually. This procedure has, therefore, the potential to increase the risk for Type I errors (Frazier et al., 2004). However, because the three defence styles were assumed to affect the correlation in partly opposite directions it seemed to be useful to examine the moderation for every defence style individually. Moreover, Springer and colleagues (2006) have shown that the six dimensions of Ryff's Psychological Well-Being Scale are of questionable discriminant validity. However, the researcher attempted to avoid this problem by using the total scale of psychological well-being.

Moreover, the response rate was not high, which could result in sample bias as suggested by, for example, Loewenthal (1996). However, this possibility may be rather small because the study was not concerned about absolute levels

(prevalence) but was interested in correlations between variables (Loewenthal, 1996). As argued above, potential sample bias may not substantially reduce the value of this research (cf. Butler et al., 2002; Heiervang and Goodman, 2011; Loewenthal, 1996).

Finally, hedonic well-being was not measured by subjective well-being but only by positive and negative affect. Life satisfaction a part of subjective well-being was not examined. The reason was mainly that defence mechanisms are used to regulate affect or emotions respectively (Vaillant, 1995). Therefore, this side of hedonic well-being appeared to be especially important. Moreover, Deci and Ryan (2008, p.2) argue that hedonic well-being is best reflected by positive and negative affect "(…) because life satisfaction is not strictly a hedonic concept. Rather, it involves a cognitive evaluation of the conditions of one's life". They argue, furthermore, that life satisfaction could reasonably be conceptualised as eudaimonic well-being.

# 9. Conclusion

The final chapter will summarise the empirical findings within the thesis. The results will be discussed in light of posttraumatic growth theories and the conceptualisation of real posttraumatic growth and illusory reports of posttraumatic growth as suggested in section 1.4. Moreover, attention will be drawn to research and clinical implications. Third, limitations of the thesis are discussed and new ways for researching real posttraumatic growth and illusory posttraumatic growth will be suggested. Within the next section, the results will be summarised and will be discussed in light of theoretical assumptions on real posttraumatic growth and illusory reports of posttraumatic growth.

## 9.1. Summary of the Thesis

Several researchers (e.g. Cheng et al., 2006; Davis and McKearney, 2003; Ford et al., 2008; Frazier et al., 2009; Frazier and Kaler, 2006; Goorin, 2011; Hall et al., 2009; Hobfoll et al., 2007; Maercker and Zoellner, 2004; McFarland and Alvaro, 2000; Taylor, 1983; Wortrman, 2004; Yanez et al., 2011; Zoellner and Maercker, 2006) have suggested that reports of posttraumatic growth could sometimes be illusory. Within chapter 1, illusions that could have the potential to cause illusory reports of posttraumatic growth were defined and categorised into two groups. Illusions that could be adaptive were categorised under the term positive illusions after Taylor (1989; 1983) and Vaillant (1995; 1995b). Illusions that may have the potential to be maladaptive were categorised under the term negative illusions.

In accordance with Frazier and colleagues (2009) and Hobfoll and colleagues (2007) it was, furthermore suggested that reports of posttraumatic growth could incorporate two separate phenomena having different implications for well-being. Hereupon, it was assumed that the level of illusions could be used to indicate real posttraumatic growth and illusory posttraumatic growth. Here, the focus was on defence styles after Vaillant (1995, 1995b).

High levels of maladaptive defensiveness were assumed to indicate illusory reports of posttraumatic growth. Maladaptive defensiveness was defined by a

neurotic defence style, an immature defence style and negative humour (aggressive humour and self-defeating humour). Low levels of a mature defence style or the mature defence mechanism of positive humour (affiliative and self-enhancing humour) were also assumed to indicate illusory reports of posttraumatic growth. Low levels of maladaptive defensiveness were assumed to indicate real posttraumatic growth. In addition, low levels of maladaptive defensiveness were assumed to indicate real posttraumatic growth. High levels of a mature defence style or the mature defence mechanism of humour (affiliative and self-enhancing humour) were also assumed to indicate real posttraumatic growth.

In section 1.4, a model (figure 1.) was proposed that hypothesised how real posttraumatic growth and illusory reports of posttraumatic growth could correlate with diverse well-being outcomes. This model was tested throughout the thesis. In total, the thesis investigated whether reports of posttraumatic growth are correlated with defensiveness. It was, furthermore, preliminarily explored whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with diverse well-being outcomes.

### 9.1.1. Summary of the empirical part of the thesis.

Within the second chapter, the literature was systematically reviewed concerning the correlation between self-reported posttraumatic growth and defensiveness. Of the ten studies reviewed, seven indicated that self-reported posttraumatic growth is correlated with defensiveness. However, the research design and theoretical assumption on which the design was based varied remarkably between the studies. Therefore, a coherent comparison of the studies was impeded. Moreover, none of the reviewed studies used a measurement specifically developed to assess defensiveness. Defensiveness either was measured by social desirability scales or was inferred via experimental designs or the rate of PTSD. Therefore, it seemed useful to examine whether reports of posttraumatic growth are correlated with defensiveness by using a scale that has been especially designed for measuring defence mechanisms. This has been done throughout the thesis by using the DSQ-40.

Within section 1.3, it was suggested that some illusions may be adaptive and some illusions may have the potential to be maladaptive in the long-term for the well-being of a person. Adaptive illusions were categorised as positive illusions after Taylor (1989/ 1983). Moreover, a mature defence style after Vaillant (1995) was assumed a special case of positive illusions. Here, internal and external reality may be experienced in an attenuated manner but are potentially accommodated within the self at the same time (Vaillant, 1995). In contrast, illusions that were suggested to be potentially maladaptive for the well-being of a person were termed negative illusions. For example, neurotic and immature defence styles may have the potential to distort internal or external reality. Here, accommodation processes necessary for the development of real posttraumatic growth could be negatively impacted. These theoretical assumptions on illusions were used in order to evaluate when reports of posttraumatic growth may be rather adaptive or rather maladaptive. However, this theory needed to be tested.

The first study conducted within the thesis examined, therefore, which illusions could be considered as functional psychological responses and which illusions may rather indicate maladaptive ways of coping. Two strategies were used to evaluate the functionality of illusions. First, emotional dysregulation was used as a marker to indicate which illusions may be adaptive and which illusions may be rather considered as maladaptive. Second, inter-correlations were inspected. Positive illusions after Taylor (1989/ 1983) were measured by the BIDR (self-deceptive enhancement and image management). Mature defensiveness, a special case of positive illusions after Vaillant (1995), was measured by the DSQ-40. Positive humour (affiliative humour and self-enhancing humour) a mature defence mechanism was measured by the HSQ. Negative illusions, as defined as neurotic and immature defensiveness, were measured by the DSQ-40. Negative humour (aggressive and self-defeating humour), a rather immature defence mechanism (e.g. Freud, 2006; Martin and colleagues, 2003), was measured by the HSQ.

The findings indicated that mature defensiveness, self-enhancing humour and self-deceptive enhancement were significantly inter-correlated. Moreover,

mature defensiveness, affiliative humour, self-enhancing humour, self-deceptive enhancement and image management were significantly inversely correlated with emotional dysregulation. Therefore, these listed illusions or strategies to deal with stress may be conceptualised as functional ways of coping. Therefore, the theory proposed in section 1.3. was supported. Positive illusions after Taylor (1989/ 1983) and positive illusions (mature defensiveness) after Vaillant (1995) appear to be functional psychological responses towards stress. However, only self-enhancing humour and self-deceptive enhancement predicted significantly emotional dysregulation. In contrast, neurotic defensiveness, immature defensiveness and self-defeating humour were significantly inter-correlated. Furthermore, immature defensiveness and self-defeating humour were significantly correlated with emotional dysregulation. The results support the theory proposed in section 1.3. Neurotic defensiveness, immature defensiveness and negative humour appear rather to be maladaptive psychological responses towards stress. However, only immature defensiveness and self-defeating humour predicted significantly emotional dysregulation.

The results gained within the first study do support the theoretical assumptions about when reports of posttraumatic growth could be illusory and when they could constitute real transformational posttraumatic growth (see section 1.4.). Therefore, the conceptualisation of real posttraumatic growth and illusory reports of posttraumatic growth, suggested in 1.4, could be used with more confidence within the next studies. The next studies preliminarily explored whether reports of posttraumatic growth are correlated with defensiveness. Moreover, it was investigated whether real posttraumatic growth and illusory reports of posttraumatic growth differ in their correlation with well-being.

Within chapter 5, it was investigated whether reports of posttraumatic growth are, in fact, correlated with defensiveness. Furthermore, it was examined whether real and illusory posttraumatic growth correlate differently with negative change following adversity. In accordance with, for example, Joseph (2011), Janoff-Bulman (2009), and Calhoun and Tedeschi (2009) it was suggested in section 1.4. that real posttraumatic growth may often be correlated with negative

change following adversity. This may not necessarily be the case for illusory reports of posttraumatic growth as, for example, suggested by (cf. Maercker and Zoellner, 2004; cf. Zoellner and Maercker, 2009, 2006; Cheng et al., 2006). Two self-report measurements were used to measure reports of posttraumatic growth, namely, the PTGI and the CiOQ-P. Moreover, real posttraumatic growth was separated from illusory reports of posttraumatic growth by using the level of defensiveness as indicator for real and illusory posttraumatic growth. Moderation analyses were used for this purpose. Real posttraumatic growth was assumed to be indicated by low levels of neurotic defensiveness or immature defensiveness or high levels of mature defensiveness. Illusory posttraumatic growth was assumed to be indicated by high levels of neurotic defensiveness or immature defensiveness or low levels of mature defensiveness.

Reports of posttraumatic growth measured by the PTGI correlated significantly with all defence styles. Reports of posttraumatic growth measured by the CiOQ-P were significantly correlated with a mature defence style and a neurotic defence style. However, only a neurotic defence style predicted reports of posttraumatic growth significantly measured by the PTGI and the CiOQ-P. The findings suggest, therefore, that reports of posttraumatic growth could sometimes be defensive and illusory respectively. Moreover, illusory reports of posttraumatic growth appear correlated in particular with neurotic defensiveness. However, also other interpretations of the results are possible. For example, the significant correlation between reports of posttraumatic growth and maladaptive defensiveness could be caused by confounding variables. This possibility will be discussed in more detail in section 9.3.

Although the moderation analyses were not significant, a meaningful effect size was found. Therefore, useful tendencies could be discovered, justifying further exploration. Here, the results could preliminarily suggest that the correlation between reports of posttraumatic growth and negative change following adversity is at highest at low levels of neurotic defensiveness and immature defensiveness. In contrast, the correlation between reports of posttraumatic growth and negative change following adversity were meaningless

or negative at high levels of neurotic defensiveness and immature defensiveness. According to the model (figure 1.) introduced in chapter 1.4., low levels of neurotic and immature defensiveness were assumed to indicate real posttraumatic growth. In contrast, high levels of neurotic and immature defensiveness were assumed to indicate illusory reports of posttraumatic growth. The results preliminarily suggest, therefore, that real posttraumatic growth is correlated positively with negative change following adversity. In contrast, illusory reports of posttraumatic growth were not correlated with negative change following adversity. Therefore, real posttraumatic growth appears to be correlated with the awareness for negative change following adversity while this awareness for negative change is not existent in illusory posttraumatic growth.

The results are in line with theoretical assumptions about real posttraumatic growth suggested by, for example, Joseph (2011), Janoff-Bulman (2009) and Calhoun and Tedeschi (2009). Moreover, to some extent, the findings are also in line with assumptions about real posttraumatic growth and illusory reports of posttraumatic growth suggested by, for example, Maercker and Zoellner (2004) and Zoellner and Maercker (2006). Moreover, Cheng and colleagues (2006) also support the findings through a study. They found that a mixture of negative change following adversity and posttraumatic growth following the SARS epidemic in Hong Kong was inversely correlated with defensiveness. Reports of only positive change (posttraumatic growth) were, in contrast, correlated positively with defensiveness.

However, because the study was rather exploratory further research was needed. To be more confident in the results, similar studies using different scales or the same scales were carried out. The next study within the thesis explored the correlation between reports of posttraumatic growth and illusions from a different angle. Here, the perspective on illusions slightly changed. The previous study explored how self-reported posttraumatic growth correlates with three clusters of defensiveness. The subsequent study explored how reports of posttraumatic growth correlate with a particular defence mechanism namely humour. Moreover,

it was examined whether reports of posttraumatic growth correlate with illusions after Taylor (1989/ 1983).

Within chapter 6 it was investigated whether the defence mechanism of humour and positive illusions after Taylor (1989/ 1983) are correlated with reports of posttraumatic growth. Furthermore, it was examined whether real and illusory posttraumatic growth correlate differently with negative change following adversity. As before, in accordance with, for example, Joseph (2011), Janoff-Bulman (2009), and Calhoun and Tedeschi (2009), it was hypothesised that real posttraumatic growth may often be correlated with negative change following adversity. This may not necessarily be the case for illusory reports of posttraumatic growth (cf. Maercker and Zoellner, 2004; cf. Zoellner and Maercker, 2009, 2006; Cheng et al., 2006). Two self-report measurements were used to measure reports of posttraumatic growth namely the PTGI and the CiOQ-P. Moreover, real posttraumatic growth was separated from illusory reports of posttraumatic growth. Moderation analyses were used for this purpose. Real posttraumatic growth was assumed to be indicated by either high levels of positive humour (affiliative humour and self-enhancing humour) or low levels of negative humour (aggressive humour and self-defeating humour). Illusory reports of posttraumatic growth were assumed to be indicated by either low levels of positive humour (affiliative humour and self-enhancing humour) or high levels of negative humour (aggressive humour and self-defeating humour). Moreover, high levels of positive illusions after Taylor (1989/ 1983) were conceptualised as a rather benign or even helpful form of illusory reports of posttraumatic growth.

Self-reported posttraumatic growth measured by the PTGI was not significantly correlated with any humour style and with self-enhancing strategies after Taylor (1989/ 1983). In contrast, reports of posttraumatic growth measured by the CiOQ-P were significantly correlated with self-enhancing humour. The reason for the mainly non-significant results could be explained by the conceptualisation of the humour styles. Positive humour (affiliative humour and self-enhancing humor) may be rather conceptualised as mature defence mechanisms (cf. Erickson and Feldstein, 2007; Martin et al., 2003). Negative

humour (aggressive humour and self-defeating humour) may be rather conceptualised as immature defence mechanisms (cf. Freud, 2006; cf. Erickson and Feldstein, 2007; Martin et al., 2003). However, the study within chapter 5 suggested that only a neurotic defence style was uniquely correlated with reports of posttraumatic growth.

No significant moderation effect could be discovered concerning humour. However, some tendencies concerning self-enhancing humour were noticeable and were preliminarily explored. The correlation between reports of posttraumatic growth, measured by the CiOQ, and negative change following adversity was significantly moderated by the level of self-deceptive enhancement. Posttraumatic growth and negative change following adversity were only slightly inversely correlated within the high self-enhancement group. In contrast, negative change following adversity and reports of posttraumatic growth were moderately inversely correlated within the low self-enhancement group. The results could suggest that negative change following adversity and posttraumatic growth are less likely to co-exist in case of real posttraumatic growth (indicated by low levels of self-deceptive enhancement) than in case of illusory reports of posttraumatic growth (indicated by high levels of self-deceptive enhancement).

