

**DARK LAUGHTER: AN EXPLORATION INTO DARK TETRAD TRAITS AND
HARMFUL HUMOUR STYLES**

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**Thesis submitted to the University of Nottingham for the degree of
Doctor in Forensic Psychology**

Submitted for Examination: January 2023

Thesis Abstract

Background: Humour is often associated with positive psychosocial outcomes. However, it can be a subjective concept, and problems can arise if content is deemed harmful by others. In fact, literature has suggested that humour styles may sometimes be driven by a more malevolent purpose. When exploring the motivation behind more harmful styles, a starting point is to examine their association with dark tetrad (DTe) traits. These traits include psychopathy, narcissism, Machiavellianism and sadism, and are often related to amoral and antisocial behaviour. Few studies examine 'dark humour', a style defined by making amusement of disturbing or sinister subjects. This style is often synonymous with coping yet can be considered harmful, and in extreme cases has led to prosecution. Dark humour is commonplace in the media and minimal research has examined how exposure may influence behaviour.

Aims: This thesis aims to explore personality traits related to a potentially more harmful side of humour use, with a particular focus on dark humour and the effect of exposure to this on one's behaviour. Specifically, it aims to address whether DTe traits relate to the use of more harmful styles of humour, whether DTe traits relate to the preference and use of dark humour, and whether observing dark humour content making amusement of antisocial behaviours may increase one's short-term proclivity to engage in similar acts.

Method: A systematic review and meta-analysis investigated the relationship between DTe traits and humour styles, as measured by the Humor Styles Questionnaire (HSQ), including affiliative, self-enhancing, aggressive and self-

defeating humour styles. A critique of the HSQ was then conducted to assess its psychometric properties. A primary research project (study 1) explored the relationship between DTe traits and dark humour preference. Participants completed an online questionnaire including measures of DTe traits and core personality traits, before rating internet memes and video clips representing dark and non-dark humour. A secondary research project (study 2) explored the relationship between exposure to dark humour suggestive of sexual harassment or assault (i.e. dark sexual humour) and sexual harassment proclivity. Incorporating different aspects of the same online questionnaire used for the primary study, participants completed measures of DTe traits, core personality traits, and sexual harassment proclivity, before being randomly allocated to observe internet memes and video clips representing dark, non-dark humour or dark sexual humour. Participants rated each humour stimulus before again completing a measure of sexual harassment proclivity post-exposure.

Results: Meta-analysis results found that psychopathy and Machiavellianism positively predict aggressive and self-defeating humour styles, and narcissism positively predicts affiliative, self-enhancing, aggressive and self-defeating humour. Insufficient data was available for inclusion of sadism in the meta-analysis, but a narrative summary indicated a potential relationship with the use of injurious humour styles. Psychometric critique outcomes suggested that the Humor Styles Questionnaire (HSQ) shows relatively good reliability and validity, with some revisions suggested, particularly for the measurement of aggressive humour across different countries. The primary research project found Machiavellianism to be the only DTe trait to positively predict dark humour preference, with preference found to be indicative of use. The secondary research

project found psychopathy, narcissism and Machiavellianism, but not sadism, to positively predict sexual harassment proclivity. Sexual harassment proclivity was found to decrease following exposure to all humour genres. In those exposed to dark sexual humour, narcissism was the only DTe trait to significantly relate to reduced sexual harassment proclivity post-exposure.

Discussion and conclusion: Overall, findings suggest that there may be a more malevolent intent behind the use of injurious styles (i.e. aggressive and self-defeating humour). Whereas it was surmised that dark humour's sole relationship with Machiavellianism may suggest an association with the cynical characteristics unique to this construct, potentially implying less malevolent intent. This informed discussion as to how this may influence one's response to, and potential reprimand for, the use of each humour style. The existing risk of distress to others when using dark humour was considered, in addition to its potential contribution to, or indication of, cynical attitudes. Implications for forensic settings were discussed. Findings also suggest that, although some humour styles may be considered antisocial behaviour in themselves and potentially driven by dark traits, humour in general may decrease certain proclivities for antisocial behaviour (i.e. sexual harassment proclivity), at least in the short-term. This study provides a basis for further investigation in an under-researched area, with future variations of this study, e.g. examining the potential influence of dark humour content on other antisocial behaviour or longer-term effects, recommended for an increased understanding of this area. Overall thesis limitations and future directions are discussed.

Acknowledgements

I would like to thank both of my research supervisors, Dr Simon Duff and Dr Vincent Egan, for their ongoing support throughout the development of this thesis. I would also like to thank my family; I could not have managed to get through three degrees and seven years of study without your unwavering love and encouragement. My parents taught me the benefits of humour but I'm not sure they quite predicted providing financial support in order for me to write a thesis on it! A heartfelt thank you to my partner for his love and support, for helping me to maintain a positive perspective during the most difficult of times, and for his patience in putting so many aspects of our life on hold whilst I study.

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Chapter One: Introduction

This chapter describes theoretical background, aims of the thesis and provides a summary of each following chapter.

Introduction

The main concept explored in this thesis is the relationship between personality and a potentially more harmful use of humour.

Humour

The concept of humour is defined as '*the ability to find things funny, the way in which people see that some things are funny, or the quality of being funny*' (Cambridge Dictionary, 2022). Literature has long recognised an association between humour and positive psychosocial outcomes, with humour suggested as an effective coping strategy for stress (Newman & Stone, 1996; Christopher, 2015) and an affiliation tactic to strengthen interpersonal relationships (Lefcourt, 2001). Humour has also been suggested to reduce chronic pain and associated anxiety, stress and loneliness (Pérez-Aranda et al., 2018) and increase positive affect (Cann & Collette, 2014). Overall, it appears that humour generally contributes towards wellbeing and, in the words of McGhee (2010, p.24), it "*may or may not add years to your life, but it will certainly add life to your years*". These recognised benefits of humour have even led to advocacy for its use as a psychological intervention, and in some cases, evidence of effectiveness (Zhao et al., 2019).

However, the definition above recognises that there are multiple perspectives to consider, with the '*ability to find things funny*' referring to the reception of humour, and the '*quality of being funny*' referring to the production. Everyone has a different sense of humour and appreciates different styles, and problems can arise

when intended jokes are deemed as harmful or offensive. Literature has also suggested a more malevolent purpose of humour, whether consciously or unconsciously. For example, research has found use of aggressive humour related to lower levels of empathy (Hampes, 2010), suggesting that those using more aggressive humour styles may have less understanding as to how their actions affect others. Freud (1905) suggested that humour could be utilised as a release of repressed aggression, a form of catharsis subsequently reducing aggressive tendencies, but of potential detriment to spectators or targets. Studies have also suggested that sexist or racist jokes may be related to offence-supportive attitudes (Ryan & Kanjorski, 1998; Billig, 2001). Findings such as these raise the question as to whether potentially harmful effects of humour may be due to a discrepancy between subjective styles or limited insight into its impact on others, or whether there could be a more intentional malevolent purpose. For example, it has been suggested that 'humour' may be used as a vehicle to mask more anti-social attitudes and/or behaviours to avoid reprimand (Ford, Breeden, O'Connor & Banos, 2017). Research has found that humorous 'teasing' can emerge as a form of workplace bullying (Mortensen & Baarts, 2018) and ambiguity between 'banter' and bullying has been found, particularly via online communication (Steer, Betts, Baguley & Binder, 2020).

Dark tetrad (DTe) traits

When considering the use of more harmful humour styles within the context of personality, the dark tetrad traits are considered a good starting point. The DTe consists of personality traits associated with amoral and antisocial behaviour (Međedović & Petrović, 2015). They include narcissism, psychopathy,

Machiavellianism and sadism; the latter added to the initial dark triad (DT) at a later stage due to its similarities to the other three traits (Buckels, Jones & Paulhus, 2013; Book et al., 2016). Narcissistic traits are characterised by a heightened sense of ego and entitlement (Raskin & Hall, 1979), psychopathic traits by emotional detachment and aggressive exploitation (Hare, 1991), Machiavellian traits by manipulation for personal gain and a cynical World view (Rauthmann & Will, 2011), and sadism by enjoyment in cruelty to others (Buckels, Jones & Paulhus, 2013). When considering the location of these traits, in comparison to core personality traits, they appear to generally relate to poles of personality dimensions considered more problematic. Some findings suggest that the DTe core is represented by low honesty-humility, emotionality, agreeableness and conscientiousness, with the negative pole of honesty-humility (i.e. boastful, vain and greedy characteristics) having the most impact (Book et al., 2016), whilst others advocate that the three DT traits lie solely under the negative pole of agreeableness (i.e. antagonism) (Vize, Collison, Miller & Lynam, 2020).

Thesis aims and research questions

Overall, this thesis aims to examine the relationship between DTe personality traits and potentially harmful humour styles. Later chapters focus specifically on 'dark humour', otherwise known as dark comedy, black humour or gallows humour, which finds amusement in disturbing topics. This is perhaps one of the more subjective styles of humour, with a risk of causing offense or detriment to others, yet rarely studied within the context of personality (see chapter 4 for further details regarding dark humour). Much existing literature focuses on the

benefits of humour but the current thesis aims to examine the more harmful use. See an overview of each following chapter and associated aims as follows:

Chapter two - This chapter presents a systematic review and meta-analysis, synthesising all existing data on the relationship between DTe personality traits and humour styles. Gaining an overview of humour use related to these traits was considered a pertinent first step to gain insight into humour use with a potentially more malicious intent. All DT traits showed a significant relationship to the use of humour styles considered injurious. Sadism was excluded from the meta-analysis, but a narrative summary of initial findings suggested a potential association with use of aggressive humour. How we may respond to such humour was discussed within the context of these findings.

Chapter three - This chapter presents a critique on the psychometric properties of the Humor Styles Questionnaire (Martin, Puhlik-Doris, Larsen, Gray & Weir, 2003), perhaps the most well-renowned scale for measuring both benign and injurious humour styles. This was relevant due to its use in measuring humour styles within the prior systematic review. Generally, it was suggested to be a reliable and valid measure, but some issues were identified that require addressing, particularly regarding its use across different countries. Limits in examining more specific humour styles, e.g. dark humour, were also recognised.

Chapter four - At this stage, the thesis directs its attention to dark humour, due to minimal existing research on this style of humour within the context of personality. This chapter presents an examination of the relationship between DTe traits and dark humour preference. It further examines whether *preference* relates

to use. Due to no existing dark humour measures and an intent to use real-World dark humour content as stimuli, ratings of both video clips and internet memes were used to assess dark humour preference. This included a preliminary study identifying suitable humour content. Findings showed that Machiavellianism was the only DTe trait to predict humour preference, which is also found to be indicative of use. A poster on this research project was presented at the BPS Division of Forensic Annual Conference (see Appendix A) and instigated discussion around the subjectivity of this humour style.

Chapter five - Whereas chapter four explores the presence of malevolent personality traits in those who prefer or tend to use dark humour, chapter five explores whether observation of dark humour content can affect one's proclivity to behave antisocially. This chapter examines the relationship between DTe traits and sexual harassment proclivity, whether observing dark humour content suggestive of sexual assault can increase sexual harassment proclivity in the short-term, and whether DTe traits independently predict change in sexual harassment proclivity post-exposure to such humour. Findings showed a relationship between narcissism, psychopathy and Machiavellianism, and sexual harassment proclivity. It was also observed that humour in general, regardless of genre, appeared to decrease sexual harassment proclivity. When exposed to dark sexual humour, high narcissism was the only trait to show a significant reduction in sexual harassment proclivity. A short presentation was given at the University of Nottingham Research Impact Conference, recognising the impact of this research project on knowledge, victims, policy and risk.

Chapter six – This chapter aims to bring together key findings from all chapters and considers their applicability to forensic psychology, in terms of how we might respond to or judge those using humour styles deemed harmful, and policy for media outlets displaying such humour content. This chapter discusses how findings related to injurious humour styles (i.e. aggressive and self-defeating) differ from those regarding dark humour, within the context of personality; with the latter appearing to be driven by more malevolent traits. Also, how a subjective preference for humour styles might be managed within occupational settings. Limitations identified throughout the thesis are considered, in addition to future suggestions for work in this area.

In summary, the overall thesis investigates the following questions:

- Are DTe traits related to the use of more injurious/harmful styles of humour?
- More specifically, are DTe traits related to the preference and use of dark humour?
- Does observing dark humour content making amusement of antisocial behaviours increase one's short-term proclivity to engage in such? Do DTe traits predict these outcomes?

What is the importance of asking these questions?

There is no doubt that, despite the positive influence humour can have on one's life, it can also be harmful. There is a fine line between aggressive humour styles such as mockery, ridicule and sarcasm being perceived as amusing or malicious,

perhaps influenced by factors such as whether an individual is the intended target or an observer. Dark humour tends to be less personally directed yet has the potential to cause harm dependent on an individual's personal perception of the subject of amusement. There is a spectrum of potential damage caused by humour, ranging from minor embarrassment or offense at the expense of spectators or targets, to more extreme distress in which the joke teller may potentially be reprimanded or prosecuted (Khorsandi, 2018; Smith, 2021).

Gaining an understanding of personality traits related to the use of more harmful humour styles, can provide insight into the motivation behind its use. For example, might someone with high psychopathic traits use harmful humour styles due to a lack of consideration as to how others may perceive it? Alternatively, might an individual with high narcissistic traits use harmful humour to decrease another person's self-worth or dignity in comparison to their own? Further understanding around potential motivations may, in turn, assist society in taking an informed standpoint when considering potential reprimand for those justifying seemingly antisocial behaviour as "a joke", particularly since the use of such justification is suggested to further perpetuate behaviour (Page, Pina & Giner-Sorolla, 2015; Bandura, Barbaranelli, Caprara & Pastorelli, 1996). Examining the short-term effects of watching dark humour suggestive of sexual harassment or assault on one's proclivity to engage in sexual harassment behaviours may also provide insight as to whether humour content regarding more distressing subjects, either in the media, online or via interpersonal interactions, may contribute to the proclivity to act out certain antisocial behaviours. This may not only influence media policies, but also be a consideration in environments or professions that appear to habitually use such humour.

Regarding the importance of asking these questions within the field of forensic psychology; a further understanding of harmful humour styles, and consequently how we view these, may inform how such might be addressed in forensic settings when used both between staff and in staff-client interactions. For example, if a client's humour style has become problematic, whether detrimental to their own wellbeing or social relationships, then could intervention potentially alter humour use to address the problematic aspect and allow clients to reap more positive outcomes from humour use? Conversely, for clinicians to reflect on whether their use of certain humour styles may be detrimental to client wellbeing.

Chapter Two: Systematic Review

Malevolence behind the joke? A systematic review and meta-analysis exploring the relationship between dark tetrad personality traits and humour styles

Abstract

Humour has the capacity to bring joy and amusement yet can also be detrimental to one's wellbeing. Dark tetrad (DTe) traits, including psychopathy, narcissism, Machiavellianism and sadism are considered to represent the more malevolent side of personality, associated with amoral and antisocial behaviours. No review has yet examined the relationship between these traits and humour style use, which could potentially provide insight into the more harmful use of humour. The present study therefore provides an overview of literature examining the relationship between DTe traits and humour styles measured using the Humor Styles Questionnaire (Martin, Puhlik-Doris, Larsen, Gray & Weir, 2003) and synthesises results into a random-effects meta-analysis model. A systematic search identified 18 relevant papers from 9 different countries (N=4110), with one study removed during quality assessment due to a high risk of bias, leaving a total of 17. Meta-analyses were conducted examining the relationship between psychopathy, narcissism, Machiavellianism and each of the four humour styles, including affiliative, self-enhancing, aggressive and self-defeating humour. Results showed a positive relationship between psychopathy and aggressive and self-defeating humour styles, a positive relationship between narcissism and all humour styles, and a positive relationship between Machiavellianism and aggressive and self-defeating humour styles. Further comparison of narcissism subscales showed a positive relationship between grandiose narcissism and affiliative and self-enhancing humour and a negative relationship between vulnerable narcissism and affiliative and self-enhancing humour. It was concluded that such contradictory findings may have contributed to the high heterogeneity observed and further exploration of subscale data is recommended when made

available. Findings examining the relationship between sadism and humour styles were presented in a narrative summary only, due to an insufficient number of studies for inclusion in the meta-analysis. These findings initially suggested a potential positive relationship between sadism and injurious humour styles, yet further research is required. Overall, findings suggest that malevolent traits may be related to more harmful humour use. This questions attempts to justify harmful humour as 'just a joke' and proposes that it may be more relevant to interpret such humour as a form of verbal aggression, particularly when an individual has felt targeted or victimised.

Introduction

As mentioned in the introduction of this thesis, humour can be a somewhat 'double-edged sword', in that it has the capacity to bring joy and amusement yet, dependent on style and context, can be equally detrimental to wellbeing. One's sense of humour is suggested to be accounted for by personality traits (Ruch, 1996), so a natural first step in examining the potentially more harmful side of humour is to identify humour styles related to DTe traits; considered the more antisocial and immoral dimensions of personality (Međedović & Petrović, 2015).