In total, with exception of self-enhancing humour, the correlation between reports of posttraumatic growth and humour was non-significant. Although some interesting tendencies concerning self-enhancing humour were preliminarily explored, the correlation between reports of posttraumatic growth and negative change following adversity was not affected by the level of any humour style. Taking the results together, it is concluded that the defence mechanism of humour may not remarkably influence reports of posttraumatic growth and its implications. If so, the theoretical assumption that the level of humour could indicate real posttraumatic growth and illusory posttraumatic growth may be rejected.

The study presented in chapter 6 did not substantially support the assumption that reports of posttraumatic growth are correlated with illusions measured by humour and self-enhancement strategies. Further studies were needed to explore the assumption that reports of posttraumatic growth could sometimes be

correlated with illusions indicated by defence mechanisms. In addition, it was not entirely clear whether real posttraumatic growth and illusory posttraumatic growth could differ in their correlation with well-being besides negative change following adversity.

Therefore, two further studies investigated whether reports of posttraumatic growth are correlated with defensiveness within chapter 7. It was also preliminarily explored whether illusory posttraumatic growth and real posttraumatic growth differ in their correlation with posttraumatic stress (cognitive processing) and emotional dysregulation (emotional processing).

According to the theory proposed by Janoff-Bulman (2009), Joseph (2004), Joseph and Linley (2005) and Joseph (2009), it was hypothesised (figure 1.) that real posttraumatic growth occurs when the trauma or parts of the trauma are successfully or almost successfully processed[15] and have been accommodated positively. Immediately following a trauma, a person may oscillate between intrusive and avoidant states until they have worked through the experience (Horowitz, 1986; Horowitz et al., 1995). "When a baseline is reached and intrusive and avoidant states are no longer present, this is explained as resulting from either cognitive assimilation of the traumatic memory or a revision of existing schemas to accommodate the new information" (Joseph and Linley, 2005, p.272). According to these assumptions, intrusive and avoidant states (posttraumatic stress) may have diminished to a critical degree if their function is indeed making sense out of the experience and rebuilding fundamental assumptions (posttraumatic growth). Therefore, although real posttraumatic growth may be set in motion by posttraumatic stress (cognitive processing) as, for example, suggested by Joseph (2011) and Dekel and colleagues (2012), in the long run real posttraumatic growth and posttraumatic stress and emotional dysregulation should be inversely correlated (Joseph, 2011).

[15] This assumption does not mean that real posttraumatic growth may not develop further over time. The contrary may be the case. However, what the proposed assumption suggests is that cognitive processing (posttraumatic stress) as meanin g making process has reduced because, to some extent, meaning has been found. This finding of meaning or reconstruction of meaning giving schemas is already implicated by the term positive accommodation.

In contrast, assimilation processes could cause illusory reports of posttraumatic growth. Assimilation could occur when the person uses defensive processes (Joseph and colleagues, 2012). By using some maladaptive defence mechanisms emotions and information relating to the trauma may not be experienced and could lose their connection to the event or the self (Vaillant, 1995, 1995b). However, the experience of trauma-related emotions and information is considered crucial in order to work through the trauma and to accommodate the adverse experience (Joseph and Linley, 2005). Therefore, the use of defence mechanisms that have the potential to hinder internal and external experiences may also have the potential to block cognitive and emotional processing and trauma processing respectively (cf. Horowitz et al., 1995). Moreover, new experiences may be warded off when associated in one way or another with the adverse experience (Joseph, 2004). Here, reports of posttraumatic growth could be considered part of an overall defensive pattern to push away discomforting feelings and cognitions. It was hypothesised that illusory reports of posttraumatic growth correlate with posttraumatic stress and emotional dysregulation because the trauma experience may often not been faced by the affected person.

Although not significant, the first study suggested that reports of posttraumatic growth measured by the PTGI were inversely correlated with all defence styles and posttraumatic stress. Moreover, reports of posttraumatic growth were correlated significantly and inversely with emotional dysregulation (emotional processing). These findings were contrary to the results gained within chapter 5. The diverging results may be caused by the unique sample characteristics. Of special importance may be that more time has been elapsed since the trauma within this sample than within the sample of chapter 5. Already Luszczynska and colleagues (2012), Maercker and Zoellner (2004) and Zoellner and Maercker (2009/ 2006) suggest that illusory posttraumatic growth may be predominant shortly after the traumatic event has been experienced while real posttraumatic growth may be present mainly when more time has elapsed since the traumatic event. The findings of the study suggest that, in fact, sometimes reports

of posttraumatic growth are real and are correlated with successful trauma processing.

Although the sample size was too small to discover easily significant results, the findings showed meaningful tendencies that contradicted the results gained within chapter 5. The sample size of the previous study was also too small for doing moderation analyses. Therefore, another study using a larger sample size was conducted within chapter 7.

Within this study, neurotic defensiveness was correlated significantly with reports of posttraumatic growth measured by the PTGI. Therefore, reports of posttraumatic growth could sometimes be illusory. Another explanation of the results is that the correlation between reports of posttraumatic growth and a neurotic defence style is caused by a confounding variable. Moreover, reports of posttraumatic growth were correlated significantly with posttraumatic stress but not with emotional dysregulation (emotional processing). The findings suggest that reports of posttraumatic growth are not correlated with successful or almost successful cognitive trauma processing measured by posttraumatic stress. Humour was not correlated with reports of posttraumatic growth measured by the PTGI. The results may suggest that reports of posttraumatic growth, be they real or illusory, are independent of the defence mechanism of humour. Contrary to suggestions in section 1.4, the level of any humour style may not be a good indicator for real or illusory reports of posttraumatic growth.

The hierarchical moderation analyses indicated that neither the level of humour nor the level of any defence style significantly and meaningfully moderated the correlation between reports of posttraumatic growth and posttraumatic stress as well as emotional dysregulation. In addition, non-parametric moderation analyses were conducted in order to examine whether extreme high levels of defensiveness and extreme low levels of defensiveness moderate the correlation between posttraumatic stress, emotional dysregulation and reports of posttraumatic growth. No defence style moderated significantly the correlation between reports of posttraumatic growth and emotional dysregulation. Therefore, real posttraumatic growth and illusory reports of posttraumatic growth

do not differ concerning their correlation with emotional dysregulation. Neither the level of positive humour nor the level of negative humour moderated the correlation between reports of posttraumatic growth and posttraumatic stress as well as emotional dysregulation.

Within the non-parametric moderation analyses, the correlation between posttraumatic stress and reports of posttraumatic growth was moderated significantly by the level of neurotic defensiveness. The correlation between posttraumatic stress and reports of posttraumatic growth was at highest at extreme low levels of neurotic defensiveness and was lowest at extreme high levels of neurotic defensiveness.

According to the model introduced within chapter 1.4, real posttraumatic growth was assumed to be correlated with low levels of neurotic defensiveness while illusory posttraumatic growth was assumed to be correlated with high levels of neurotic defensiveness. Therefore, the results suggest that real posttraumatic growth (extreme low levels of neurotic defensiveness) is correlated with posttraumatic stress, while this is not the case for illusory reports of posttraumatic growth (extrem high levels of neurotic defensiveness). In conclusion, the findings could suggest that real posttraumatic growth is not necessarily accompanied by successful trauma processing as, for example, suggested by Janoff-Bulman (2009); Joseph (2009), Joseph and Linley (2005), Joseph (2004) and the model proposed in section 1.4 (figure 1.). A reasonable explanation may be that both real posttraumatic growth and posttraumatic stress result from shattered fundamental assumptions as, for example, suggested by Dekel and colleagues (2012), Janoff-Bulman (2009) and Joseph (2011). These shattered fundamental assumptions could force an individual to change them. Contrary to theories (e.g. Joseph and Linley, 2005; Joseph, 2004), this change (accommodation) could be independent from successful trauma reconciliation but could produce a mental state within the person, where the destructed fundamental assumptions are experienced (intrusion and avoidant states). However, at the same time, the loss could be used to build something new (Joseph, 2011; cf. Lev-Wiesel and Amir, 2009) or disrupted

structures could be used more intensively in domains where they are still unbroken.

In conclusion, one study (7.2.) supported the idea that sometimes reports of posttraumatic growth measured by the PTGI are real. However, at other times such reports of posttraumatic growth could sometimes be illusory (see study 7.3). The different results may be time-dependent. Luszczynska and colleagues (2012), Maercker and Zoellner (2004) and Zoellner and Maercker (2009/ 2006) suggested that illusory posttraumatic growth may be predominant shortly after the traumatic event has been experienced while real posttraumatic growth may be present mainly when more time has elapsed since the traumatic event. Moreover, study 7.2 suggested that real posttraumatic growth is correlated with successful trauma processing while study 7.3 suggested that real posttraumatic growth, measured by extrem low levels of neurotic defensiveness, may sometimes be accompanied by posttraumatic stress. Therefore, it was suggested that real posttraumatic growth could be divided into two groups, namely, those who have successfully reconciled their traumatic experience and those in which real posttraumatic growth co-exists with posttraumatic stress. Those two forms of real posttraumatic growth could be time dependent. Real reports of posttraumatic growth could co-exist with trauma processing (posttraumatic stress) when the trauma has been experienced not long ago. In contrast, real reports of posttraumatic may be more likely not to co-exist with trauma processing (posttraumatic stress) when the trauma has been experienced a long time ago.

Reports of posttraumatic growth were not correlated with any humour style. Moreover, the correlation between reports of posttraumatic growth and trauma processing (posttraumatic stress and emotional dysregulation) was not significantly moderated by the level of humour. Therefore, reports of posttraumatic growth, whether they are real or illusory, may be independent of the level of humour. It was concluded that the level of humour indicates neither real posttraumatic growth nor illusory reports of posttraumatic growth.

The previous studies have explored whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with well-being. Well-

being was measured by the absence of distress such as negative change following adversity, posttraumatic stress and emotional dysregulation. However, well-being is not only defined by the absence of distress but may also be defined by positive mental states (Joseph, 2011). Therefore, within the next study, it was explored whether real posttraumatic growth and illusory posttraumatic growth differ in their correlation with hedonic well-being (positive and negative affect) and psychological well-being. Moreover, it was again explored whether reports of posttraumatic growth are correlated with defensiveness.

In the final study (Chapter 8), reports of posttraumatic growth measured by the PTGI were again correlated significantly with a neurotic defence style and an immature defence style. However, only a neurotic defence style predicted significantly reports of posttraumatic growth. The results suggest again that reports of posttraumatic growth could sometimes be illusory. Another explanation of the results is that the correlation between reports of posttraumatic growth and a neurotic defence style is caused by a confounding variable. Moreover, reports of posttraumatic growth were correlated significantly with positive affect but not with psychological well-being. Therefore, the assumption that reports of posttraumatic growth are rather about psychological well-being than about hedonic wellbeing as suggested by Calhoun and Tedeschi (2009) and Joseph and Linley (2005) was not supported within this study.

The moderation analyses, using hierarchical regressions, indicated that only the level of mature defensiveness affected the correlation between reports of posttraumatic growth and negative affect as well as positive affect. The correlation between reports of posttraumatic growth and positive affect was at its lowest at high levels of mature defensiveness. Moreover, the correlation between reports of posttraumatic growth and negative affect was highest at high levels of mature defensiveness. According to the model in section 1.4., real posttraumatic growth is indicated by high levels of mature defensiveness or by low levels of neurotic defensiveness or immature defensiveness. In contrast, low levels of mature defensiveness or high levels of neurotic or immature defensiveness indicate illusory posttraumatic growth. Therefore, higher levels of real posttraumatic

growth (indicated by high levels of mature defensiveness) appear to be correlated with decreased positive affect and increased negative affect. In contrast, higher levels of illusory reports of posttraumatic growth (indicated by low levels of mature defensiveness) appear to be correlated with increased positive affect and decreased negative affect. However, higher mature defenders report higher positive affect and lower negative affect than low mature defenders independent of their level of reported posttraumatic growth. In other words, although higher levels of real posttraumatic growth decrease hedonic well-being high mature defenders experience, nevertheless, higher hedonic well-being when compared to low mature defenders (illusory posttraumatic growth).

Real posttraumatic growth (indicated by low neurotic or immature defensiveness) did not differ significantly from illusory reports of posttraumatic growth (indicated by high neurotic or immature defensiveness) concerning hedonic well-being. Moreover, no defence style moderated significantly the correlation between reports of posttraumatic growth and psychological well-being. Therefore, real posttraumatic growth and illusory reports of posttraumatic growth did not differ significantly concerning their correlation with psychological well-being.

In conclusion, the significant correlation between reports of posttraumatic growth and neurotic as well as immature defensiveness could suggest that those reports are sometimes illusory. However, a confounding variable could have also caused this positive correlation. Illusory reports of posttraumatic growth are correlated with increases in hedonic well-being while this is not the case for real posttraumatic growth. Therefore, the model (figure 1.) proposed in section 1.4. must be rejected. However, in general illusory posttraumatic growth showed lower levels in hedonic well-being when compared to real transformational posttraumatic growth. Therefore, high levels of illusory posttraumatic growth could be required to gain the same amount of hedonic well-being when compared to the lowest point of hedonic well-being in real transformational posttraumatic growth. Such high levels of illusions (low mature defensiveness) could come for a high price such as

social liabilities (Westphal and Bonanno, 2007) and low functioning levels over time (cf. Vaillant, 1995).

### 9.1.2. Conclusions of the empirical investigations.

With one exception, three studies within the thesis indicate that self-reported posttraumatic growth is correlated with maladaptive defensiveness measured by the DSQ-40. Especially a neurotic defence style appears to be correlated with reports of posttraumatic growth. It was concluded that reports of posttraumatic growth could sometimes be illusory. However, two further explanations are also reasonably possible. First, a confounding variable could have caused the positive correlation between reports of posttraumatic growth and neurotic defensiveness. Second, Jayawickreme and Blackie (2014) suggest that reports of posttraumatic growth could reflect a personality trait. If so, the correlation between reports of posttraumatic growth and defensiveness could only indicate a certain personality structure.

Illusory reports of posttraumatic growth could be influenced by the time that has passed since the traumatic event as argued by Luszczynska and colleagues (2012), Maercker and Zoellner (2004) and Zoellner and Maercker (2009/ 2006). They suggested that illusory reports of posttraumatic growth might be predominant shortly after the traumatic event has been experienced while real posttraumatic growth may be present mainly when more time has elapsed since the traumatic event. This assumption could be supported by the study presented in chapter 7.2. Here, reports of posttraumatic growth were inversely correlated (non-significant) with maladaptive defensiveness. The sample was unique on several descriptive variables. For example, the time that has been passed since the traumatic event was significantly higher (Mean=12.63 years) than within the other four samples (Mean= 6.21 years; range= 4.57- 8.76 years).

Furthermore, it was hypothesised that the defence mechanism of humour is correlated with reports of posttraumatic growth. With exemption of self-enhancing humour measured by the CiOQ, reports of posttraumatic growth were not significantly correlated with any humour style. The correlation between reports of

posttraumatic growth and well-being was not significantly moderated by the level of any humour style. It was concluded that reports of posttraumatic growth could be independent of any humour style. The assumption that the level of humour could indicate real posttraumatic growth and illusory reports of posttraumatic growth is, therefore, questionable and was rejected.

Across three studies, real posttraumatic growth and illusory reports of posttraumatic growth differed only slightly concerning well-being when measured by the level of defensiveness through the DSQ-40.

Although the moderation analyses were not significant within chapter 5, they showed a meaningful effect size. Therefore, potentially important trends were preliminarily explored. Sometimes, real posttraumatic growth (low levels of neurotic and immature defensiveness) could tend to co-exist with negative change following adversity. These findings are in line with theories and empirical research suggesting that real posttraumatic growth and distress may often be experienced simultaneously (Calhoun and Tedeschi, 2009; Janhoff-Bulman, 2009; Joseph, 2011; Cheng et al., 2006). Such a tendency could not be discovered for illusory posttraumatic growth (high levels of neurotic and immature defensiveness). Instead of accommodation, high defensive processes could lead to assimilation of the experience as suggested by, for example, Joseph and colleagues (2012). Both preliminary and non-significant results were in line with the model proposed in section 1.4.

Real posttraumatic growth and illusory posttraumatic growth differ significantly in their correlation with posttraumatic stress only when extreme low levels or extreme high levels of neurotic defensiveness are used. Here, real posttraumatic growth was correlated positively with posttraumatic stress and illusory posttraumatic growth was correlated inversely with posttraumatic stress. Janoff-Bulman (2009), Joseph and Linley (2005) and Joseph (2004) suggested that real posttraumatic growth arises when trauma processing (posttraumatic stress) is not existent anymore or has reduced substantially[16]. In accordance with

[16] For a detailed discussion on that matter, refer to section 7.1.

these theories above, the model in section 1.4. hypothesised that real posttraumatic growth is inversely correlated with trauma processing (posttraumatic stress). This hypothesis proposed within section 1.4. must be rejected within this sample. It was concluded that real posttraumatic growth is not necessarily accompanied by successful or almost successful trauma processing.

However, the first study within chapter 7.2. suggests a possible sub-category of real posttraumatic growth. Although not significant, real posttraumatic growth was correlated inversely and meaningfully with posttraumatic stress. Therefore, one may reasonably assume that within this sample real posttraumatic growth was correlated with successful cognitive processing as suggested by various theories (e.g. Janoff-Bulman, 2009; Joseph and Linley, 2005; Joseph, 2004). Here, trauma processing appears to be finalised. Those diverging results could suggest that two forms of real posttraumatic growth exist that are time dependent. Real reports of posttraumatic growth could co-exist with trauma processing (posttraumatic stress) when the trauma has been experienced not very long ago. In contrast, real reports of posttraumatic growth may be more likely not to co-exist with trauma processing (posttraumatic stress) when the trauma has been experienced long time ago. However, the sample size of the study within chapter 7.2. was small and drawing inferences beyond the sample may be premature. Therefore, the proposed sub-category of real posttraumatic growth is speculative in nature and further research is needed to strengthen these speculations.

Finally, real posttraumatic growth and illusory posttraumatic growth, indicated by the level of mature defensiveness, differed significantly concerning hedonic well-being. Although, the level of hedonic well-being was consistently higher for real posttraumatic growth than for illusory reports of posttraumatic growth, the dynamic change between the variables was unexpected. Real posttraumatic growth was correlated inversely with hedonic well-being while illusory reports of posttraumatic growth were correlated positively with hedonic well-being. These results were contrary to assumptions made within section 1.4.

Real posttraumatic growth and illusory reports of posttraumatic growth did not differ significantly and meaningfully in any other well-being dimension such as psychological well-being and emotional dysregulation.

In total, it is concluded that real posttraumatic growth and illusory posttraumatic growth differ only slightly from each other concerning well-being. The explored difference may be interesting; however, it raises the question of whether it is, in fact, useful to differentiate between real and illusory reports of posttraumatic growth. However, it cannot be excluded that high levels of illusions could come for a high price such as social liabilities (Westphal and Bonanno, 2007) and low functioning levels over time (cf. Vaillant, 1995). This possibility was not tested within this thesis. Moreover, the study could implicate that also real posttraumatic growth could be accompanied by posttraumatic stress (cognitive processing) and negative change following adversity. Moreover, illusory reports of posttraumatic growth were consistently not correlated with distress. Those results are in contradiction to suggestions made by, for example, Zoellner and Maercker (2006) and Frazier and colleagues (2009). Zoellner and Maercker (2006) suggested that real posttraumatic growth should be positively correlated with well-being measures while illusory reports of posttraumatic growth may be inversely correlated with well-being measures.

The thesis attempted to increase knowledge concerning reports of posttraumatic growth. It was examined whether reports of posttraumatic growth are correlated with illusions, especially with defensiveness. Moreover, it was explored whether real transformational posttraumatic growth and illusory reports of posttraumatic growth differ in their correlation with diverse well-being measures. The results were critically discussed and conclusions were drawn. However, it may be interesting how those results and conclusions could inform preliminarily practice. Therefore, both clinical and research implications will be discussed within the next section.

## 9.2. Implications for Clinical and Research Practice

### 9.2.1. Implications for clinical practice.

As stated in section 3.1.1, the thesis should not be read with a clinical lens but rather with a lens for individual differences. Therefore, the next section attempts to draw implications for clinical practice without using the medical model.

This thesis suggests that reports of posttraumatic growth are sometimes not valid/real but illusory. Moreover, self-reported posttraumatic growth was especially correlated with neurotic defensiveness. Therefore, the facilitation of posttraumatic growth could be premature especially as one could unintentionally facilitate illusory posttraumatic growth. The long-term consequences of illusions, especially illusory posttraumatic growth are still unknown and disputed.

Moreover, within the thesis higher levels of real posttraumatic growth were correlated with increased negative affect but no significant increase in positive affect when accompanied by high mature defensiveness. Moreover, real posttraumatic growth indicated by extreme low levels of neurotic defences was correlated with posttraumatic stress. Although not significant, real posttraumatic growth (low neurotic or immature defensiveness) was positively correlated with negative change following adversity. Therefore, real posttraumatic growth may sometimes come at a high price (Calhoun and Tedeschi, 2009).

However, adverse events happen and the best way to deal with them may be to learn from them. This may not reduce pain and suffering but could help to live life in a constructive way despite of what has happened. Hence, therapists and people working with trauma survivors could use the awareness for real posttraumatic growth in order to respond to clients in a helpful way. Moreover, the co-existence of real posttraumatic growth and posttraumatic stress as well as negative change following adversity could be conceptualised as an authentic way of coping with trauma in which the person remains at the same time open for new experience. However, a direct facilitation of posttraumatic growth may be premature as it could give raise for illusory posttraumatic growth. This reservation concerning illusory posttraumatic growth will be explained within the next paragraph.

Illusory posttraumatic growth appears to be correlated with hedonic well-being and was not correlated with posttraumatic stress and negative change following adversity. Thus, a facilitation of illusory posttraumatic growth could be warranted in the short-term. However, it is not clear whether the facilitation of illusory posttraumatic growth has negative long-term consequences. Moreover, illusory reports of posttraumatic growth may indicate that the affected person is still highly distressed by the traumatic event. Vaillant (1995) suggests that maladaptive defences are used in order to ward off overwhelming stress. Therefore, therapists should be aware that reports of illusory posttraumatic growth reflect in fact overwhelming states of stress that may hinder trauma processing. Real posttraumatic growth may be facilitated by helping the person to reduce their dependence on maladaptive defensiveness (Vaillant, 1992). Here, the person-centered conditions (psychological contact, unconditional positive regard, and empathy) of therapy (Rogers, 1959) may have the potential to reduce those defences. Moreover, real posttraumatic growth may be facilitated by helping the person to develop more mature defences (Vaillant, 1992).

Moreover, this thesis suggests that using reports of posttraumatic growth, as outcome measures in therapy may be counter-productive under the precondition that such reports could sometimes be not real and valid respectively. However, if one needs to use well-being outcome measures for various reasons it might be helpful to use measurements, which are not, or at least less, prone to illusory reports of positive change. Both posttraumatic growth measurements used within the thesis were, however, prone to illusory reports of posttraumatic growth. In contrast, Ryffs Psychological Well-being scale appeared not to be prone for illusory reports.

### 9.2.2. Implications for research.

This thesis has several implications for research on posttraumatic growth. These implications are discussed next. First, reports of posttraumatic growth do not necessarily reflect real posttraumatic growth but may instead sometimes be illusory. This assumption is supported by research on reports of posttraumatic

growth (e.g. Cheng et al., 2006; Davis and McKearney, 2003; Frazier et al., 2009; Frazier and Kaler, 2006; Hall et al., 2009; McFarland and Alvaro, 2000). Moreover, three studies within this thesis suggest that reports of posttraumatic growth are correlated with neurotic defensiveness. These results could indicate that sometimes reports of posttraumatic growth are illusory. Therefore, reports of posttraumatic growth and real posttraumatic growth should be considered as two separate constructs until measurements are found that that are more valid. This differentiation may be important in order to avoid false conclusions about the concept of posttraumatic growth.

Second, reports of posttraumatic growth could incorporate two independent psychological phenomena, namely real posttraumatic growth and illusory posttraumatic growth as suggested in different ways by, for example, Frazier and colleagues (2009), Hobfoll and colleagues (2007), Maercker and Zoellner (2004); Zoellner and Maercker (2006/ 2009). If so, both phenomena that are measured by self-reported posttraumatic growth could be accompanied by different psychological implications (ibid). In addition, this thesis suggests that real posttraumatic growth and illusory reports of posttraumatic growth differ concerning their correlation with well-being. However, the difference between real posttraumatic growth (as defined within the thesis) and illusory reports of posttraumatic growth (as defined within the thesis) was minor. However, to avoid false conclusions, it should be borne in mind when using self-report measurements of posttraumatic growth that those measurements could include two different psychological phenomena.

Prospective studies and comparison studies may be useful in order to investigate the proposed assumptions over time and in depth. These possibilities will be discussed in more detail within section 9.4. Another way of conducting research on real posttraumatic growth and illusory posttraumatic growth has been suggested within the thesis (see section 1.4. and section 3.1.2.2.). Because of the research aim, a cross-sectional study design was used. However, this procedure may also incorporate several weaknesses. These limitations will be discussed next.

### 9.3. Limitations

This thesis has several limitations. First, the thesis focuses only on illusions to explain why reports of posttraumatic growth may sometimes not real and valid respectively. However, other factors could also cause the invalidity of self-reported posttraumatic growth. For example, as suggested by Ford and colleagues (2008), the evaluation of positive change following adversity (posttraumatic growth) may cognitively overwhelm most of the subjects. Moreover, illusions were conceptualised as defence styles after Vaillant (1995, 1995b). The mature defence mechanism of humour and self-enhancement strategies were conceptualised after Taylor (1989/ 1983). However, it cannot be excluded that other forms of illusions contribute to the invalidity of self-reported posttraumatic growth. For example, Bitsch and colleagues (2011) suggested that an insufficient conceptualisation of posttraumatic growth leads to the invalidity of its measurements. This possibility was not investigated within this thesis. However, several arguments made by Bitsch and colleagues (2011) could be neglected as discussed in more detail within section 1.2.3. In addition, worldview defences could also be responsible for illusory reports of posttraumatic growth (e.g. Davis and McKearney, 2003; Hall et al., 2009; Luszczynska et al., 2012). This possibility was not investigated within the thesis. However, it is not feasible to examine all potential possibilities. Therefore, a frame for the thesis was set and clarified. The research conducted stayed mainly within this frame.

To measure defensiveness, the DSQ-40 was used. The DSQ-40 was also used in order to separate real posttraumatic growth from illusory posttraumatic growth. However, the definition of real posttraumatic growth and illusory posttraumatic growth was not entirely exclusive. To illustrate this, real posttraumatic growth was defined by low levels of neurotic or immature defensiveness or by high levels of mature defensiveness. This definition, however, does not exclude the case where somebody is using, for example, low levels of neurotic defensiveness and high levels of immature defensiveness. However, if those cases do not constitute the overall tendency of the sample, they should be counter-balanced due to the quantitative research design. Moreover, all defence

styles were defined by the defence mechanisms included into the DSQ-40. Other defence mechanisms that were not part of the instrument were not measured. Hence, no conclusions can be drawn concerning defence mechanisms that go beyond what is measured by the DSQ-40. For example, Vaillant (1995) describes also altruism as a mature defence mechanism. However, altruism was not measured by the DSQ-40.

Although the factor structure of the DSQ-40 was supported by some studies (Blaya et al., 2007; Maltby and Day, 2004; Ryad et al., 2009) two studies (Hayasshi et al., 2004; Schauenburg et al., 2007) found that the item-loadings were different to the initial suggestions made by Andrews and colleagues (1993). Moreover, although the construct validity of the DSQ-40 is usually supported (e.g. Andrews et al., 1993; Blaya et al., 2006) the DSQ-40 shows some minor problems concerning its content validity (Chabrol et al., 2005; Schauenburg et al., 2007). Finally, the DSQ-40 measures certain behaviours, which are assumed to emerge regularly when a person is under distress. However, around eleven items do not connect those behaviours with distress. Therefore, the DSQ-40 shows some weaknesses concerning its factor structure and its content validity. These weaknesses should be borne in mind when reading the results.

Moreover, although the DSQ-40 is widely used it shows some problems concerning its item consistency (reliability) especially for neurotic defensiveness and mature defensiveness (Andrews et al., 1993). Those problems were also noticeable within this thesis. However, only four items were used to calculate the inter-item consistencies of a neurotic defence style and mature defence style. However, the number of items affects the internal reliability (Loewenthal, 1996; Zeigler-Hill and Pratt, 2007). Moreover, it may be useful to remember that Cronbach's alpha measures whether a scale could be one-dimensional (Brosius, 2006). A low value, therefore, suggests that the scale may not be one-dimensional. This could be the case for all three defence styles. The DSQ-40 may be rather a formative measurement and Cronbach's alpha could not the best way to assess its reliability (cf. Diamantopoulos and Winklhofer, 2001). However, the DSQ-40 shows satisfactory to very good test-retest reliability (Andrews et al., 1993).

Moreover, the construct validity of the DSQ-40 was supported within chapter 4. In other words, the defence styles appear to measure what they should measure according to the theory.

In addition, one could argue that unconscious processes are barely measurable by self-report measurements. However, the DSQ-40 does not measure unconscious processes per se but their behavioural derivates (Andrews et al., 1993). Although such reports may sometimes be biased, people are usually capable of reporting their own behaviour (ibid). In conclusion, the DSQ-40 has certainly some limitations and those should be borne in mind. However, as suggested by Bargh and Williams (2009), it is important to do research on non-conscious processes. This may especially hold ground for research that is primarily explorative. Moreover, although the empirical research concerning defence mechanisms is for sure still in its infancy, the DSQ-40 is one of the most valid and reliable measurements, which assess defence mechanisms.

Within the correlation analyses, it was measured whether reports of posttraumatic growth are correlated with defensiveness measured by the DSQ-40. Because reports of posttraumatic growth were correlated with especially neurotic defensiveness, it was concluded that such reports are sometimes defensive. However, it is important to bear in mind that Pearson correlation coefficients only state to what extent two variables co-exist (Benninghaus, 2002; Coolican, 1998). Therefore, also other ways of interpreting the results are possible.
For example, some unique characteristics of the samples could theoretically have caused the positive association between reports of posttraumatic growth and defensiveness. Those unique sample characteristics and their potential effects on the results will be discussed next.