Humor Styles Questionnaire (HSQ)

Several measures have been developed to measure 'humour styles', defined as the form of humour used due to the specific function it offers (Martin, Puhlik-Doris, Larsen, Gray & Weir, 2003), and comprising part of one's sense of humour. Although, some measures encompass a broader range of styles, such as the Comic Styles Markers (Ruch, Heintz, Platt, Wagner & Proyer, 2018) which measure eight comic styles, the Humor Styles Questionnaire (HSQ; Martin et al., 2003) is perhaps the most widely used model of humour used in literature since its development (see chapter 3 for a detailed critique of this measure). Dimensions of the HSQ (Martin et al., 2003) were defined following a review into the everyday function of humour use. A 2x2 model was established, recognising humour styles that are relatively benign and used to enhance the self (i.e. self-enhancing humour) or others (i.e. affiliative humour), versus those potentially injurious to self (i.e. self-defeating humour) or others (i.e. aggressive humour). See below for further descriptions:

- 1) *Affiliative humour*. Telling jokes and funny stories to entertain others, facilitate relationships and reduce interpersonal tensions.
- 2) *Self-enhancing humour*. Taking a humorous and positive outlook on life and the World in general, even during times of adversity.
- 3) *Aggressive humour*. Using humour to tease, ridicule, or “put down” others. This may include sarcasm, ridicule or irony.
- 4) *Self-defeating humour*. Excessively disparaging oneself to gain approval from others.

Personality and humour styles

Two prior reviews have explored the ‘Big Five’ personality traits (extraversion, agreeableness, conscientiousness, neuroticism and openness to experience) and humour styles using the HSQ. The first was a meta-analysis conducted by Mendiburo-Seguel, Páez and Martínez-Sánchez (2015), which found moderate to weak effect sizes with positive relationships observed between affiliative humour and both extraversion and openness to experience, and between self-enhancing humour and extraversion, and a negative relationship observed between self-enhancing humour and neuroticism. Aggressive humour was observed to have a negative relationship with agreeableness and conscientiousness, and self-defeating humour showed a positive relationship with neuroticism. A more recent systematic review conducted by Plessen and colleagues (2020) also examined for publication bias and study quality and observed largely comparable findings. They found that self-enhancing and affiliative humour styles were related to extraversion, agreeableness, conscientiousness and openness, and negatively

correlated with neuroticism. In addition, self-defeating humour and aggressive humour were positively associated with neuroticism and negatively associated with agreeableness and conscientiousness.

Rationale

Literature has provided insight into personality and humour use; however, reviews have focused on core personality traits, rather than the more malevolent. Particularly in more recent years, there has been an increasing focus on DTe traits, i.e. psychopathy, narcissism, Machiavellianism and sadism, due to amoral and antisocial behaviours often associated with such (Baughman, Dearing, Giammarco & Vernon, 2012; Chabrol, Van Leeuwen, Rodgers, & Séjourné, 2009). Considering the potentially harmful and damaging effects of some humour styles, as outlined in the introductory chapter of this thesis, it is not surprising that research has started to explore how DTe traits relate to humour use. A scoping search confirmed that no systematic reviews have yet explored this relationship, which has the potential to provide insight into how individuals with more malevolent traits may utilise humour. As dark triad (DT) traits have been suggested to be positioned solely under the dimension of antagonism – the negative pole of agreeableness (Vize, Collison, Miller & Lynam, 2020), it could be hypothesised that a positive relationship between dark traits and negative humour styles (i.e. aggressive or self-defeating) may be observed. Exploring the relationship between each construct of the DTe and humour use may offer a basis on which to further consider the motivation and intention behind use of more harmful styles. For example, might those who bully and ridicule others through humour have less affective empathy, as observed in those with psychopathic traits, or could it be a

narcissistic attempt to inflate one's own ego? Increased knowledge of what may be driving the use of harmful humour styles, may further inform the perspectives and actions of those on the receiving end of such jokes.

Objectives

The current review aims to assess the relationship between DTe personality traits and the use of humour styles, and whether this relationship is unique for each DTe construct.

Method

Registration and direction

To maintain transparency throughout the review process, the protocol for the current review was registered on Prospero (CRD42020189134) on 06/07/2020, prior to commencement. This protocol was developed in adherence to PRISMA guidelines (Moher et al., 2015).

Criteria for considering studies

An adapted version of the PICO (population, intervention/interest, comparator and outcome) framework was used to determine eligibility for review. As comparators were not deemed relevant for the review question, due to the use of cross-sectional models in this research area, this was omitted. Criteria for eligibility can be viewed in Table 1. With regards to humour style measurement, only those

defined within and assessed by the HSQ, as the most widely used measure, were included. This decision was made to maintain clarity in the review outcomes and applicability, as criteria to meet the defined concept of 'humour style' can be ambiguous. Other reviews have implemented such inclusion and exclusion criteria for humour styles (Plessen et al., 2020). No exclusions were made based on publication status or date.

Table 1. *Systematic review inclusion and exclusion criteria*

	Include	Exclude
Population	All.	No exclusion criteria.
Intervention/ interest	Measure of any construct within the DTe (psychopathy, Machiavellianism, narcissism or sadism).	Any personality trait not within the DTe.
Outcome	Affiliative, self-enhancing, aggressive or self-defeating humour styles, as assessed using the HSQ.	No use of the HSQ.
Design	Any study with a quantitative outcome between DTe traits and humour styles, as defined by the HSQ, sufficient for computation of effect size.	No quantitative outcome between DTe traits and humour styles, as defined by the HSQ. Overall quantitative outcome provided for dark triad or dark tetrad only, not individual traits.
Language	English text available.	No English text available, due to no available resources for translation.

Information sources and timeline

Nine online bibliographic databases were searched, including OVID, ProQuest, Cochrane and Web of Science. Grey literature searches were also conducted on

EThOS, Open Access, and the ProQuest Dissertation and Theses Database, to encompass both published and unpublished text. In the second phase of the search, reference lists were hand-searched to identify any further relevant papers, in studies already identified for inclusion following full-text review. In addition, a forward citation search was conducted for these same studies in Google Scholar, hand-searching texts appearing under 'cited by'. Although there are weaknesses to using Google Scholar as a sole search engine, it is considered a 'powerful addition' due to its ability to identify grey literature not found in more traditional databases (Haddaway, Collins, Coughlin & Kirk, 2015). Both phases were completed between 2nd June – 29th July 2022.

Search strategy

Table 2. Syntax terms used in systematic searches

Dark Tetrad	Humour Styles Questionnaire
"dark triad"	Exp humor/
"dark tetrad"	Exp "wit and humor as topic"/
"dark personalit*"	humour*
"dark trait*"	humor*
Exp psychopathy/	"affiliative humo*"
"Psychopathy"	"aggressive humo*"
"psychopaths"	"self-defeating humo*"
"psychopathic"	"self-enhancing humo*"
Exp narcissism/	"humor styles questionnaire"
narcissis*	
Exp Machiavellianism/	
Machiavellian*	
Exp sadism/	
sadis*	

The search strategy was based on terms related to the DT, DTe, or each individual construct, in conjunction with the HSQ and each individual humour style defined within. Humour searches included both the American and English spelling. For

databases with less complex search syntax (e.g. EThOS), searches were based solely on humour terms due to limited research in this area. See Table 2 for the terms used and Appendix B for the full search syntax for each database.

Quality Assessment

The Appraisal tool for Cross-Sectional Studies (AXIS; Downes, Brennan, Williams & Dean, 2016) was used to assess study validity, through critically appraising measures to minimise bias (see tool in Appendix E and data in Appendix F). All studies used a cross-sectional design, so a tool specified for this type of research was deemed most suitable. The AXIS tool measures reporting, selection, response and measurement bias. It consists of 20 items and scores are measured as 'yes', 'no' or 'don't know'. To calculate an overall quality percentage, 'yes' was scored as 1 and 'no' or 'don't know' was scored as 0. One item, '*if appropriate, was information about non-responders described*', was not considered applicable to studies that had not identified or monitored non-responders, so percentages were calculated without this item. Guidelines outlined by Thomas and Egan (2022) were used to rate the quality of each study (see Table 3).

Table 3. *Guidelines for rating quality assessment scores*

Quality Assessment Score (%)	Quality Rating	Risk of Bias
Between 0%-33%	Low	High
Between 34%-67%	Medium	Medium
Between 68%-100%	High	Low

Planned method of meta-analysis

A data extraction table was developed outlining the measures and type of statistical analyses used, correlation coefficients (r) and a summary of the reported outcome of interest (see Table 5). Any DTe constructs showing insufficient data for data synthesis, with only 2 or 3 effect sizes being suggested as insufficient by Seide, Röver and Friede (2019), were not included in the meta-analysis and a brief narrative overview was instead included in the results independent of meta-analysis outcomes. Studies perceived to have a potentially distorting influence on the meta-analysis were excluded from the meta-analysis.