Although probably not affecting the correlations under investigation within this thesis, women and younger people generally report more posttraumatic growth (Helgeson et al., 2006). This tendency was only marginally discovered within the thesis. Age was consistently not correlated with reports of posttraumatic growth. Women were only in two studies more likely to report posttraumatic growth than men were.

Trauma severity, current distress and the total number of traumas were only correlated with reports of posttraumatic growth in one study. The latter three variables, however, did not correlate with any defence style. Therefore, it is unlikely that they function as a confounding variable between reports of posttraumatic growth and any investigated defence style within the samples. However, it could be possible that those variables discussed above do constitute a confounding variable when using a sample that includes a wider range for each variable. Within this thesis, the range of several variables was sometimes limited. For example, the mean age was younger than within the general population for those studies where a student sample was used. In addition, the trauma has usually been experienced not very long ago (range= 4.47 to 8.76 years) within the student samples.

Moreover, other potential confounding variables not investigated could have caused the correlation between reports of posttraumatic growth and defensiveness. This possibility cannot be excluded. Another way of interpreting the results is suggested by Jayawickreme and Blackie (2014). They argue that reports of posttraumatic growth could reflect a personality trait. If so, the correlation between reports of posttraumatic growth and defensiveness could only indicate a certain personality structure.

The hierarchical moderation analyses deviated from the “golden” standard recommended by, for example, Frazier and colleagues (2004). They suggest that all potential moderator variables should be included in one step/block. This has not been done within the hierarchical moderation analyses in order to detect moderation effects for each potential moderator individually. This procedure has, therefore, the potential to increase the risk for Type I errors (Frazier et al., 2004). However, because the three defence styles were assumed to affect the correlation in partly opposite directions it seemed to be useful to examine the moderation for every defence style individually.

Furthermore, Jayawickreme and Blackie (2014) urge doing prospective studies using a control group when investigating real transformational posttraumatic growth. However, the aim of the thesis did not really match a

prospective research design. Why this is the case will be explained next. Prospective research designs are usually expensive, time consuming and require special knowledge (cf. Frazier et al., 2009; Gunty et al., 2011; Lehman et al., 1993). Moreover, in order to do a prospective research design one needs ideally access to a clinical population (Jayawickreme and Blackie, 2014). This rather resource intensive and risky design may not be warranted when studies explore new ideas (Calhoun and Tedeschi, 2009) and correlations between variables (Calhoun and Tedeschi, 2009; Diekman, 2002)[17]. Therefore, a series of cross-sectional studies preliminarily explored how diverse concepts correlate with each other and whether real posttraumatic growth and illusory posttraumatic growth could differ in their correlation with well-being. Especially the latter is not yet well established and studies that explore this possibility from diverse angles are needed. Here, it is suggested that prospective studies may be used within the second step namely when several exploratory studies indicated that the idea could be worth to be validated through a more rigorous and a more resource intensive research design.

Moreover, most studies within the thesis had a low to moderate sample size. Therefore, the power of the studies was affected and the probability of doing a Type II error is increased. In other words, the probability that one detects no significant correlation although a significant correlation exists is higher in these studies (Weiß, 2008). To counter-balance this limitation also meaningful effect sizes were explored and discussed within the thesis. Moreover, non-parametric moderation analyses were used within the thesis. However, non-parametric moderation analyses using, for example, a median split reduce artificially the information of the data (Frazier et al., 2004). According to Frazier and colleagues (2004) this method results in lower power to detect significant differences and leads, therefore, to a higher probability of doing a Type II error. Moreover, they

[17] In addition, although a prospective design using a control group is for sure an advanced method, one also needs to acknowledge the usual case where participants are recruited from one institutional setting. If so, any variance between the groups could be caused by institutional characteristics rather than by the phenomenon under investigation. Even if one could resolve this problem by, for example, using cluster analysis one still measures as suggested by Aspinwall and Tedeschi (2010) self-reports of posttraumatic growth and not necessarily real posttraumatic growth.

also suggest that dichotomisation could produce spurious effects. Therefore, doing a Type I error could increase.

Furthermore, all studies were cross-sectional and convenient samples were used. Therefore, the results are not representative (Shadish et al., 2002). However, the main aim of the study was to explore preliminarily how diverse concepts correlate with each other. As Heiervang and Goodman (2011, p.70) pointed out "(…) selection bias is much more likely to affect point estimates such as prevalence than patterns of association". Therefore, reduced representativeness and potential selection bias may not substantially reduce the value of this research (cf. Butler et al., 2002; Heiervang and Goodman, 2011; Loewenthal, 1996).
All studies used only self-report measurements. Therefore, a mono-operation bias could have occurred which could threaten the validity of the studies (ibid). In addition, the surveys within chapter 6 and chapter 7.2. had a low response rate, which makes them prone for selection bias. However, as suggested above, analyses of correlation may be less affected by selection bias. Moreover, results gained within the studies could depend on the type of trauma experienced (e.g. Joseph and Linley, 2008c). Therefore, conclusions drawn may not be valid for people who have experienced a different type of trauma.

Within chapter 8, Ryff's Psychological Well-Being Scale was used to assess psychological well-being. Springer and colleagues (2006) argued that the six dimensions of Ryff's scale are of questionable discriminant validity. Therefore, the total scale was used to avoid validity problems. The study within chapter 8 suggests that posttraumatic growth is not correlated with psychological well-being. However, it cannot be excluded that posttraumatic growth is correlated with domains of eudaimonic well-being not captured by Ryff's Psychological Well-Being Scale. Therefore, further research is needed to investigate whether real posttraumatic growth is, in fact, not correlated with eudaimonic well-being.

Finally, it has been suggested that hedonic well-being is reflected by subjective well-being that measures positive affect, negative affect and life satisfaction (e.g. Chen et al., 2012). However, hedonic well-being was only measured by positive affect and negative affect within chapter 8. The reason was

mainly that defence mechanisms are used to regulate affect or emotions respectively (Vaillant, 1995). Therefore, this side of hedonic well-being appeared to be especially important. Moreover, Deci and Ryan (2008, p.2) argue that hedonic well-being or happiness (subjective well-being) is best reflected by positive and negative affect "(…) because life satisfaction is not strictly a hedonic concept. Rather, it involves a cognitive evaluation of the conditions of one's life". They argue, furthermore, that life satisfaction could reasonably be conceptualised as eudaimonic well-being.

In total, the low sample size, especially of several studies may have increased the possibility to reject an alternative hypothesis, though it is empirically true. In addition, the mature defence scale and the neurotic defence scale of the DSQ-40 lack internal consistency and one could be justifiably skeptical concerning its reliability. Nevertheless, the DSQ-40 is one of the most valid and reliable measurements assessing defensiveness although not in a direct way but through behaviour. Moreover, the conceptualisation of real posttraumatic growth and illusory reports of posttraumatic growth as suggested within the thesis is not the only way in which one could interpret the results.

Although the thesis certainly has several limitations, it opens a new perspective on how real posttraumatic growth and illusory reports of posttraumatic growth could be conceptualised and examined. It was possible to explore preliminarily and in breadth, whether real and illusory reports of posttraumatic growth differ in their correlation with well-being. Finally, hypotheses concerning real and illusory reports of posttraumatic growth were preliminarily tested. Nevertheless, to the best of the author's knowledge, the limitations of the thesis were taken into account when results were interpreted. Moreover, the exploratory nature of the thesis could lay the ground for future research using more rigorous research designs or perspectives that were not at the focus of the research. Potential future research designs will be discussed next.

### 9.4. Future Research

This thesis suggested that real posttraumatic growth (extreme low levels of neurotic defensiveness) was significantly correlated with posttraumatic stress. Moreover, real posttraumatic growth, characterised by high levels of mature defensiveness, was significantly correlated with reduced hedonic well-being. Although not significant, real posttraumatic growth (low levels of neurotic or immature defensiveness) was correlated with the awareness for negative change following adversity.

However, other factors not investigated within the thesis could also be correlated with real posttraumatic growth or illusory reports of posttraumatic growth. Factors not investigated were, for example, social support and shattered assumptions. In the same vein, within the thesis eudaimonic well-being was measured by Ryff's Psychological Well-Being Scale. However, other domains of eudaimonic well-being not captured by Ryff's Psychological Well-Being Scale could be correlated with real posttraumatic growth (Joseph, personal communication, April 11, 2014). Such domains are, for example, character strength after Joseph and Linley (2005), existential re-evaluations after Janoff-Bulman (2009), self-determination after Ryan and Deci (2001), ambiguity tolerance after Frenkel-Brunswik (1948), sense for responsibility (cf. Joseph, 2011), will to meaning after Frankl (2010), transcendence (Waterman, 2008), flow experiences (Waterman et al., 2010), life satisfaction, and authenticity after Wood and colleagues (2008).

As suggested by Jayawickreme and Blackie (2014), future research could use a prospective study design incorporating a control group in order to investigate real posttraumatic growth. Here, a current standing version of personal growth (after trauma) could be substracted from the current standing versions of personal growth (before trauma) (Frazier et al., 2009). In this way one would gain an actual posttraumatic growth score as suggested by Frazier and colleagues (2009) and Jayawickreme and Blackie (2014). Hereupon, one could examine how real posttraumatic growth and illusory reports of posttraumatic growth after Frazier and colleagues (2009) correlate with defensiveness. In this way, one could also

investigate whether assumptions made by Frazier and colleagues (2009) corroborate with assumptions made within the thesis. A validity issue of the conceptualisation of real and illusory posttraumatic growth may arise when no corroboration is found.

Longitudinal prospective studies would be another way to examine real and illusory reports of posttraumatic growth. Within such a design one could examine long-term change or stability. Here, one could again examine whether real posttraumatic growth after Frazier and colleagues (2009) is correlated with defensiveness and well-being at several times of measurement.

Another way would be to examine whether reports of posttraumatic growth are accompanied by corresponding behaviour as suggested by, for example, Hobfoll and colleagues (2007), and Park and Lechner (2009). However, the latter possibility may be a rather complicated enterprise given the variability of posttraumatic growth domains. To measure behaviour without self-reports may also be problematic given the variability of behaviour within one person (Conner, Tennen, Fleeson and Feldman-Barrett, 2009).

Another way would be to investigate only reports of posttraumatic growth no matter whether they are real or illusory. However, investigating only reports of posttraumatic growth would probably be accompanied by neglecting the philosophical and humanistic underpinnings of real transformational posttraumatic growth. Nevertheless, this procedure may be especially useful when the differentiation between real and illusory posttraumatic growth is unimportant for well-being outcomes and social implications. However, the former is not supported within the thesis and through research by, for example, Frazier and colleagues (2009) and Yanez and colleagues (2011).

The latter was not investigated within the thesis. However, it is likely that real posttraumatic growth and illusory posttraumatic growth differ concerning their social impact. For example, Hall and colleagues (2009) suggest that illusory posttraumatic growth is sometimes correlated with negative attitudes towards out-groups (exclusionism). Although using a different framework, Cozzolino (2006) suggests that concrete reflections about death could cause an internal motivation

shift (pro-social) that resembles to some extent descriptions of real posttraumatic growth. In contrast, rather abstract ways of death reflection or salience could cause an external motivation shift as described within the Terror Management Theory.

These assumptions were partly supported through a study by Cozzolino, Staples, Meyers and Samboceti (2001). After death reflection, the group who showed initially high levels of extrinsic value orientation tended towards more intrinsic values. No significant change was observed for the group who showed low levels of extrinsic value orientation. The latter group showed, nevertheless, a tendency towards more extrinsic values after they reflected about their death. However, the results gained by Cozzolino and colleagues (2001) were not supported within a study by Lykins and colleagues (2007). They found the opposite pattern. After death reflection, the intrinsic value orientation increased for the group who were already intrinsic motivated. In contrast, the extrinsic value orientation increased for the group who were already extrinsic motivated. In conclusion, studies investigating the impact of real and illusory posttraumatic growth on society are still rare. Illusory posttraumatic growth could be useful in the short-term to cope with adverse experiences, however, it could affect negatively the social environment and oneself in long-term at the same time (cf. Bonanno et al., 1995). Furthermore, it could be speculated that this negative effect does not exist for real posttraumatic growth. However, more research is needed on this matter.

Jayawickreme and Blackie (2009) suggest that experience sampling methods by Conner and colleagues (2009) could be useful when investigating posttraumatic growth. This qualitative research design may be especially helpful when reports of posttraumatic growth, defensiveness and well-being are examined. Experience sampling could enable the researcher to examine behaviour, emotions and thoughts from a subjective perspective (Conner et al., 2009). Hereupon, patterns of subjective experience could be examined by taking at the same time contextual factors into account (ibid).

Moreover, the field could benefit from an examination when real posttraumatic growth is correlated with trauma reconciliation as suggested within

chapter 7.2. and when real posttraumatic growth is correlated with on-going posttraumatic stress (cognitive processing) as suggested in chapter 7.2. Here, a useful method could be a partially structured interview that leaves also space for the flow of communication. The focus of the research could be on the lived experience of the person and its subjective meaning as suggested by Eatough (2012). Moreover, context factors that are usually not well captured by quantitative methods can be taken into account (ibid).

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# Appendices

**Appendix 1.** Defense Style Questionnaire-40 (DSQ-40)

This questionnaire consists of a number of statements about personal attitudes. There are no right or wrong answers. Using the 9-point scale shown below, please indicate how much you agree or disagree with each statement by circling one of the numbers on the scale beside the statement. For example, a score of 5 would indicate that you neither agree nor disagree with the statement, a score of 3 that you moderately disagree, a score of 9 that you strongly agree.