Due to the correlational design of all included studies, data synthesis was based on Pearson's r correlation, as the measurement value showing most commonality. In cases where constructs were split into subscales only, i.e. the Pathological Narcissism Inventory (PNI) divided into grandiose and vulnerable narcissism, an overall metric was calculated by transforming the correlation coefficient into a standardised measure (Fisher's Z), calculating an average, and transforming back into Pearson's r . This is suggested by Silver and Dunlap (1987) as the least biased way to average correlation coefficients. Analysis was compared with and without the inclusion of effect sizes from studies using PNI, to ensure that the differing format of this questionnaire and transformed overall metrics did not have a distorting influence on the analysis.

Data were synthesised to explore the pooled relationship between each DT construct, including psychopathy, narcissism and Machiavellianism, and each humour style as assessed by the HSQ. Comprehensive Meta-Analysis (CMA)

software was used to conduct this analysis. This uses the Hedges and Olkin (1985) method, in which correlation coefficients are transformed to Fisher's Z . A random-effects model was considered most suitable due to expected variance related to diverse populations and varied measures used to assess DT constructs. Heterogeneity statistics were used to further determine total variation between studies, including Cochran Q and I^2 , the latter interpreted using thresholds suggested by Higgins and Thompson (2002): <25% = low, 25–50% = moderate, 50–75% = high, and >75% = very high heterogeneity. A leave-one-out sensitivity analysis was conducted between each DTe construct and each humour style, to test the robustness of a meta-analysis by calculating whether the overall effect size remained unchanged each time one study is removed. Funnel plots were also assessed to determine publication bias and subgroup analysis was conducted if considered to offer a key contribution to findings or further explanation into heterogeneity.

Results

Screening process

Initial database searches identified 481 papers of potential relevance, including 415 from academic databases and 66 from grey literature searches, and stored using EndNote bibliographic software. A total of 149 duplicate records were removed. When screening titles and abstracts, 291 records were removed based on inclusion and exclusion criteria set out in the screening tool (see Appendix C). This tool was piloted by the author and a second independent reviewer on 30 titles and abstracts, as recommended by Boland, Cherry and Dickson (2017). A total of

41 records were identified for full-text review, all of which were accessible. The screening tool was completed for each full text, with notes regarding the reason for any study exclusions. Both reviewers agreed through discussion on all studies included or excluded, so no third-party involvement was deemed necessary. In some cases, further information was required to assess relevance, and researchers were contacted. This included information as to whether independent samples were used in datasets showing similarities, and in some cases to gain correlational data.

At the first stage of screening, a total of 15 full texts were deemed eligible for inclusion. Reference lists for these texts were then hand-searched, identifying no further studies of relevance. Google Scholar 'cited by' lists were then hand-searched for these texts which identified six further studies of relevance. Authors were contacted for three of these papers. Two confirmed that no English text existed (Aghli, Ahi & Mansouri, 2018; Carqueville, 2020), which led to exclusion of these studies. No reply was gained from another (Gan, 2019), meaning that no effect sizes were obtained for individual DT constructs, and this study was therefore also excluded. A total of 18 relevant texts were therefore identified during the screening process. See the full process outlined in Figure 1, in adherence with PRISMA guidelines (Page et al., 2021). An overview of all excluded studies at the stage of full-text review is provided in Appendix D.

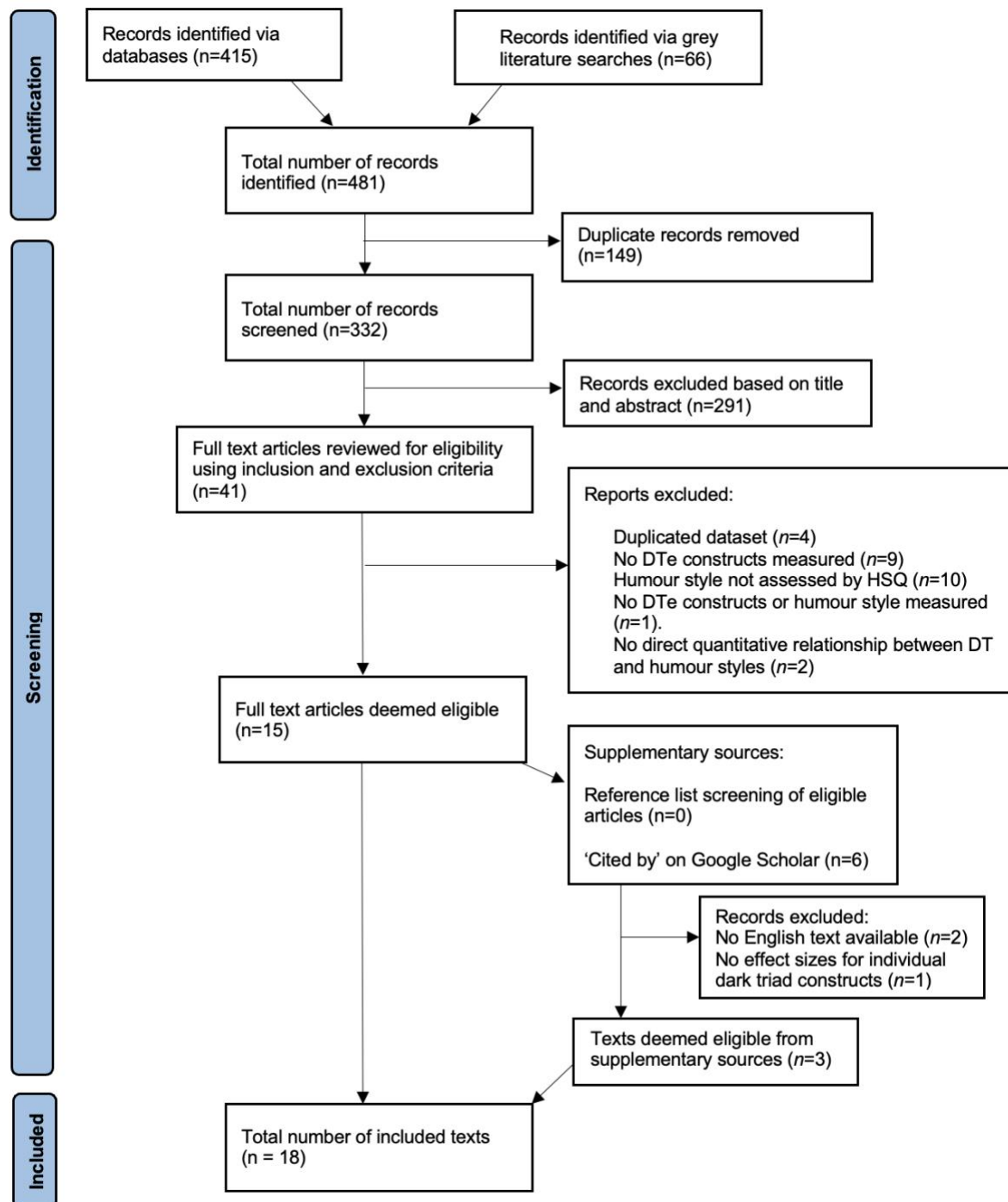


Figure 1. *PRISMA flow diagram outlining the systematic search process*

Following the search process, one study was excluded from the review due to 'low' quality assessment scores at 30% (Williams, 2018), and was therefore considered to pose a high risk of bias. Although it was identified that the study did not show substantially lower scores than some other studies in the 'medium' range,

limitations within fundamental domains, such as description of basic data, confirmed its unsuitability. A threshold requiring 'high' quality for inclusion was not deemed appropriate, as it was expected that most studies may fall into the 'medium' range, due to cross-sectional design and many being based solely on student samples.

Following the exclusion of one further study during quality assessment, 17 texts were included in the final review. Characteristics of all studies included can be observed in Table 4.

Study characteristics

A total of 17 relevant texts were identified, following the exclusion of one text during quality assessment. Dates ranged from 2010 (Veselka et al., 2010) to 2022 (Choi, Ha & Choi, 2022; Yee & Lee, 2022; Torres-Marín, Navarro-Carrillo & Carretero-Dios, 2022). All studies had a cross-sectional design. They were conducted in a variety of countries, including USA ($n=6$), Canada ($n=3$), Israel ($n=2$), Malaysia ($n=1$), South Korea ($n=1$), Japan ($n=1$), Netherlands ($n=1$), Spain ($n=1$) and Serbia ($n=1$). Most studies used student samples ($n=9$), with some papers using a mixed student and general community sample ($n=3$), military leaders ($n=1$) and online community samples ($n=3$). A twin sample ($n=1$) was also included, with the paper providing separate data for participants identified as 'twin 1' or 'twin 2'. Participant ages appeared to range from 17 to 92 years; however, some studies did not report precise ranges. Sample sizes ranged from 110 to 400, with a total sample of 4110.