Strongly disagree ← 1 2 3 4 5 6 7 8 9 → Strongly agree

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1. I get satisfaction from helping others and if this were taken away from me I would get depressed | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 2. I'm able to keep a problem out of mind until I have time to deal with it | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 3. I work out my anxiety through doing something constructive and creative like painting or woodwork | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 4. I am able to find good reasons for everything I do | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 5. I'm able to laugh at myself pretty easily | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 6. People tend to mistreat Me | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 7. If someone mugged me and stole my money, I'd rather he be helped than punished | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 8. People say I tend to ignore unpleasant facts as if they didn't exist | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 9. I ignore danger as if I was Superman | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10. I pride myself on my abilityto cut people down to size | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 11. I often act impulsively when something is bothering me | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 12. I get physically ill when things aren't going well for me | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 13. I'm a very inhibited Person | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 14. I get more satisfaction from my fantasies than from my real life | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Strongly disagree ← 1 2 3 4 5 6 7 8 9 → Strongly agree

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 15. I've special talents that allow me to go through life with no problems | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 16. There are always good reasons when things don't work out for me | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 17. I work more things out in my daydreams than in my real life | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 18. I fear nothing | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 19. Sometimes I think I'm an angel and other times I think I'm a devil | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 20. I get openly aggressive when I feel hurt | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 21. I always felt that someone I know is like a guardian Angel | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 22. As far as I'm concerned, people are either good or bad | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 23. If my boss bugged me, I might make a mistake in my work or work more slowly so as to get back at him | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 24. There is someone I know who can do anything and who is absolutely fair and just | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 25. I can keep the lid on my feelings if letting them out would interfere with what I'm doing | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 26. I'm usually able to see the funny side of an otherwise painful predicament | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 27. I get a headache when I have to do something I don't like | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 28. I often find myself being very nice to people who by all rights I should be angry at | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 29. I am sure I get a raw deal from life | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Strongly disagree ← 1 2 3 4 5 6 7 8 9 → Strongly agree

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 30. When I have to face a difficult situation I try to imagine what it will be like and plan ways to cope with it | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 31. Doctors never really understand what is wrong with me | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 32. After I fight for my rights, I tend to apologize for my assertiveness | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 33. When I'm depressed or anxious, eating makes me feel better | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 34. I'm often told that I don't show my feelings | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 35. If I can predict that I'm going to be sad ahead of time, I can cope better | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 36. No matter how much I complain, I never get a satisfactory response | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 37. Often I find that I don't feel anything when the situation would seem to warrant strong emotions | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 38. Sticking to the task at hand keeps me from feeling depressed or anxious | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 39. If I were in a crisis, I would seek out another person who had the same problem | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 40. If I have an aggressive thought, I feel the need to do something to compensate for it | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

**Appendix 2.** Humor Style Questionnaire (HSQ)

People experience and express humor in many different ways. Below is a list of statements describing different ways in which humor might be experienced. Please read each statement carefully, and indicate the degree to which you agree or disagree with it. Please respond as honestly and objectively as you can. Use the following scale:

| Totally Disagree | Moderately Disagree | Slightly Disagree | Neither Agree Nor Disagree | Slightly Agree | Moderately Agree | Totally Agree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. I usually don't laugh or joke around much with other people. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. If I am feeling depressed, I can usually cheer myself up with humor. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. If someone makes a mistake, I will often tease them about it. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. I let people laugh at me or make fun at my expense more than I should. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. I don't have to work very hard at making other people laugh -- I seem to be a naturally humorous person. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. Even when I'm by myself, I'm often amused by the absurdities of life. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. People are never offended or hurt by my sense of humor. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. I will often get carried away in putting myself down if it makes my family or friends laugh. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. I rarely make other people laugh by telling funny stories about myself. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. If I am feeling upset or unhappy I usually try to think of something funny about the situation to make myself feel better. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. When telling jokes or saying funny things, I am usually not very concerned about how other people are taking it. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 12. I often try to make people like or accept me more by saying something funny about my own weaknesses, blunders, or faults. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 13. I laugh and joke a lot with my friends. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 14. My humorous outlook on life keeps me from getting overly upset or depressed about things. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 15. I do not like it when people use humor as a way of criticizing or putting someone down. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 16. I don't often say funny things to put myself down. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 17. I usually don't like to tell jokes or amuse people. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

People experience and express humor in many different ways. Below is a list of statements describing different ways in which humor might be experienced. Please read each statement carefully, and indicate the degree to which you agree or disagree with it. Please respond as honestly and objectively as you can. Use the following scale:

| Totally Disagree | Moderately Disagree | Slightly Disagree | Neither Agree Nor Disagree | Slightly Agree | Moderately Agree | Totally Agree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 18. If I'm by myself and I'm feeling unhappy, I make an effort to think of something funny to cheer myself up. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 19. Sometimes I think of something that is so funny that I can't stop myself from saying it, even if it is not appropriate for the situation. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 20. I often go overboard in putting myself down when I am making jokes or trying to be funny. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 21. I enjoy making people laugh. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 22. If I am feeling sad or upset, I usually lose my sense of humor. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 23. I never participate in laughing at others even if all my friends are doing it. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 24. When I am with friends or family, I often seem to be the one that other people make fun of or joke about. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 25. I don't often joke around with my friends. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 26. It is my experience that thinking about some amusing aspect of a situation is often a very effective way of coping with problems. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 27. If I don't like someone, I often use humor or teasing to put them down. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 28. If I am having problems or feeling unhappy, I often cover it up by joking around, so that even my closest friends don't know how I really feel. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 29. I usually can't think of witty things to say when I'm with other people. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 30. I don't need to be with other people to feel amused -- I can usually find things to laugh about even when I'm by myself. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 31. Even if something is really funny to me, I will not laugh or joke about it if someone will be offended. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 32. Letting others laugh at me is my way of keeping my friends and family in good spirits. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**Appendix 3.** Balanced Inventory of Desirable Responding (BIDR)

Using the scale below as a guide, write a number beside each statement to indicate how true it is.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Not true | | | somewhat | | | very true |

____ 1. My first impressions of people usually turn out to be right.

____ 2. It would be hard for me to break any of my bad habits.

____ 3. I don't care to know what other people really think of me.

____ 4. I have not always been honest with myself.

____ 5. I always know why I like things.

____ 6. When my emotions are aroused, it biases my thinking.

____ 7. Once I've made up my mind, other people can seldom change my opinion.

____ 8. I am not a safe driver when I exceed the speed limit.

____ 9. I am fully in control of my own fate.

____ 10. It's hard for me to shut off a disturbing thought.

____ 11. I never regret my decisions.

____ 12. I sometimes lose out on things because I can't make up my mind soon enough.

____ 13. The reason I vote is because my vote can make a difference.

____ 14. My parents were not always fair when they punished me.

____ 15. I am a completely rational person.

____ 16. I rarely appreciate criticism.

____ 17. I am very confident of my judgments

____ 18. I have sometimes doubted my ability as a lover.

____ 19. It's all right with me if some people happen to dislike me.

____ 20. I don't always know the reasons why I do the things I do.

Using the scale below as a guide, write a number beside each statement to indicate how true it is.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Not true | | | somewhat | | | very true |

____ 21. I sometimes tell lies if I have to.

____ 22. I never cover up my mistakes.

____ 23. There have been occasions when I have taken advantage of someone.

____ 24. I never swear.

____ 25. I sometimes try to get even rather than forgive and forget.

____ 26. I always obey laws, even if I'm unlikely to get caught.

____ 27. I have said something bad about a friend behind his/her back.

____ 28. When I hear people talking privately, I avoid listening.

____ 29. I have received too much change from a salesperson without telling him or her.

____ 30. I always declare everything at customs.

____ 31. When I was young I sometimes stole things.

____ 32. I have never dropped litter on the street.

____ 33. I sometimes drive faster than the speed limit.

____ 34. I never read sexy books or magazines.

____ 35. I have done things that I don't tell other people about.

____ 36. I never take things that don't belong to me.

____ 37. I have taken sick-leave from work or school even though I wasn't really sick.

____ 38. I have never damaged a library book or store merchandise without reporting it.

____ 39. I have some pretty awful habits.

____ 40. I don't gossip about other people's business.

**Appendix 4.** Difficulties in Emotion Regulation Scale (DERS)

Please indicate how often the following statements apply to you by writing the appropriate number from the scale below on the line beside each item.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Almost Never (0-10%) | Sometimes (11-35%) | About half the time (36-65%) | Most of the time (66-90%) | Almost always (91-100%) |

_____ 1) I am clear about my feelings.

_____ 2) I pay attention to how I feel.

_____ 3) I experience my emotions as overwhelming and out of control.

_____ 4) I have no idea how I am feeling.

_____ 5) I have difficulty making sense out of my feelings.

_____ 6) I am attentive to my feelings.

_____ 7) I know exactly how I am feeling.

_____ 8) I care about what I am feeling.

_____ 9) I am confused about how I feel.

_____ 10) When I'm upset, I acknowledge my emotions.

_____ 11) When I'm upset, I become angry with myself for feeling that way.

_____ 12) When I'm upset, I become embarrassed for feeling that way.

_____ 13) When I'm upset, I have difficulty getting work done.

_____ 14) When I'm upset, I become out of control.

_____ 15) When I'm upset, I believe that I will remain that way for a long time.

_____ 16) When I'm upset, I believe that I will end up feeling very depressed.

_____ 17) When I'm upset, I believe that my feelings are valid and important.

_____ 18) When I'm upset, I have difficulty focusing on other things.

_____ 19) When I'm upset, I feel out of control.

_____ 20) When I'm upset, I can still get things done.

_____ 21) When I'm upset, I feel ashamed at myself for feeling that way.

Please indicate how often the following statements apply to you by writing the appropriate number from the scale below on the line beside each item.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Almost Never (0-10%) | Sometimes (11-35%) | About half the time (36-65%) | Most of the time (66-90%) | Almost always (91-100%) |

_____ 22) When I'm upset, I know that I can find a way to eventually feel better.

_____ 23) When I'm upset, I feel like I am weak.

_____ 24) When I'm upset, I feel like I can remain in control of my behaviors.

_____ 25) When I'm upset, I feel guilty for feeling that way.

_____ 26) When I'm upset, I have difficulty concentrating.

_____ 27) When I'm upset, I have difficulty controlling my behaviors.

_____ 28) When I'm upset, I believe there is nothing I can do to make myself feel better.

_____ 29) When I'm upset, I become irritated at myself for feeling that way.

_____ 30) When I'm upset, I start to feel very bad about myself.

_____ 31) When I'm upset, I believe that wallowing in it is all I can do.

_____ 32) When I'm upset, I lose control over my behavior.

_____ 33) When I'm upset, I have difficulty thinking about anything else.

_____ 34) When I'm upset I take time to figure out what I'm really feeling.

_____ 35) When I'm upset, it takes me a long time to feel better.

_____ 36) When I'm upset, my emotions feel overwhelming.

**Appendix 5.** Posttraumatic Growth Inventory (PTGI)

Please, indicate for each of the statements below the degree to which this change occurred in your life as a result of your crisis, using the following scale.

0 = I did not experience this change as a result of my crisis.

1 = I experienced this change to a very small degree as a result of my crisis.

2 = I experienced this change to a small degree as a result of my crisis.

3 = I experienced this change to a moderate degree as a result of my crisis.

4 = I experienced this change to a great degree as a result of my crisis.

5 = I experienced this change to a very great degree as a result of my crisis.

| | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 1. I changed my priorities about what is important in life. (V) | | | | | | |
| 2. I have a greater appreciation for the value of my own life. (V) | | | | | | |
| 3. I developed new interests. (II) | | | | | | |
| 4. I have a greater feeling of self-reliance. (III) | | | | | | |
| 5. I have a better understanding of spiritual matters. (IV) | | | | | | |
| 6. I more clearly see that I can count on people in times of trouble. (I) | | | | | | |
| 7. I established a new path for my life. (II) | | | | | | |
| 8. I have a greater sense of closeness with others. (I) | | | | | | |
| 9. I am more willing to express my emotions. (I) | | | | | | |
| 10. I know better that I can handle difficulties. (III) | | | | | | |
| 11. I am able to do better things with my life. (II) | | | | | | |
| 12. I am better able to accept the way things work out. (III) | | | | | | |
| 13. I can better appreciate each day. (V) | | | | | | |
| 14. New opportunities are available which wouldn't have been otherwise. (II) | | | | | | |

Please, indicate for each of the statements below the degree to which this change occurred in your life as a result of your crisis, using the following scale.

0 = I did not experience this change as a result of my crisis.
1 = I experienced this change to a very small degree as a result of my crisis.

2 = I experienced this change to a small degree as a result of my crisis.

3 = I experienced this change to a moderate degree as a result of my crisis.

4 = I experienced this change to a great degree as a result of my crisis.

5 = I experienced this change to a very great degree as a result of my crisis.

| | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 15. I have more compassion for others. (I) | | | | | | |
| 16. I put more effort into my relationships. (I) | | | | | | |
| 17. I am more likely to try to change things which need changing. (II) | | | | | | |
| 18. I have a stronger religious faith. (IV) | | | | | | |
| 19. I discovered that I'm stronger than I thought I was. (III) | | | | | | |
| 20. I learned a great deal about how wonderful people are.(I) | | | | | | |
| 21. I better accept needing others. (I) | | | | | | |

**Appendix 6.** Changes in Outlook Questionnaire (CiOQ)

Each of the following statements was made by people who experienced stressful and traumatic events in their lives about how the event had changed them. Please, think about how you have changed since the event, read each one and indicate, by circling the number, how much you agree or disagree with it at the present time.

| | Strongly disagree | Disagree | Disagree a little | Agree a little | Agree | Strongly agree |
|---|---|---|---|---|---|---|
| 1. I don't look forward to the future anymore | 1 | 2 | 3 | 4 | 5 | 6 |
| 2. My life has no meaning anymore | 1 | 2 | 3 | 4 | 5 | 6 |
| 3. I no longer feel able to cope with things | 1 | 2 | 3 | 4 | 5 | 6 |
| 4. I don't take life for granted anymore | 1 | 2 | 3 | 4 | 5 | 6 |
| 5. I value my relationships much more now | 1 | 2 | 3 | 4 | 5 | 6 |
| 6. I feel more experienced about life now | 1 | 2 | 3 | 4 | 5 | 6 |
| 7. I don't worry about death at all anymore | 1 | 2 | 3 | 4 | 5 | 6 |
| 8. I live every day to the full now | 1 | 2 | 3 | 4 | 5 | 6 |
| 9. I fear death very much now | 1 | 2 | 3 | 4 | 5 | 6 |
| 10. I look on each day as a bonus | 1 | 2 | 3 | 4 | 5 | 6 |
| 11. I feel as if something bad is just around the corner waiting to happen | 1 | 2 | 3 | 4 | 5 | 6 |
| 12. I'm a more understanding and tolerant person now | 1 | 2 | 3 | 4 | 5 | 6 |
| 13. I have greater faith in human nature now | 1 | 2 | 3 | 4 | 5 | 6 |
| 14. I no longer take people or things for granted | 1 | 2 | 3 | 4 | 5 | 6 |
| 15. I desperately wish I could turn the clock back to before it happened | 1 | 2 | 3 | 4 | 5 | 6 |

Each of the following statements was made by people who experienced stressful and traumatic events in their lives about how the event had changed them. Please, think about how you have changed since the event, read each one and indicate, by circling the number, how much you agree or disagree with it at the present time.

| | Strongly disagree | Disagree | Disagree a little | Agree a little | Agree | Strongly agree |
|---|---|---|---|---|---|---|
| 16. I sometimes think it's not worth being a good person | 1 | 2 | 3 | 4 | 5 | 6 |
| 17. I have very little trust in other people now | 1 | 2 | 3 | 4 | 5 | 6 |
| 18. I feel very much as if I'm in limbo | 1 | 2 | 3 | 4 | 5 | 6 |
| 19. I have very little trust in myself now | 1 | 2 | 3 | 4 | 5 | 6 |
| 20. I feel harder towards other people | 1 | 2 | 3 | 4 | 5 | 6 |
| 21. I am less tolerant of others now | 1 | 2 | 3 | 4 | 5 | 6 |
| 22. I am much less able to communicate with other people | 1 | 2 | 3 | 4 | 5 | 6 |
| 23. I value other people more now | 1 | 2 | 3 | 4 | 5 | 6 |
| 24. I am more determined to succeed in life now | 1 | 2 | 3 | 4 | 5 | 6 |
| 25. Nothing makes me happy any more | 1 | 2 | 3 | 4 | 5 | 6 |
| 26. I feel as if I'm dead from the neck downwards | 1 | 2 | 3 | 4 | 5 | 6 |

**Appendix 7.** Traumatic Events

Please indicate if you have ever experienced or were confronted with one of the following events. If you have experienced more than one of the listed events, please choose the event what you consider as most stressful.

1. Loss of a loved one ❑
2. Serious illness ❑
3. Serious accident ❑
4. Disaster ❑
5. Violence/Crime ❑
6. War/Civil conflict/political violence ❑
7. Forced migration ❑
8. Other very stressful situation ❑ if you ticked this box please write down the nature of the event

9. None ❑

Please indicate how many years or months have elapsed since the mentioned event has happened?

| |
|---|
| |

Below you will find some questions about how you felt as you went through the mentioned event. Please indicate how much you agree or disagree with the listed statements by ticking the box.

| | Strongly disagree | Disagree | Disagree a little | Agree a little | Agree | Strongly agree |
|---|---|---|---|---|---|---|
| I just felt so helpless | | | | | | |
| I felt very threatened by the event | | | | | | |
| I felt very distressed by the event | | | | | | |

How do you feel today about the mentioned event? Please indicate how much you agree or disagree with each listed statement by ticking the box.

| | Strongly disagree | Disagree | Disagree a little | Agree a little | Agree | Strongly agree |
|---|---|---|---|---|---|---|
| I still feel very helpless when I remember what has happened | | | | | | |
| I still feel very threatened by what has happened | | | | | | |
| I still feel very distressed by what has happened | | | | | | |

**Appendix 8.** Adapted Version of the Traumatic Events Questionnaire (TEQ)

Below you will find a list of stressful life events.
If you have experienced one of the events, please tick the appropriate box. If you have experienced more than one of the listed events, please choose the event you consider most stressful.

☐ Have you been in or witnessed a serious industrial, farm, or car accident, or a large fire or explosion?

☐ Have you been in a natural disaster such as a tornado, hurricane, flood or major earthquake?

☐ Have you been a victim of a violent crime such as rape, robbery,or assault?

☐ As a child, were you the victim of either physical or sexual abuse?

☐ As an adult, have you had any unwanted sexual experiences that involved the threat or use of force?

☐ As an adult, have you ever been in a relationship in which you were abused either physically or otherwise?

☐ Have you witnessed someone who was mutilated, seriously injured, or violently killed?

☐ Have you been in serious danger of losing your life or of being seriously injured?

☐ Have you received news of the mutilation, serious injury, or violent or unexpected death of someone close to you?

☐ Have you ever had any other very traumatic event like these?

☐ Have you had any experiences like these that you feel you can't tell about (note: you don't have to describe the event).

☐ I have not experienced such an event.

How many years have elapsed since the event?

If you have experienced one of the events and ticked "Yes" on the previous page please indicate below to what degree you were affected.

| | **1 Not at all** | **2** | **3** | **4** | **5** | **6** | **7 Severely** |
|---|---|---|---|---|---|---|---|
| **a.** Were you injured? | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

| | **1 Not at all** | **2** | **3** | **4** | **5** | **6** | **7 Extremely** |
|---|---|---|---|---|---|---|---|
| **b.** Did you feel your life was threatened? | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| **c.** How traumatic was this for you at that time? | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| **d.** How traumatic is this for you now? | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

**Appendix 9.** Impact of Event Scale (IES)

Below is a list of comments made by people after stressful events. Please check each item, **indicating how frequently these comments were true for you during the past seven days only**. *If they did not occur during that time, please mark the 'not at all' column.*

| | Not at all | Rarely ex-perienced | Some-times ex-perienced | Often ex-perienced |
|---|---|---|---|---|
| 1. I thought about it when I didn't mean to | | | | |
| 2. I avoided letting myself get upset when I thought about it or was reminded of it | | | | |
| 3. I tried to remove it from memory | | | | |
| 4. I had trouble falling asleep or staying asleep | | | | |
| 5. I had waves of strong feelings about it | | | | |
| 6. I had dreams about it | | | | |
| 7. I stayed away from reminders of it | | | | |
| 8. I felt as if it hadn't happened or it wasn't real | | | | |
| 9. I tried not to talk about it | | | | |
| 10. Pictures about it popped into my mind | | | | |
| 11. Other things kept making me think about it | | | | |
| 12. I was aware that I still had a lot of feelings about it, but I didn't deal with them | | | | |
| 13. I tried not to think about it | | | | |
| 14. Any reminder brought back feelings about it | | | | |
| 15. My feelings about it were kind of numb | | | | |

**Appendix 10.** 9-Items Ryff Scale of Psychological Well-being (RPWB)

The following set of questions deals with how you feel about yourself and your life. Please remember that there are no right or wrong answers.

| Circle the number that best describes your present agreement or disagreement with each statement. | Strong-ly Dis-agree | Dis-agree Some-what | Dis-agree Slight-ly | Agree Slight-ly | Agree Some-what | Strong-ly Agree |
|---|---|---|---|---|---|---|
| 1. Most people see me as loving and affectionate. | 1 | 2 | 3 | 4 | 5 | 6 |
| 3. In general, I feel I am in charge of the situation in which I live. | 1 | 2 | 3 | 4 | 5 | 6 |
| 4. I am not interested in activities that will expand my horizons. | 1 | 2 | 3 | 4 | 5 | 6 |
| 6. When I look at the story of my life, I am pleased with how things have turned out. | 1 | 2 | 3 | 4 | 5 | 6 |
| 7. Maintaining close relationships has been difficult and frustrating for me. | 1 | 2 | 3 | 4 | 5 | 6 |
| 8. I am not afraid to voice my opinions, even when they are in opposition to the opinions of most people. | 1 | 2 | 3 | 4 | 5 | 6 |
| 9. The demands of everyday life often get me down. | 1 | 2 | 3 | 4 | 5 | 6 |
| 11. I live life one day at a time and don't really think about the future. | 1 | 2 | 3 | 4 | 5 | 6 |
| 12. In general, I feel confident and positive about myself. | 1 | 2 | 3 | 4 | 5 | 6 |
| 13. I often feel lonely because I have few close friends with whom to share my concerns. | 1 | 2 | 3 | 4 | 5 | 6 |
| 14. My decisions are not usually influenced by what everyone else is doing. | 1 | 2 | 3 | 4 | 5 | 6 |

| Circle the number that best describes your present agreement or disagreement with each statement. | Strong-ly Dis-agree | Dis-agree Some-what | Dis-agree Slight-ly | Agree Slight-ly | Agree Some-what | Strong-ly Agree |
|---|---|---|---|---|---|---|
| 15. I do not fit very well with the people and the community around me. | 1 | 2 | 3 | 4 | 5 | 6 |
| 17. I tend to focus on the present, because the future nearly always brings me problems. | 1 | 2 | 3 | 4 | 5 | 6 |
| 18. I feel like many of the people I know have gotten more out of life than I have. | 1 | 2 | 3 | 4 | 5 | 6 |
| 19. I enjoy personal and mutual conversations with family members or friends. | 1 | 2 | 3 | 4 | 5 | 6 |
| 20. I tend to worry about what other people think of me. | 1 | 2 | 3 | 4 | 5 | 6 |
| 21. I am quite good at managing the many responsibilities of my daily life. | 1 | 2 | 3 | 4 | 5 | 6 |
| 22. I don't want to try new ways of doing things - my life is fine the way it is. | 1 | 2 | 3 | 4 | 5 | 6 |
| 26. Being happy with myself is more important to me than having others approve of me. | 1 | 2 | 3 | 4 | 5 | 6 |
| 27. I often feel overwhelmed by my responsibilities. | 1 | 2 | 3 | 4 | 5 | 6 |
| 28. I think it is important to have new experiences that challenge how you think about yourself and the world. | 1 | 2 | 3 | 4 | 5 | 6 |
| 29. My daily activities often seem trivial and unimportant to me. | 1 | 2 | 3 | 4 | 5 | 6 |
| 30. I like most aspects of my personality. | 1 | 2 | 3 | 4 | 5 | 6 |
| 31. I don't have many people who want to listen when I need to talk. | 1 | 2 | 3 | 4 | 5 | 6 |

| Circle the number that best describes your present agreement or disagreement with each statement. | Strongly Disagree | Disagree Somewhat | Disagree Slightly | Agree Slightly | Agree Somewhat | Strongly Agree |
|---|---|---|---|---|---|---|
| 32. I tend to be influenced by people with strong opinions. | 1 | 2 | 3 | 4 | 5 | 6 |
| 34. When I think about it, I haven't really improved much as a person over the years. | 1 | 2 | 3 | 4 | 5 | 6 |
| 35. I don't have a good sense of what it is I'm trying to accomplish in life. | 1 | 2 | 3 | 4 | 5 | 6 |
| 36. I made some mistakes in the past, but I feel that all in all everything has worked out for the best. | 1 | 2 | 3 | 4 | 5 | 6 |
| 39. I generally do a good job of taking care of my personal finances and affairs. | 1 | 2 | 3 | 4 | 5 | 6 |
| 41. I used to set goals for myself, but that now seems like a waste of time. | 1 | 2 | 3 | 4 | 5 | 6 |
| 42. In many ways, I feel disappointed about my achievements in life. | 1 | 2 | 3 | 4 | 5 | 6 |
| 43. It seems to me that most other people have more friends than I do. | 1 | 2 | 3 | 4 | 5 | 6 |
| 47. I enjoy making plans for the future and working to make them a reality. | 1 | 2 | 3 | 4 | 5 | 6 |

| Circle the number that best describes your present agreement or disagreement with each statement. | Strong-ly Dis-agree | Dis-agree Some-what | Dis-agree Slight-ly | Agree Slight-ly | Agree Some-what | Strong-ly Agree |
|---|---|---|---|---|---|---|
| 49. People would describe me as a giving person, willing to share my time with others. | 1 | 2 | 3 | 4 | 5 | 6 |
| 50. I have confidence in my opinions, even if they are contrary to the general consensus. | 1 | 2 | 3 | 4 | 5 | 6 |
| 51. I am good at juggling my time so that I can fit everything in that needs to be done. | 1 | 2 | 3 | 4 | 5 | 6 |
| 52. I have a sense that I have developed a lot as a person over time. | 1 | 2 | 3 | 4 | 5 | 6 |
| 53. I am an active person in carrying out the plans I set for myself. | 1 | 2 | 3 | 4 | 5 | 6 |
| 55. I have not experienced many warm and trusting relationships with others. | 1 | 2 | 3 | 4 | 5 | 6 |
| 56. It's difficult for me to voice my own opinions on controversial matters. | 1 | 2 | 3 | 4 | 5 | 6 |
| 58. I do not enjoy being in new situations that require me to change my old familiar ways of doing things. | 1 | 2 | 3 | 4 | 5 | 6 |
| 59. Some people wander aimlessly through life, but I am not one of them. | 1 | 2 | 3 | 4 | 5 | 6 |
| 60. My attitude about myself is probably not as positive as most people feel about themselves. | 1 | 2 | 3 | 4 | 5 | 6 |
| 62. I often change my mind about decisions if my friends or family disagree. | 1 | 2 | 3 | 4 | 5 | 6 |
| 64. For me, life has been a continuous process of learning, changing, and growth. | 1 | 2 | 3 | 4 | 5 | 6 |

| Circle the number that best describes your present agreement or disagreement with each statement. | Strongly Disagree | Disagree Somewhat | Disagree Slightly | Agree Slightly | Agree Somewhat | Strongly Agree |
|---|---|---|---|---|---|---|
| 65. I sometimes feel as if I've done all there is to do in life. | 1 | 2 | 3 | 4 | 5 | 6 |
| 67. I know that I can trust my friends, and they know they can trust me. | 1 | 2 | 3 | 4 | 5 | 6 |
| 72. The past had its ups and downs, but in general, I wouldn't want to change it. | 1 | 2 | 3 | 4 | 5 | 6 |
| 75. I have difficulty arranging my life in a way that is satisfying to me. | 1 | 2 | 3 | 4 | 5 | 6 |
| 76. I gave up trying to make big improvements or changes in my life a long time ago. | 1 | 2 | 3 | 4 | 5 | 6 |
| 78. When I compare myself to friends and acquaintances, it makes me feel good about who I am. | 1 | 2 | 3 | 4 | 5 | 6 |
| 80. I judge myself by what I think is important, not by the values of what others think is important. | 1 | 2 | 3 | 4 | 5 | 6 |
| 81. I have been able to build a home and a lifestyle for myself that is much to my liking. | 1 | 2 | 3 | 4 | 5 | 6 |
| 82. There is truth to the saying that you can't teach an old dog new tricks. | 1 | 2 | 3 | 4 | 5 | 6 |

**Appendix 11.** The Positive and Negative Affect Schedule (PANAS)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then list the number from the scale below next to each word. Indicate the extent you have felt this way over the past week.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Very slightly or not at all | A little | Moderately | Quite a bit | Extremely |

| | |
|---|---|
| _____ 1. Interested | _____ 11. Irritable |
| _____ 2. Distressed | _____ 12. Alert |
| _____ 3. Excited | _____ 13. Ashamed |
| _____ 4. Upset | _____ 14. Inspired |
| _____ 5. Strong | _____ 15. Nervous |
| _____ 6. Guilty | _____ 16. Determined |
| _____ 7. Scared | _____ 17. Attentive |
| _____ 8. Hostile | _____ 18. Jittery |
| _____ 9. Enthusiastic | _____ 19. Active |
| _____ 10. Proud | _____ 20. Afraid |

**Appendix 12.** Sample of an information sheet and consent form

## School of Sociology and Social Policy

## University of Nottingham

### A survey on how people feel following life stress



Hello, my name is Michaela Boerner and this survey is part of my research for my PhD. I would be very grateful if you would spend a few minutes to help me by taking part. It will only take about 15 minutes.

**Information**

**Who is carrying out the study?**

My name is Michaela Boerner. I am a PhD student in the School of Sociology and Social Policy. If you have any questions please contact me on:

Tel: 0115-9514891

Email: lqxmb10@nottingham.ac.uk

Or if you would like to speak to my supervisors. They are Prof. Stephen Joseph (Stephen.Joseph@nottingham.ac.uk) and Dr David Murphy (david.murphy@nottingham.ac.uk).

**What the study is about?**

The purpose of the study is to find out about the way people manage stressful events in their lives and how they cope. It is my pilot study and I am asking students and staff around the university to help me.

**What will the participant have to do?**

The study involves answering a questionnaire in which you rate personal attitudes, feelings and behaviours. Some demographic details will also be asked. The completion of the questionnaires will take about 15 minutes.

**What are the benefits of participating in the study?**

There are no personal benefits involved although it may be useful to fill in the questionnaire to think about how you cope with life stress. If you would like, please supply your email address at the end and when this study is finished I will send you a summary of the results.

**Are there any foreseeable risks to the individual if they participate in the research? Are there any costs or inducements to taking part in the research?**

There are no risks or costs. But if you do feel upset by something that has happened to you in your life the University Counselling Service can be contacted on 0115 951 3695 or via their email address: counselling.service@nottingham.ac.uk. You can also approach the University Counselling Service in room A75 at the Trent Building in the University Park of the University of Nottingham.

Finally, you are under no obligation to fill out these questionnaires. Your participation is entirely voluntary and you can stop at any time.

**What happens to the collected information?**

The collected data will be anonymised by using an ID-number. The hardcopy of the questionnaires will be stored in safe place and following analysis they will be stored by the University of Nottingham for 7 years. Afterwards the questionnaires will be destroyed. The researcher will transfer the data to a statistical program (SPSS) and will analyse and interpret them via this program.