Table 4. *Study characteristics*

Author (Year)	Country	Age M (SD)	Gender (%)	N	Population	General study focus
Choi, Ha & Choi (2022)	South Korea	22	Not reported	380	Squad leaders and members of the Republic of Korea Army	To examine the mediation effect of team commitment in the leader humour-change-orientated organisational citizenship behaviour link and whether it varied by leader Machiavellianism.
Averitt (2019)	USA	29.53 (13.25)	198 female (84%), 37 male (16%)	235	Student and other community participants over the age of 18 years	To examine humour styles and self-esteem as potential mediators for the relationship between personality and life satisfaction.
Besser & Zeigler-Hill (2011) <i>Study 1</i>	Israel	23.61 (3.08)	56 men, 131 women	187	Undergraduate students	To examine the association between the pathological forms of narcissism (grandiose and vulnerable) and humour styles in Jewish Israeli undergraduates.
<i>Study 2</i>		23.56 (2.89)	77 men, 174 women	251	Undergraduate students	To examine whether humour mediates the relationship between pathological narcissism and perceived stress.
Crysel & Webster (2018) <i>Study 4</i>	USA	31.2 (10.1)	144 men, 115 women	261	Online community sample (mTurk users)	To explore the convergent validity between a trait measure of schadenfreude and related measures, including measures for the DT and aggressive humour.

Author (Year)	Country	Age M (SD)	Gender (%)	N	Population	General study focus
Yee & Lee (2022)	Malaysia	Not stated	111 females (65.7%), 57 males (33.7%), 1 non-disclosed (0.6%)	169	Students	To investigate the relationship between DT traits, humour styles and schadenfreude.
Masui, Fujiwara & Ura (2013)	Japan	18.43 (0.77)	69 females, 70 males	139	Undergraduate students	To investigate social exclusion as a possible mediator of the association between psychopathy and negative humour styles in noninstitutionalised young adults.
Lobbestael & Freund (2021)	Netherlands	28.08 (12.56)	177 males	177	Students and other community participants	To analyse the relationship between four humour styles and both psychopathic and narcissistic traits, and their subfactors.
Veselka, Schermer, Martin & Vernon (2010)	Canada	41.4 (17.5)	18 male pairs, 96 female pairs	228	114 pairs of monozygotic and dizygotic twins	To investigate correlations between four humour styles and the DT traits of personality.
Martin, Lastuk, Schermer, Jeffery, Vernon & Veselka (2012)	Canada	20.7 (2.6)	108 females, 92 males	200	Undergraduate students	To replicate the relationship between DT traits and humour styles found by Veselka and colleagues (2010), and to expand on these results by exploring relationships between subfactors of the DT and humour styles.

Author (Year)	Country	Age M (SD)	Gender (%)	N	Population	General study focus
Zeigler-Hill, Besser & Jett (2013) - <i>Study 1</i>	USA	Participants: 20.59 (4.57) Perceivers: 28.42 (13.20)	Participant: 38 men, 219 women Perceivers: 386 men, 808 women	Participant: 257 Perceiver: 1194	Participant: Undergraduate students Perceiver: Community	To examine whether humour serves as an interpersonal signal such that an individual's style of humour is associated with how the person is perceived by others, including their level or narcissism.
Marino (2011)	USA	19.07 (1.22)	65 males, 62 females	127	Undergraduate students	To examine whether observational assessments of affiliative humour are related to narcissism, interpersonal warmth, self-esteem, extraversion and satisfaction with life. Both subjective use of affiliative humour was rated by the participant, and objective use rated by the perceiver.
Duarte (2020)	USA	Median = 36 (ranging from 18 to 55)	197 males, 203 females	400	Online community sample (mTurk users)	To test an evolutionary functional analysis of the use of aggressive humour, in that it facilitates intrasexual competition. This was tested by measuring aggressive humour in both genders, intrasexual competition, and controlling for covariates related to mating effort and aggression, and DT personality traits.
Torres-Marín, Navarro-Carrillo & Carretero-Dios (2022) - <i>Study 1</i>	Spain	21.88 (SD = 3.51; range from 18 to 42)	102 females, 97 males (2 non-disclosed)	201	Undergraduate students	To empirically differentiate the traits of the DTe in their relationships to different humour-related personality systems, including the Humor Styles Model, the Disposition toward Ridicule and Laughter and the Comic Styles Marker.

Author (Year)	Country	Age M (SD)	Gender (%)	N	Population	General study focus
Hollandsworth (2019)	USA	20.9 (2.85) ranging from 18-34	23 men, 69 women, 18 other/no response	110	Undergraduate students	To determine whether past results exploring the association between the pathological forms of narcissism (grandiose and vulnerable) and humour styles (Besser & Zeigler-Hill, 2011) could be replicated in an individualistic culture.
Međedović & Bulut (2017)	Serbia	23.7 (6.89)	69% female, 31% male	341	Online community sample	To explore the relationship between the DTe traits and their relations with cynicism, aggressive humour and attitudes towards immigrants.
Podnar (2013) - <i>Study 3</i>	Canada	Overall sample 18.57 (2.04). No mean reported for relevant sub- sample.	127 males, 120 females	247	Undergraduate students	To examine the relationships between the Prosocial Teasing Questionnaire and individual difference variables, including DT traits.
Zeigler-Hill & Besser (2011)	Israel	23.57 (2.91)	60 men, 140 women	200	Undergraduate students	To examine whether humour styles mediate the associations between pathological forms of narcissism (grandiose and vulnerable) and self- esteem in a sample of Israeli undergraduates.

Study focus

For ten papers, the study aims mainly focused on the relationship between DTe traits and humour styles. Most explored DTe traits as individual constructs, occasionally investigating subscales (Lobbestael & Freund, 2021; Martin, Lastuk, Schermer, Jeffery, Vernon & Veselka, 2012; Podnar, 2013; Masui, Fujiwara & Ura, 2013). In one study, social exclusion was also explored as a potential mediator in the relationship between psychopathy and injurious humour styles (Masui, Fujiwara & Ura, 2013). Other outcomes were also incorporated in exploring the relationship between DTe traits and humour styles. This included schadenfreude (Yee & Lee, 2022), cynicism and attitudes towards immigrants (Međedović & Bulut, 2017), other humour-related measures including the Humor Styles Model, the Disposition toward Ridicule and Laughter, and the Comic Styles Marker (Torres-Marín, Navarro-Carrillo & Carretero-Dios (2022) [Study 1]), and other personality characteristics, including self-esteem (Zeigler-Hill, Besser & Jett, 2013 [study 1]). Zeigler-Hill et al.'s (2013) study measured *perceived* narcissism and humour styles, in which recruited 'perceivers' known to the participants rated observed traits. This more objective measure, as compared to self-report, was also incorporated in Marino's (2011) study, where participants self-reported narcissistic traits and affiliative humour, but were then also rated in affiliative humour use by previously unknown observers.

Other papers showed less focus on the direct relationship between DTe traits and humour styles, but explored humour styles (Averitt, 2019; Zeigler-Hill & Besser, 2011) and DTe traits (Choi, Ha & Choi, 2022) as a mediator of other relationships, a confound (Duarte, 2020), or both as outcomes (Podnar, 2013 [study 3]). One

study tested the convergent validity of a newly developed scale to measure schadenfreude, with DT and aggressive humour measures (Crysel & Webster, 2018 [Study 4]). Studies including sadism as an outcome were less common, with only two identified (Međedović & Bulut, 2017; Torres-Marín, Navarro-Carrillo & Carretero-Dios, 2022 [Study 1]). See Table 5 for a full summary of results.

Measures

A variety of measures assessed DTe traits. Measures of all three DT traits included The Dirty Dozen (DD; Jonason & Webster, 2010) and the Short Dark Triad (SD-3; Jones & Paulhus, 2014); inclusive of the Spanish-translated SD-3 (Pineda, Sandín, & Muris, 2018). Assessment for psychopathic traits included use of the Self-Report Psychopathy Scale (SRP-III; Williams, Paulhus & Hare, 2007), the Psychopathic Personality Inventory - Revised (PPI-R; Lilienfeld & Widows, 2005); including an authorised Dutch version (Uzieblo, Verschuere, Jellicic, Rossi, Maesschalck, & Crombez, 2006), and a Japanese translated version of the Levenson Self-Report Psychopathy scale (Levenson, Kiehl, & Fitzpatrick, 1995; Osumi, Kanayama, Sugiura, & Ohira, 2007). To assess for narcissistic traits, the Pathological Narcissism Inventory (Pincus, Ansell, Pimentel, Cain, Wright, & Levy, 2009) was used which, in contrast with the other narcissism scales, solely provides subscale scores for grandiose and vulnerable narcissism, the Narcissistic Grandiosity Scale (Rosenthal, Hooley & Steshenko, 2007), and the Narcissistic Personality Inventory (NPI; Raskin & Hall, 1979; NPI-16; Ames, Rose, & Anderson, 2006); including a Dutch version (Barelds & Dijkstra, 2010). Marino's (2011) study did highlight potential limitations, in that the NPI may have limited scope for assessing more pathological narcissistic tendencies, as compared to measures such as the PNI. To

assess for Machiavellian traits, the MACH-IV (Christie, 1970) was used. To measure sadistic traits the Short Sadistic Impulse Scale (SSIS; O'Meara, Davies, & Hammond, 2011) was used; including the Spanish version of this scale (Torres-Marín, Navarro-Carrillo & Carretero-Dios, 2020). With regards to the HSQ, Japanese, Dutch and Spanish versions were also used (Kimura, Tsugawa & Oka, 2008; Dikkers, de Lange, Burgersdijk & Doosje, 2011; Torres-Marín, Navarro-Carrillo & Carretero-Dios, 2018).

When examining coefficient alphas for both DTe and humour scales, several studies did not report this information; however, most that did showed an 'acceptable' or above range $\alpha > .6$ in both DTe and humour measurement. Two studies fell below that threshold, including Masui, Fujiwara and Ura's (2013) study, in which a low coefficient alpha for secondary psychopathy ($\alpha = .46$) in the secondary psychopathy subscale of the Japanese translated LSRP scale was observed, and Hollandsworth's (2019) study in which a low alpha for the aggressive humour subscale of the HSQ ($\alpha = .50$) was observed. These limits in internal consistency may have led to possible bias. Most scales translated into other languages reported previous validation. However, a Korean version of the DD Machiavellianism subscale and HSQ used in Choi, Ha and Choi's (2022) study and a Hebrew version of the PNI and HSQ in Besser and Zeigler-Hill's (2011) study did not mention prior validation but were forward and back translated and showed 'good' internal consistency (alphas ranging from .71 to .83, and .71 to .88, respectively). Zeigler-Hill, Besser and Jett (2013) also adapted the Narcissistic Grandiosity Scale and the HSQ to be completed as a 'perceiver' which, although not previously validated, gained high coefficient alphas ($\alpha = .79$) for the Narcissistic Grandiosity Scale and the HSQ (alphas ranging from .71 to .84).

Risk of Bias

Overall, the quality of studies included in the review indicated a moderate risk of bias. Biased methods of selection were a significant problem across many of the studies, e.g. convenience or online-only sampling methods. Many of the studies also used student-only samples, both leading to the generalisation of unrepresentative samples to the overall population. Due to the cross-sectional design of studies, potential response bias was an additional concern as, in many cases, it was not possible to monitor non-responders without a precisely defined sample group and therefore the risk of response bias was not addressed. With regards to measurement bias, as discussed above, most studies used well-validated measures appropriate to the study aims. However, self-report measures were used in all studies, aside from Zeigler-Hill et al. (2013) and Marino (2011) who used 'perceiver' ratings. Therefore, social desirability bias may have influenced results, particularly when measuring DTe traits; the core of which are suggested to be largely represented by low honesty-humility (Book et al., 2016). Reporting bias largely varied between studies. Most studies reported clear study objectives and methodology, although several did not incorporate a description of analyses within this. Basic data was sufficiently described in all studies. However, internal consistency in the data was difficult to determine in multiple studies due to insufficient information, particularly sample sizes not being reported in result tables. Discussions and conclusions were largely justified by the results and limitations were outlined in all but two studies. See the quality assessment table in Appendix F.

Relationship between sadism traits and humour styles

Studies examining the relationship between sadism and humour styles were identified in the review but were not included in the meta-analysis due to only two studies showing outcomes for such. Torres-Marín and colleagues (2022 [Study 1]) observed initial correlations showing a positive relationship between sadism and both aggressive ($r=.35$, $p<.001$) and self-defeating humour ($r=.23$, $p<.01$), with no significant relationship observed with affiliative or self-enhancing humour. Sadism was not found to positively predict any humour styles when controlling for other DTe traits. Međedović and Bulut (2017) found sadism to be positively correlated with aggressive humour ($r=.53$, $p<.01$), and a significant positive predictor for aggressive humour when added to a model in conjunction with other DTe traits, $R^2=.38$, $F(7, 334)=28.83$, $p<.01$.

Table 5. *Study data*

Study	Measures	Statistical analyses	Correlation coefficient (<i>r</i>)	Summary of reported outcome of interest
Choi, Ha & Choi (2022)	Intervention: Korean translation of the DD measured Machiavellianism Outcome: Korean translation of the HSQ	Correlation	Machiavellianism and AFH = 0.06, ns Machiavellianism and AGH= 0.47, $p<.001$	High leader Machiavellianism / Increased AGH*** and AFH.
Averitt (2019)	Intervention: NPI-16 measured narcissism Outcome: HSQ	Correlation and mediation modelling	Narcissism and AFH = .14, $p<.05$ Narcissism and SEH = .18, $p<.01$ Narcissism and SDH = -.15, $p<.05$	High narcissism / increased AFH* and SEH** humour, and low SDH* However, when added to a model as a potential confound alongside other variables, narcissism was found to be a non-significant predictor of humour styles.
Besser & Zeigler-Hill (2011) <i>Study 1</i>	Intervention: Hebrew translation of the PNI measured narcissism Outcome: Hebrew translation of the HSQ	Correlation and mediation modelling	Grandiose narcissism and AFH= .15, $p<.05$ Grandiose narcissism and SEH= .15, $p<.05$ Grandiose narcissism and AGH= .23, $p<.001$ Grandiose narcissism and SDH= .14, $pp<.05$ Vulnerable narcissism and AFH= -.10, ns Vulnerable narcissism and SEH= -.07, ns Vulnerable narcissism and AGH= .22, $p<.01$ Vulnerable narcissism and SDH= .24, $p<.001$	High grandiose narcissism / increased AFH*, SEH*, AGH*** and SDH* High vulnerable narcissism / increased AGH** and SDH*** humour, and decreased AFH and SEH

Study	Measures	Statistical analyses	Correlation coefficient (<i>r</i>)	Summary of reported outcome of interest
<i>Study 2</i>		Correlation and mediation modelling	Grandiose narcissism and AFH= .12, ns Grandiose narcissism and SEH= .14, $p < .05$ Grandiose narcissism and AGH= .21, $p < .001$ Grandiose narcissism and SDH= .20, $p < .001$ Vulnerable narcissism and AFH= -.13, $p < .001$ Vulnerable narcissism and SEH= -.10, ns Vulnerable narcissism and AGH= .22, $p < .01$ Vulnerable narcissism and SDH= .27, $p < .001$	High grandiose narcissism / increased AFH, SEH*, AGH*** and SDH*** High vulnerable narcissism / decreased AFH*** and SEH, and increased AGH** and SDH*** humour. Mediation analysis suggested that a tendency for those with grandiose traits to use benign humour styles may help to reduce stress, whereas those with vulnerable traits using injurious styles may heighten stress.
Crysel & Webster (2018) Study 4	Intervention: DD measured psychopathy, narcissism, and Machiavellianism Outcome: HSQ	Correlation	Machiavellianism and AGH = .60, $p < .001$ Psychopathy and AGH = .48, $p < .001$ Narcissism and AGH = .33, $p < .001$	High psychopathy, narcissism and Machiavellianism / increased AGH***

Study	Measures	Statistical analyses	Correlation coefficient (<i>r</i>)	Summary of reported outcome of interest
Yee & Lee (2022)	Intervention: SD3 measured psychopathy, narcissism, and Machiavellianism Outcome: HSQ	Correlation	Psychopathy and AFH = $-.16$, $p < .05$ Psychopathy and SEH = $-.06$, ns Psychopathy and AGH = $.70$, $p < .01$ Psychopathy and SDH = $.16$, $p < .05$ Narcissism and AFH = $.05$, ns Narcissism and SEH = $-.04$, ns Narcissism and AGH = $.43$, $p < .01$ Narcissism and SDH = $-.10$, ns Machiavellianism and AFH = $-.17$, $p < .05$ Machiavellianism and SEH = $-.06$, ns Machiavellianism and AGH = $.55$, $p < .01$ Machiavellianism and SDH = $.10$, ns	High psychopathy / decreased AFH* and SEH, and increased AGH** and SDH*. High narcissism / increased AFH and AGH** humour, and decreased SEH and SDH High Machiavellianism / decreased AFH* and SEH, and increased AGH** and SDH.
Masui, Fujiwara & Ura (2013)	Intervention: J-LSRP measured psychopathy Outcome: J-HSQ	Correlation	Psychopathy and AFH = $-.34$, $p < .001$ Psychopathy and SEH = $-.03$, ns Psychopathy and AGH = $.28$, $p < .001$ Psychopathy and SDH = $.00$, ns	High psychopathy / decreased AFH*** humour, marginally decreased SEH, and increased AGH*** humour. No relationship between psychopathy and SDH.