**Complaint procedure**

If you wish to complain about the way in which the research is being conducted or have any concerns about the research then in the first instance please contact the principal investigator Michaela Boerner. If this does not resolve the matter to your satisfaction then please contact the supervisor Stephen Joseph or write to address below; or contact the School's Research Ethics Officer, Professor Brigitte Nerlich, tel. 0115 846 7065, email Brigitte.Nerlich@nottingham.ac.uk.

School of Sociology and Social Policy

Law and Social Sciences Building

University Park

Nottingham NG7 2RD

**Thank you very much for taking the time reading this information sheet. Please find the questionnaire on the next few pages.**

**Please read the consent form carefully and if you want to take part in this study please sign below otherwise you will be automatically excluded. Thank you very much for your time and effort!**

## School of Sociology and Social Policy

## University of Nottingham

## Participant Consent Form

**A survey on how people feel following life stress**

In signing this consent form I confirm that:

| | | |
|---|---|---|
| I have read the Participant Information Sheet and the nature and purpose of the research project has been explained to me. | Yes ☐ | ☐ No |
| I have had the opportunity to ask questions. | Yes ☐ | ☐ No |
| I understand the purpose of the research project and my involvement in it. | Yes ☐ | ☐ No |
| I understand that my participation is voluntary and I may withdraw from the research project at any stage, without having to give any reason and withdrawing will not penalise or disadvantaged me in any way. | Yes ☐ | ☐ No |
| I understand that while information gained during the study may be published, any | Yes ☐ | ☐ No |

| | | |
|---|---|---|
| information I provide is confidential (with one exception – see below), and that no information that could lead to the identification of any individual will be disclosed in any reports on the project, or to any other party. No identifiable personal data will be published. | | |
| I understand that the researcher may be required to report to the authorities any significant harm to a child/young person (up to the age of 18 years) that he/she becomes aware of during the research. I agree that such harm may violate the principle of confidentiality. | Yes ☐ | ☐ No |
| I understand that data will be securely stored | Yes ☐ | ☐ No |
| I understand that the information provided can be used in other research projects which have ethics approval, but that my name and contact information will be removed before it is made available to other researchers. | Yes ☐ | ☐ No |
| I understand that I may contact the researcher *[*or *supervisor]* if I require further information about the research, and that I may contact the Research Ethics Officer of the School of Sociology and Social Policy, University of Nottingham, if I wish to make a complaint relating to my involvement in the research. | Yes ☐ | ☐ No |
| I agree to take part in the above research project. | Yes ☐ | ☐ No |

| | | |
|---|---|---|
| Participant's name (BLOCK CAPITAL) | Participant's signature | Date |
| Researcher's name (BLOCK CAPITAL) | Researcher's signature | Date |

**Appendix 13.** Ethical approval for the study on “Illusions and their correlation with Emotional Dysregulation: A Student Survey” (Chapter 4.)

School of Sociology & Social Policy

# Research ethics checklist for staff and students

The University of Nottingham's Guidance on Ethical Review states: "Ethical review (and approval) is required for all projects where the research involves participation of human subjects, their data and/or their tissue (even where the applicant indicates that there is only minimal risk)."

This form must be therefore be completed for all research projects, research assignments or dissertations/theses which are conducted within the School and involve human participants or data that are sensitive or protected. You must not begin data collection or approach potential research participants until you have completed this form, received ethical clearance, and submitted this form for retention with the appropriate staff.

If the study is based only on a review of documentary sources already in the public domain and involves NO fieldwork of any sort, then this form does not need to be completed.

Completing the form includes providing a brief summary of the research in Section 2 and ticking some boxes in Section 4. Ticking a shaded box in Section 4 indicates that the study is above minimal risk and requires further action by the researcher. Two things need to be stressed:

- Ticking one or more shaded boxes does not mean that you cannot conduct your research as currently anticipated; however, it does mean that further questions will need to be asked and addressed, further discussions will need to take place, and alternatives may need to be considered or additional actions undertaken.
- Avoiding the shaded boxes does not mean that ethical considerations can subsequently be 'forgotten'; on the contrary, research ethics need to be informed - for everyone and in every project – an ongoing process of reflection and debate.

The following checklist is a starting point for an ongoing process of reflection about the ethical issues concerning your study.

For further information on ethical issues, please consult the School's Ethics webpage: http://www.nottingham.ac.uk/sociology/research/research-ethics.aspx

## SECTION 1: THE RESEARCHER(S)

**To be completed in all cases**

Title of project: The association between humour and emotional regulation: a correlational study.

Name of principal researcher: Michaela Börner

Status: Postgraduate research student

Email address: lqxmb10@nottingham.ac.uk

Names of other project members:

**To be completed by students only:**

**NAME IN CAPITALS MICHAELA BÖRNER**

Student ID number: 4165592

Degree programme: PhD-programme in Sociology

Module name/number:

Supervisors: Professor Stephen Joseph and Dr. David Murphy

## Authorisation

This section must be completed in **all** cases – by type of investigator the form must be countersigned by the following personnel:

Undergraduate student → module convenor or tutor/project supervisor
Postgraduate taught student → dissertation supervisor
Postgraduate research student → supervisor/upgrade panel
Staff → School Research Ethics Officer (REO)
All forms should be countersigned by the REO

Having reviewed the ethical issues arising from the proposed research:

- ☐ I am happy for the research to go ahead as planned.
- ☐ I have requested that changes be made to the research protocol. The principal researcher must complete and submit a revised form which integrates these changes
- ☐ This project must be referred on for more detailed ethical scrutiny. Please forward a hard copy to the School's REO
- ☐ This project is to be referred to Research Development Group for consideration (this option is for School REO only)

Signed ..... Date 23/1/13

Designation .....

School REO ..... Date 5/02/13

Note: **any** research protocols lodged with the School office may be subject to review by the School's Research Ethics Officer

SECTION 6: FURTHER INFORMATION & JUSTIFICATION OF METHODOLOGY

One box should be completed for **each** shaded box ticked in section 4 of this form.

| Ethical issue: |
|---|

| Ethical issue:<br><br>Supervisor/REO's response (including whether ethical issue has been satisfactorily addressed): |
|---|

*Please continue on separate sheets if required*

**Appendix 14.** Ethical approval for the study on "Negative change in Illusory and Real Posttraumatic Growth" (Chapter 5)

**School of Sociology & Social Policy**

# Research ethics checklist for staff and students

The University of Nottingham's Guidance on Ethical Review states: "Ethical review (and approval) is required for all projects where the research involves participation of human subjects, their data and/or their tissue (even where the applicant indicates that there is only minimal risk)."

This form must be therefore be completed for all research projects, research assignments or dissertations/theses which are conducted within the School and involve human participants or data that are sensitive or protected. You must not begin data collection or approach potential research participants until you have completed this form, received ethical clearance, and submitted this form for retention with the appropriate staff.

If the study is based only on a review of documentary sources already in the public domain and involves NO fieldwork of any sort, then this form does not need to be completed.

Completing the form includes providing a brief summary of the research in Section 2 and ticking some boxes in Section 4. Ticking a shaded box in Section 4 indicates that the study is above minimal risk and requires further action by the researcher. Two things need to be stressed:

- Ticking one or more shaded boxes does not mean that you cannot conduct your research as currently anticipated; however, it does mean that further questions will need to be asked and addressed, further discussions will need to take place, and alternatives may need to be considered or additional actions undertaken.
- Avoiding the shaded boxes does not mean that ethical considerations can subsequently be 'forgotten'; on the contrary, research ethics need to be informed - for everyone and in every project – an ongoing process of reflection and debate.

The following checklist is a starting point for an ongoing process of reflection about the ethical issues concerning your study.

For further information on ethical issues, please consult the School's Ethics webpage: http://www.nottingham.ac.uk/sociology/research/research-ethics.aspx

---

## SECTION 1: THE RESEARCHER(S)

**To be completed in all cases**

Title of project: The nature of posttraumatic growth.

Name of principal researcher: Michaela Börner

Status: Postgraduate research student

Email address: lqxmb10@nottingham.ac.uk

Names of other project members:

---

**To be completed by students only:**

**NAME IN CAPITALS MICHAELA BÖRNER**

Student ID number: 4165592

Degree programme: PhD-programme in Sociology

Module name/number:

Supervisor/module leader or tutor: Stephen Joseph and David Murphy

## Authorisation

This section **must** be completed in **all** cases – by type of investigator the form must be countersigned by the following personnel:

Undergraduate student → module convenor or tutor/project supervisor
Postgraduate taught student → dissertation supervisor
Postgraduate research student → supervisor/upgrade panel
Staff → School Research Ethics Officer (REO)
All forms should be countersigned by the REO

Having reviewed the ethical issues arising from the proposed research:

- ☐ I am happy for the research to go ahead as planned.
- ☐ I have requested that changes be made to the research protocol. The principal researcher must complete and submit a revised form which integrates these changes
- ☐ This project must be referred on for more detailed ethical scrutiny. Please forward a hard copy to the School's REO
- ☐ This project is to be referred to Research Development Group for consideration (this option is for School REO only)

Signed ..... Date 12.01.12

Designation Research Supervisor

School REO ..... Date 13/01/12

Note: **any** research protocols lodged with the School office may be subject to review by the School's Research Ethics Officer

SECTION 6: FURTHER INFORMATION & JUSTIFICATION OF METHODOLOGY

One box should be completed for **each** shaded box ticked in section 4 of this form.

Ethical issue: General issues (previous life experiences, trauma)

Rationale for chosen methodology and/or how ethical issue is to be addressed:

Although a convenient sample will be approached that is not itself vulnerable the pilot study aims to identify people who experienced a trauma in order to assess the correlation between posttraumatic growth and defense mechanisms. Therefore, it is assumed that several individuals may have experienced a trauma. These students might be especially vulnerable. However, the chosen methodology that consists of fully structured questionnaires imposes at the very most a minor risk for the participants. Participants could get emotional affected if they experienced a trauma and do remember its adversity and effect on their own life through the questions of the TLEQ questionnaire. This risk will be tried to be reduced through arrangement of the questionnaires. For example, following the TLEQ a questionnaire that disconnect the thinking of participants from trauma will be incorporated. This questionnaire will not be analysed and will be destroyed as soon as possible. Furthermore, it will be made clear that the participants have control about their participation. Thus, they will be encouraged to fill not out the questionnaires in sum or to refuse to fill out certain questions as soon as they feel uncomfortable to do so. Moreover, it will be made clear that their study

attendance has neither a positive nor a negative effect on the assessment and treatment by the researcher, university or university staff.

Supervisor/REO's response (including whether ethical issue has been satisfactorily addressed):

Ethical issue: 4.2 (All participants will be given accurate information about the nature of the research and the purposes to which the data will be put)

Rationale for chosen methodology and/or how ethical issue is to be addressed:

The aim of the study is to evaluate the correlation between poattraumatic growth and defense mechanisms. The results would be very much distorted if the participant would know that their defense style is under evaluation as they would automatically use defenses to protect their world view and view of the self. Therefore, the purpose of the study will be explained in a very general way but won't give any particulars. However, the participants will roughly know the purpose of the study and the researcher will be as open and transparent as possible.

Supervisor/REO's response (including whether ethical issue has been satisfactorily addressed):

**Appendix 15.** Ethical approval for "An Internet Survey on Humour and Reports of Posttraumatic Growth" (Chapter 6)

**School of Sociology & Social Policy**

# Research ethics checklist for staff and students

The University of Nottingham's Guidance on Ethical Review states: "Ethical review (and approval) is required for all projects where the research involves participation of human subjects, their data and/or their tissue (even where the applicant indicates that there is only minimal risk)."

This form must be therefore be completed for all research projects, research assignments or dissertations/theses which are conducted within the School and involve human participants or data that are sensitive or protected. You must not begin data collection or approach potential research participants until you have completed this form, received ethical clearance, and submitted this form for retention with the appropriate staff.

If the study is based only on a review of documentary sources already in the public domain and involves NO fieldwork of any sort, then this form does not need to be completed.

Completing the form includes providing a brief summary of the research in Section 2 and ticking some boxes in Section 4. Ticking a shaded box in Section 4 indicates that the study is above minimal risk and requires further action by the researcher. Two things need to be stressed:

- Ticking one or more shaded boxes does not mean that you cannot conduct your research as currently anticipated; however, it does mean that further questions will need to be asked and addressed, further discussions will need to take place, and alternatives may need to be considered or additional actions undertaken.
- Avoiding the shaded boxes does not mean that ethical considerations can subsequently be 'forgotten'; on the contrary, research ethics need to be informed - for everyone and in every project – an ongoing process of reflection and debate.

The following checklist is a starting point for an ongoing process of reflection about the ethical issues concerning your study.

For further information on ethical issues, please consult the School's Ethics webpage: http://www.nottingham.ac.uk/sociology/research/research-ethics.aspx

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## SECTION 1: THE RESEARCHER(S)

**To be completed in all cases**

Title of project: The influence of humour and social desirability on changes of the self caused by life stress

Name of principal researcher: Michaela Börner

Status: Postgraduate research student

Email address: lqxmb10@nottingham.ac.uk

Names of other project members:

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**To be completed by students only:**

**NAME IN CAPITALS MICHAELA BÖRNER**

Student ID number: 4165592

Degree programme: PhD-programme in Sociology

Module name/number:

Supervisors: Professor Stephen Joseph and Dr. David Murphy

## Authorisation

This section **must** be completed in **all** cases – by type of investigator the form must be countersigned by the following personnel:

Undergraduate student → module convenor or tutor/project supervisor
Postgraduate taught student → dissertation supervisor
Postgraduate research student → supervisor/upgrade panel
Staff → School Research Ethics Officer (REO)
All forms should be countersigned by the REO

Having reviewed the ethical issues arising from the proposed research:

- ☑ I am happy for the research to go ahead as planned.
- ☐ I have requested that changes be made to the research protocol. The principal researcher must complete and submit a revised form which integrates these changes
- ☐ This project must be referred on for more detailed ethical scrutiny. Please forward a hard copy to the School's REO
- ☐ This project is to be referred to Research Development Group for consideration (this option is for School REO only)

Signed ..... Date 13/12/12

Designation Supervisor

School REO..... Date 10 Dec 2012

Note: **any** research protocols lodged with the School office may be subject to review by the School's Research Ethics Officer

SECTION 6: FURTHER INFORMATION & JUSTIFICATION OF METHODOLOGY

One box should be completed for **each** shaded box ticked in section 4 of this form.

Ethical issue: General issues 4.1 (previous life experiences, trauma)

Rationale for chosen methodology and/or how ethical issue is to be addressed:

Although a convenience sample will be approached that is not itself vulnerable the pilot study aims to identify people who have experienced a trauma to evaluate the association between posttraumatic growth, humour and negative psychological change. Therefore, all included individuals may have experienced a trauma. These respondents might be especially vulnerable. Although, for example, Butler (2002) pointed out that answering questions about traumatic events may have even a therapeutic effect it cannot be excluded that people become emotional affected through answering the questions. However, the chosen methodology that consists of fully structured questionnaires imposes at the very most a minor risk for the participants. This risk will be tried to be reduced through formal and non-emotional language. Furthermore, it will be made clear that the participants have control about their participation and that they can withdraw their participation at any time. Moreover, it will be made clear that their withdrawal of the survey has no negative personal effect. All respondents will be given details of the counselling service of the University of Nottingham in the introduction pages of the survey. The reference to the

counselling service of the University of Nottingham would emerge on the survey screen as follows:

*There are no risks or costs. But if you do feel upset by something that has happened to you in your life the University Counselling Service can be contacted on 0115 951 3695 or via their email address: counselling.service@nottingham.ac.uk. You can also approach the University Counselling Service in room A75 at the Trent Building in the University Park of the University of Nottingham.*

*Finally, you are under no obligation to fill out these questionnaires. Your participation is entirely voluntary and you can stop at any time.*

Respondents could have experienced crimes. Here the researcher needs, nevertheless, to respect the privacy, anonymity and the right of self-determination of the respondents except of those cases explicitly indicated otherwise or cases which fall under the exceptions which are stated in the consent form.