Study	Measures	Statistical analyses	Correlation coefficient (<i>r</i>)	Summary of reported outcome of interest
Lobbestael & Freund (2021)	Intervention: PPI-R or D-PPI-R measured psychopathy. NPI or D-NPI measured narcissism Outcome: HSQ or D-HSQ	Correlation and regression	Psychopathy and AFH = 0.36, $p < .001$ Psychopathy and SEH = 0.28, $p < .001$ Psychopathy and SDH = 0.08, ns Psychopathy and AGH = 0.39, $p < .001$ Narcissism and AFH = 0.35, $p < .001$ Narcissism and SEH = 0.21, $p < .001$ Narcissism and SDH = 0.17, $p < .05$ Narcissism and AGH = 0.34, $p < .001$ Subscale correlations available in paper.	High psychopathy / increased AFH***, SEH***, SDH and AGH*** humour High narcissism / increased AFH***, SEH***, SDH* and AGH*** Regression analyses found psychopathy to be a positive predictor of AFH***, SEH*** and AGH***. Narcissism found to be a positive predictor of AFH***, SEH**, SDH* and AGH*** humour.
Veselka, Schermer, Martin & Vernon (2010)	Intervention: NPI measured narcissism, SRP-III measured psychopathy and MACH-IV measured Machiavellianism Outcome: HSQ	<i>Twin 1 sample:</i> Correlation	Psychopathy and AFH = .07, ns Psychopathy and SEH = .02, ns Psychopathy and AGH = .38, $p < .001$ Psychopathy and SDH = .22, $p < .05$ Narcissism and AFH = .21, $p < .05$ Narcissism and SEH = .16, $p < .05$ Narcissism and AGH = .05, ns Narcissism and SDH = .07, ns Machiavellianism and AFH = -.03, ns Machiavellianism and SEH = -.15, ns Machiavellianism and AGH = .42, $p < .001$ Machiavellianism and SDH = .29, $p < .001$	High psychopathy/increased AFH, AGH*** and SDH*, and marginally increased SEH. High narcissism / increased AFH*, SEH*, AGH and SDH. High Machiavellianism / marginally decreased AFH, decreased SEH, and increased AGH*** and SDH***

Study	Measures	Statistical analyses	Correlation coefficient (<i>r</i>)	Summary of reported outcome of interest
		<i>Twin 2 sample:</i> Correlation	Psychopathy and AFH = .12, ns Psychopathy and SEH = .05, ns Psychopathy and AGH = .41, $p < .001$ Psychopathy and SDH = .24, $p < .01$ Narcissism and AFH = .18, $p < .05$ Narcissism and SEH = .10, ns Narcissism and AGH = .06, ns Narcissism and SDH = -.12, ns Machiavellianism AFH = .10, ns Machiavellianism and SEH = .03, ns Machiavellianism and AGH = .38, $p < .001$ Machiavellianism and SDH = .28, $p < .01$	High psychopathy / increased AFH, SEH, AGH*** and SDH** High narcissism / increased AFH*, SEH and AGH, and decreased SDH High Machiavellianism / increased AFH, AGH*** and SDH** humour, and marginally increased SEH
Martin, Lastuk, Schermer, Jeffery, Vernon & Veselka (2012).	Intervention: NPI measured narcissism, SRP-III measured psychopathy and MACH-IV measured Machiavellianism Outcome: HSQ	Correlation	Psychopathy and AFH = -.03, ns. Psychopathy and SEH = -.03, ns. Psychopathy and AGH = .40, $p < .01$. Psychopathy and SDH = .25, $p < .01$. Narcissism and AFH = .36, $p < .01$ Narcissism and SEH = .04, ns. Narcissism and AGH = .22, $p < .01$. Narcissism and SDH = -.05, ns. Machiavellianism and AFH = -.08, ns. Machiavellianism and SEH = -.04, ns. Machiavellianism and AGH = .24, $p < .01$. Machiavellianism and SDH = .18, $p < .01$. Subscale correlations available in paper.	High psychopathy / marginally decreased AFH and SEH, increased AGH** and SDH**. High narcissism / increased AFH, SEH, AGH** and SDH. High Machiavellianism / decreased AFH and SEH, and increased AGH** and SDH**

Study	Measures	Statistical analyses	Correlation coefficient (<i>r</i>)	Summary of reported outcome of interest
Zeigler-Hill, Besser & Jett (2013) - <i>Study 1</i>	Intervention: Modified version of the NGS measured <i>perceived</i> narcissistic grandiosity Outcome: HSQ and an adapted version of the HSQ for <i>perceived</i> humour styles	Correlation and multi-level model of regression.	Below correlations gained via email from author: ¹ <i>Perceived</i> narcissistic grandiosity and AFH = -.07, $p < .05$ ¹ <i>Perceived</i> narcissistic grandiosity and SEH = .09, $p < .01$ ¹ <i>Perceived</i> narcissistic grandiosity and AGH = .32, $p < .001$ ¹ <i>Perceived</i> narcissistic grandiosity and SDH = .23, $p < .001$	High perceived grandiosity / decreased AFH*, and increased SEH**, AGH*** and SDH***. Perceived humour was found to significantly and positively correlate with self-reported humour. Regression analyses found AGH to be a positive predictor of perceived grandiosity***
Marino (2011)	Intervention: NPI-16 measured narcissism Outcomes: HSQ	Correlation and regression	Narcissism and <i>self-reported</i> AFH = .09, ns ¹ Narcissism and <i>objective</i> AFH (i.e. rated by observers) = .24, $p < .01$	Higher narcissism / increased self-reported AFH, and increased objective AFH** Regression analysis controlling for other personality traits showed a non-significant relationship between narcissism and both self-reported and objective AFH.

Study	Measures	Statistical analyses	Correlation coefficient (<i>r</i>)	Summary of reported outcome of interest
Duarte (2020)	Intervention: SD3 measuring psychopathy, narcissism and Machiavellianism Outcomes: HSQ	Correlation and regression	Psychopathy and AFH = $-.29$, $p < .01$ Psychopathy and SEH = $.07$, ns Psychopathy and AGH = $.50$, $p < .01$ Psychopathy and SDH = $.46$, $p < .01$ Narcissism and AFH = $-.09$, ns Narcissism and SEH = $.20$, $p < .01$ Narcissism and AGH = $.31$, $p < .01$ Narcissism and SDH = $.30$, $p < .01$ Machiavellianism and AFH = $-.17$, $p < .01$ Machiavellianism and SEH = $.02$, ns Machiavellianism and AGH = $.49$, $p < .01$ Machiavellianism and SDH = $.32$, $p < .01$	High psychopathy / decreased AFH**, increased SEH, AGH** and SDH** High narcissism / decreased AFH, and increased SEH**, AGH** and SDH** High Machiavellianism / decreased AFH**, increased AGH** and SDH** humour and marginally increased SEH Regression analysis showed that the positive relationship between a measure of intrasexual-competition motive and AGH, dropped to non- significance when controlling for DT personality traits.

Study	Measures	Statistical analyses	Correlation coefficient (<i>r</i>)	Summary of reported outcome of interest
Torres-Marín, Navarro-Carrillo & Carretero-Dios (2022) - <i>Study 1</i>	Intervention: S-SD3 measured psychopathy, narcissism and Machiavellianism and S-SSIS measured sadism Outcome: S-HSQ	Correlation and regression and relative weight analyses (RWA)	Psychopathy and AFH = .01, ns Psychopathy and SEH = .02, ns Psychopathy and AGH = .40, $p < .001$ Psychopathy and SDH = .24, $p < .001$ Narcissism and AFH = .26, $p < .001$ Narcissism and SEH = .23, $p < .01$ Narcissism and AGH = .25, $p < .001$ Narcissism and SDH = .27, $p < .001$ Machiavellianism and AFH = .00, ns Machiavellianism and SEH = .09, ns Machiavellianism and AGH = .30, $p < .001$ Machiavellianism and SDH = .21, $p < .01$ ¹ Sadism and AFH = .03, ns ¹ Sadism and SEH = .08, ns ¹ Sadism and AGH = .35, $p < .001$ ¹ Sadism and SDH = .23, $p < .01$	High psychopathy / marginally increased AFH and SEH, increased AGH*** and SDH***. High narcissism / increased AFH***, SEH**, AGH*** and SDH*** High Machiavellianism / marginally increased SEH, and increased AGH*** and SDH**. No relationship between Machiavellianism and AFH High sadism / marginally increased AFH and SEH, and increased AGH*** and SDH** humour. Regression analyses found narcissism to positively predict AFH***, SEH** and SDH** humour. Psychopathy positively predicted AGH* humour. All other relationships were found to be non-significant.