Ethical issue: One signed copy of the consent form will be held by the researcher and by the participant (4.2)

Rationale for chosen methodology and/or how ethical issue is to be addressed:

The methodology of an internet-survey does not allow the researcher to make sure that the respondents receive a copy of their consent form. However, respondents are urged to read the consent form carefully before they enter the actual survey. Furthermore, the respondent has actively to agree by ticking "Yes". Moreover, the respondents will be given the possibility and will be urged to print out their consent form. Internet-surveys have the advantage for the respondents that the pressure to complete the survey is very low and to withdraw from the study and their consent needs only one mice click. The consent form which is displayed in the internet survey is accordance with the Participant Consent Form of the School of Sociology and Social Policy of the University of Nottingham. Finally, to be part in the survey potential participants need to answer the recruitment email. With this answer potential participants have already made a conscious decision to take part in the study. The study design imposes, therefore, the expectation on part of the participants to take action and sets in this way usually a natural form of participation consent.

Supervisor/REO's response (including whether ethical issue has been satisfactorily addressed):

Method & design have been discussed + are well thought through by Michaela. No further issues.

*Please continue on separate sheets if required*

**Appendix 16.** Ethical approval for the study on “Reports of Posttraumatic Growth and Trauma Processing among NGO Members and People in Helping Professions” (Chapter 7.2.)

**School of Sociology & Social Policy**

# Research ethics checklist for staff and students

The University of Nottingham's Guidance on Ethical Review states: "Ethical review (and approval) is required for all projects where the research involves participation of human subjects, their data and/or their tissue (even where the applicant indicates that there is only minimal risk)."

This form must be therefore be completed for all research projects, research assignments or dissertations/theses which are conducted within the School and involve human participants or data that are sensitive or protected. You must not begin data collection or approach potential research participants until you have completed this form, received ethical clearance, and submitted this form for retention with the appropriate staff.

If the study is based only on a review of documentary sources already in the public domain and involves NO fieldwork of any sort, then this form does not need to be completed.

Completing the form includes providing a brief summary of the research in Section 2 and ticking some boxes in Section 4. Ticking a shaded box in Section 4 indicates that the study is above minimal risk and requires further action by the researcher. Two things need to be stressed:

- Ticking one or more shaded boxes does not mean that you cannot conduct your research as currently anticipated; however, it does mean that further questions will need to be asked and addressed, further discussions will need to take place, and alternatives may need to be considered or additional actions undertaken.
- Avoiding the shaded boxes does not mean that ethical considerations can subsequently be 'forgotten'; on the contrary, research ethics need to be informed - for everyone and in every project – an ongoing process of reflection and debate.

The following checklist is a starting point for an ongoing process of reflection about the ethical issues concerning your study.

For further information on ethical issues, please consult the School's Ethics webpage: http://www.nottingham.ac.uk/sociology/research/research-ethics.aspx

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## SECTION 1: THE RESEARCHER(S)

**To be completed in all cases**

Title of project: Do certain coping strategies help or hinder people to deal with traumatic events and to develop posttraumatic growth?

Name of principal researcher: Michaela Börner

Status: Postgraduate research student

Email address: lqxmb10@nottingham.ac.uk

Names of other project members:

---

**To be completed by students only:**

**NAME IN CAPITALS MICHAELA BÖRNER**

Student ID number: 4165592

Degree programme: PhD-programme in Sociology

Module name/number:

Supervisors: Professor Stephen Joseph and Dr. David Murphy

## Authorisation

This section **must** be completed in **all** cases – by type of investigator the form must be countersigned by the following personnel:

Undergraduate student → module convenor or tutor/project supervisor
Postgraduate taught student → dissertation supervisor
Postgraduate research student → supervisor/upgrade panel
Staff → School Research Ethics Officer (REO)
All forms should be countersigned by the REO

Having reviewed the ethical issues arising from the proposed research:

- ☐ I am happy for the research to go ahead as planned.
- ☐ I have requested that changes be made to the research protocol. The principal researcher must complete and submit a revised form which integrates these changes
- ☐ This project must be referred on for more detailed ethical scrutiny. Please forward a hard copy to the School's REO
- ☐ This project is to be referred to Research Development Group for consideration (this option is for School REO only)

Signed ..... Date 13/3/13

Designation Supervisor

School REO ..... Date 14/3/13

Note: **any** research protocols lodged with the School office may be subject to review by the School's Research Ethics Officer

SECTION 6: FURTHER INFORMATION & JUSTIFICATION OF METHODOLOGY

One box should be completed for **each** shaded box ticked in section 4 of this form.

Ethical issue: General issues 4.1 (previous life experiences, trauma)

Rationale for chosen methodology and/or how ethical issue is to be addressed:

Although a sample of NGO employees will be approached that is not itself vulnerable the pilot study aims to identify people who have experienced a trauma. Therefore, all included individuals may have experienced a trauma. These respondents might be especially vulnerable. Although, for example, Butler (2002) pointed out that answering questions about traumatic events may have even a therapeutic effect it cannot be excluded that people become emotional affected through answering the questions. However, the chosen methodology that consists of fully structured questionnaires imposes at the very most a minor risk for the participants. This risk will be tried to be reduced through formal and non-emotional language. Furthermore, it will be made clear that the participants have control about their participation and that they can withdraw their participation at any time. Moreover, it will be made clear that their withdrawal of the survey has no negative personal effect.

Respondents could have experienced crimes. Here the researcher needs, nevertheless, to respect the privacy, anonymity and the right of self-

determination of the respondents except of those cases explicitly indicated otherwise or cases which fall under the exceptions which are stated in the consent form.

Ethical issue: One signed copy of the consent form will be held by the researcher and by the participant (4.2)

Rationale for chosen methodology and/or how ethical issue is to be addressed:

The methodology of an internet-survey does not allow the researcher to make sure that the respondents receive a copy of their consent form. However, respondents are urged to read the consent form carefully before they enter the actual survey. Furthermore, the respondent has actively to agree by ticking "Yes". Moreover, the respondents will be given the possibility and will be urged to print out their consent form. Internet-surveys have the advantage for the respondents that the pressure to complete the survey is very low and to withdraw from the study and their consent needs only one mice click. The consent form which is displayed in the internet survey is accordance with the Participant Consent Form of the School of Sociology and Social Policy of the University of Nottingham. Finally, to be part in the survey potential participants need to answer the invitation email. With this answer potential participants have already made a conscious decision to take possibly part in the study. The study design imposes, therefore, the expectation on part of the participants to take action and sets in this way usually a natural form of participation consent.

Furthermore, it will be pointed out to the respondents that those who do not want that their data are used in another study have to tick "No" concerning the box about the use of their data in future research. This procedure is built on the assumption that it is not possible to give informed consent for future studies and that participants should at least clearly and consciously know that their data could also be used in projects they maybe never would agree on. Also the latter possibility will be stated to the participants.

Supervisor/REO's response (including whether ethical issue has been satisfactorily addressed):

Michelle has thought through the issues and has a well developed proposal

STEPHEN JOSEPH

*Please continue on separate sheets if required*

**Appendix 17.** Ethical approval for the study on “Reports of Posttraumatic Growth and Trauma Processing” (Chapter 7.3.)

**School of Sociology & Social Policy**

# Research ethics checklist for staff and students

The University of Nottingham's Guidance on Ethical Review states: "Ethical review (and approval) is required for all projects where the research involves participation of human subjects, their data and/or their tissue (even where the applicant indicates that there is only minimal risk)."

This form must be therefore be completed for all research projects, research assignments or dissertations/theses which are conducted within the School and involve human participants or data that are sensitive or protected. You must not begin data collection or approach potential research participants until you have completed this form, received ethical clearance, and submitted this form for retention with the appropriate staff.

If the study is based only on a review of documentary sources already in the public domain and involves NO fieldwork of any sort, then this form does not need to be completed.

Completing the form includes providing a brief summary of the research in Section 2 and ticking some boxes in Section 4. Ticking a shaded box in Section 4 indicates that the study is above minimal risk and requires further action by the researcher. Two things need to be stressed:

- Ticking one or more shaded boxes does not mean that you cannot conduct your research as currently anticipated; however, it does mean that further questions will need to be asked and addressed, further discussions will need to take place, and alternatives may need to be considered or additional actions undertaken.
- Avoiding the shaded boxes does not mean that ethical considerations can subsequently be 'forgotten'; on the contrary, research ethics need to be informed - for everyone and in every project – an ongoing process of reflection and debate.

The following checklist is a starting point for an ongoing process of reflection about the ethical issues concerning your study.

For further information on ethical issues, please consult the School's Ethics webpage: http://www.nottingham.ac.uk/sociology/research/research-ethics.aspx

---

## SECTION 1: THE RESEARCHER(S)

**To be completed in all cases**

Title of project: Do certain coping strategies help or hinder people to deal with traumatic events and to develop posttraumatic growth?

Name of principal researcher: Michaela Börner

Status: Postgraduate research student

Email address: lqxmb10@nottingham.ac.uk

Names of other project members:

---

**To be completed by students only:**

**NAME IN CAPITALS MICHAELA BÖRNER**

Student ID number: 4165592

Degree programme: PhD-programme in Sociology

Module name/number:

Supervisors: Professor Stephen Joseph and Dr. David Murphy

## Authorisation

This section **must** be completed in **all** cases – by type of investigator the form must be countersigned by the following personnel:

Undergraduate student → module convenor or tutor/project supervisor
Postgraduate taught student → dissertation supervisor
Postgraduate research student → supervisor/upgrade panel
Staff → School Research Ethics Officer (REO)
All forms should be countersigned by the REO

Having reviewed the ethical issues arising from the proposed research:

- ☐ I am happy for the research to go ahead as planned.
- ☐ I have requested that changes be made to the research protocol. The principal researcher must complete and submit a revised form which integrates these changes
- ☐ This project must be referred on for more detailed ethical scrutiny. Please forward a hard copy to the School's REO
- ☐ This project is to be referred to Research Development Group for consideration (this option is for School REO only)

Signed ..... Date 13/3/13

Designation Supervisor

School REO ..... Date 14/3/13

Note: **any** research protocols lodged with the School office may be subject to review by the School's Research Ethics Officer

SECTION 6: FURTHER INFORMATION & JUSTIFICATION OF METHODOLOGY

One box should be completed for **each** shaded box ticked in section 4 of this form.

Ethical issue: General issues 4.1 (previous life experiences, trauma)

Rationale for chosen methodology and/or how ethical issue is to be addressed:

Although a sample of NGO employees will be approached that is not itself vulnerable the pilot study aims to identify people who have experienced a trauma. Therefore, all included individuals may have experienced a trauma. These respondents might be especially vulnerable. Although, for example, Butler (2002) pointed out that answering questions about traumatic events may have even a therapeutic effect it cannot be excluded that people become emotional affected through answering the questions. However, the chosen methodology that consists of fully structured questionnaires imposes at the very most a minor risk for the participants. This risk will be tried to be reduced through formal and non-emotional language. Furthermore, it will be made clear that the participants have control about their participation and that they can withdraw their participation at any time. Moreover, it will be made clear that their withdrawal of the survey has no negative personal effect.

Respondents could have experienced crimes. Here the researcher needs, nevertheless, to respect the privacy, anonymity and the right of self-

determination of the respondents except of those cases explicitly indicated otherwise or cases which fall under the exceptions which are stated in the consent form.

Ethical issue: One signed copy of the consent form will be held by the researcher and by the participant (4.2)

Rationale for chosen methodology and/or how ethical issue is to be addressed:

The methodology of an internet-survey does not allow the researcher to make sure that the respondents receive a copy of their consent form. However, respondents are urged to read the consent form carefully before they enter the actual survey. Furthermore, the respondent has actively to agree by ticking "Yes". Moreover, the respondents will be given the possibility and will be urged to print out their consent form. Internet-surveys have the advantage for the respondents that the pressure to complete the survey is very low and to withdraw from the study and their consent needs only one mice click. The consent form which is displayed in the internet survey is accordance with the Participant Consent Form of the School of Sociology and Social Policy of the University of Nottingham. Finally, to be part in the survey potential participants need to answer the invitation email. With this answer potential participants have already made a conscious decision to take possibly part in the study. The study design imposes, therefore, the expectation on part of the participants to take action and sets in this way usually a natural form of participation consent.

Furthermore, it will be pointed out to the respondents that those who do not want that their data are used in another study have to tick "No" concerning the box about the use of their data in future research. This procedure is built on the assumption that it is not possible to give informed consent for future studies and that participants should at least clearly and consciously know that their data could also be used in projects they maybe never would agree on. Also the latter possibility will be stated to the participants.

Supervisor/REO's response (including whether ethical issue has been satisfactorily addressed):

Michelle has thought through the issues and has a well developed proposal

STEPHEN JOSEPH

*Please continue on separate sheets if required*

**Appendix 18.** Ethical approval for “A Study on Posttraumatic Growth and Psychological Well-Being” (Chapter 8.)

2013/63 /JG

## School of Education – Research Ethics Approval Form

The University of Nottingham

| | |
|---|---|
| Name | Michaela Borner |
| Main Supervisor | Steven Joseph / David Murphy |
| Course of Study | PhD |
| Title of Research Project: | When is Self-reported Posttraumatic Growth real? |

Is this a resubmission? Yes / ~~No~~ Date statement of research ethics received by PGR Office: 9/9/2013

Research Ethics Coordinator Comments:

I have read through the documents attached to this re-submission and I am satisfied they meet the requirements for ethical approval on condition that the following is observed (as previously requested):

Please add to the Participant Consent Form the name and contact details of the researcher, the name and email address of supervisor(s), and the generic email address of the School Ethics Co-ordinator.

I consider this research to be above minimum risk ☐

*Final responsibility for ethical conduct of your research rests with you and your supervisor. The Codes of Practice setting out these responsibilities have been published by the British Educational Research Association (BERA) and the University Research Ethics Committee.*
http://www/educationstudentintranet/researchethics/index.aspx http://www.bera.ac.uk/publications/Ethical%20Guidelines *If you have any concerns during the conduct of your research then you should consult those Codes of Practice and refer again to the School of Education's Research Ethics Committee.*

*Independently of the Ethics Committee procedures, supervisors also have responsibilities for the risk assessment of projects as detailed in the safety pages of the University web site. Ethics Committee approval does not alter, replace, or remove those responsibilities, nor does it certify that they have been met.*

Outcome:

Approved ✓ Revise and Resubmit ☐

Signed: Name: Dr J. Gimenez (Research Ethics Coordinator) Date: 19.09.2013