Study	Measures	Statistical analyses	Correlation coefficient (<i>r</i>)	Summary of reported outcome of interest
Hollandsworth (2019)	Intervention: PNI measured narcissism Outcome: HSQ	Correlation	Grandiose narcissism and AFH = .21, $p < .05$ Grandiose narcissism and SEH = .12, ns Grandiose narcissism and AGH = -.07, ns Grandiose narcissism and SDH = .21, $p < .05$ Vulnerable narcissism and AFH = -.17, ns Vulnerable narcissism and SEH = -.22, $p < .05$ Vulnerable narcissism and AGH = -.18, ns Vulnerable narcissism and SDH = .35, $p < .001$	High grandiose narcissism / increased AFH*, SEH and SDH* humour, and decreased AGH High vulnerable narcissism / decreased AFH, SEH* and AGH, and increased SDH*** humour.
Međedović & Bulut (2017)	Intervention: DD measured psychopathy, narcissism and Machiavellianism and SSIS measured sadism Outcome: HSQ	Correlation and regression and principal component analysis (PCA).	Psychopathy and AGH = .53, $p < .01$ Narcissism and AGH = .31, $p < .01$ Machiavellianism and AGH = .46, $p < .01$ ¹Sadism and AGH = .53, $p < .01$	High psychopathy, narcissism, Machiavellianism and sadism / increased AGH** In regression model controlling for (age, sex, education), only psychopathy** and sadism** positively predicted AGH PCA analysis observed DTe and AGH in the same extracted component.

Study	Measures	Statistical analyses	Correlation coefficient (<i>r</i>)	Summary of reported outcome of interest
Podnar (2013)	Intervention: NPI measured narcissism. SRP-III measured psychopathy Outcome: HSQ	Correlation	Psychopathy and AFH = -.03, ns Psychopathy and SEH = -.01, ns Psychopathy and AGH = .44, $p < .001$ Psychopathy and SDH = .16, $p < .01$ Narcissism and AFH = .15, $p < .05$ Narcissism and SEH = .13, $p < .05$ Narcissism and AGH = .22, $p < .001$ Narcissism and SDH = -.01, ns Subscale correlations available in paper.	High psychopathy / marginally decreased AFH and SEH, increased AGH*** and SDH** High narcissism / increased AFH*, SEH* and AGH***, and marginally decreased SDH
Zeigler-Hill & Besser (2011)	Intervention: PNI measured narcissism Outcome: HSQ	Correlation and mediation modelling	Grandiose narcissism and AFH = .16, $p < .05$ Grandiose narcissism and SEH = .17, $p < .05$ Grandiose narcissism and AGH = .19, $p < .01$ Grandiose narcissism and SDH = .21, $p < .01$ Vulnerable narcissism and AFH = -.07, ns. Vulnerable narcissism and SEH = -.10, ns. Vulnerable narcissism and AGH = .21, $p < .01$ Vulnerable narcissism and SDH = .26, $p < .001$	High grandiose narcissism/increased AFH*, SEH*, AGH** and SDH** humour. High vulnerable narcissism / decreased AFH and SEH, and increased AGH** and SDH*** Mediation analysis showed that the relationship between grandiose narcissism and high self-esteem was accounted for by those with grandiose traits tending to use benign humour styles, whereas the relationship between vulnerable narcissism and low self-esteem was accounted for by the tendency for those with vulnerable traits to use injurious humour styles.

*** $p < .001$, ** $p < .01$, * $p < .05$. ¹Data not included in meta-analysis. **DD** = The Dirty Dozen (Jonason & Webster, 2010), **SD3** = Short Dark Triad – 3 (Jones & Paulhus, 2014), **S-SD3** = Spanish version of the Short Dark Triad Scale – 3 (Pineda, Sandín, & Muris, 2018), **PPI-R** = Psychopathic Personality Inventory – Revised (Lilienfeld & Widows, 2005), **D-PPI-R** = Dutch version of the Psychopathic Personality Inventory – Revised (Uzieblo et al., 2006), **SRP-III** = Self-Report Psychopathy Scale – 3 (Williams et al., 2007), **J-LSRP** = Japanese version of the Levenson Self-Report Psychopathy Scale (Levenson, Kiehl, & Fitzpatrick, 1995; Osumi, Kanayama, Sugiura, & Ohira, 2007), **NPI** = Narcissistic Personality Inventory (Raskin & Hall, 1979), **D-NPI** = Dutch version of the Narcissistic Personality Inventory (Barelds & Dijkstra, 2010), **NPI-16** = 16 item Narcissistic Personality Inventory (Ames et al., 2006), **PNI** = Pathological Narcissism Inventory (Pincus et al., 2009), **NGS** = Narcissistic Grandiosity Scale (Rosenthal, Hooley & Steshenko, 2007), **MACH-IV** = Machiavellian Scale – 4 (Christie, 1970), **SSIS** = Short Sadistic Impulse Scale (O'Meara et al., 2011), **S-SSIS** = Spanish version of the Short Sadistic Impulse Scale (Torres-Marín, Navarro-Carrillo & Carretero-Dios, 2020), **HSQ** = Humor Styles Questionnaire (Martin et al., 2003), **J-HSQ** = Japanese version of the Humor Styles Questionnaire (Kimura, Tsugawa & Oka, 2008), **D-HSQ** = Dutch version of the Humor Styles Questionnaire (Dijkers et al., 2011), **S-HSQ** = Spanish version of the Humor Styles Questionnaire (Torres-Marín et al., 2018), **AFH** = Affiliative humour, **SEH** = Self-enhancing humour, **AGH** = Aggressive Humour and **SDH** = Self-defeating humour.

Meta-analyses

Data from all texts were extracted into a table for the purpose of conducting a meta-analysis (see Table 5), with two studies including two independent samples (Besser & Zeigler-Hill, 2011; Veselka, Schermer, Martin & Vernon, 2010).

Effect sizes examining the relationship between sadism and humour styles were found in only two studies (Međedović & Bulut, 2017; Torres-Marín, Navarro-Carrillo & Carretero-Dios, 2022 [Study 1]) and data pertaining to this construct was therefore not included in the meta-analysis. In addition, studies determined to have a potentially distorting influence on analysis were not included. This comprised of data from Zeigler-Hill, Besser and Jett's (2013) study and part of the data from Marino's (2011) study, as it was considered that the measurement of 'perceived' traits may differ from self-reported.

Pooled effect sizes were calculated between each DT trait (psychopathy, narcissism and Machiavellian) and humour style (affiliative, self-enhancing, aggressive and self-defeating). Pooled effect sizes, confidence intervals and statistics to inform heterogeneity are presented in Table 6. Data for each individual study and effect size forest plots can be observed in Appendix G. Heterogeneity was suggested to range from 'low' to 'substantial', which confirmed the suitability of using a random-effects model. As a random-effects model was used, all results are indicative of average effect sizes, rather than the best estimate.

With regards to the association between psychopathy and humour styles, results showed a positive relationship between psychopathy and both aggressive humour

($k=11$, $n=2363$, $r=.46$, $p<.001$), showing a medium effect size using Cohen's (1988) interpretations, and self-defeating humour ($k=9$, $n=1761$, $r=.21$, $p<.001$), showing a low effect size. The relationship between psychopathy and affiliative humour was negative but non-significant ($k=9$, $n=1761$, $r=-.04$, $p=.641$), whereas the relationship between psychopathy and self-enhancing humour was positive but non-significant ($k=9$, $n=1761$, $r=.04$, $p=.276$).

With regards to narcissism, a positive relationship was observed with affiliative humour ($k=14$, $n=2732$, $r=.13$, $p=.001$), self-enhancing humour ($k=13$, $n=2605$, $r=.10$, $p<.001$), and aggressive humour ($k=14$, $n=2972$, $r=.23$, $p<.001$); all showing low effect sizes. A weaker, yet significant, positive relationship was observed between narcissism and self-defeating humour ($k=13$, $n=2605$, $r=.11$, $p=.029$). Analyses were repeated without the inclusion of studies using the PNI measure. The correlation coefficient was observed to decrease to non-significance in the relationship between narcissism and self-defeating humour ($k=13$, $n=2605$, $r=.05$, $p=.451$), with no other significant changes observed.

With regards to Machiavellianism, a positive relationship was observed with aggressive humour ($k=9$, $n=2180$, $r=.44$, $p<.001$), showing a medium effect size, and self-defeating humour styles ($k=6$, $n=1198$, $r=.24$, $p<.001$), showing a low effect size. A negative non-significant relationship was observed between Machiavellianism and affiliative humour ($k=7$, $n=1578$, $r=-.05$, $p=.280$) and self-enhancing humour ($k=6$, $n=1198$, $r=-.01$, $p=.866$).

Table 6. *Meta-analysis data and heterogeneity statistics.*

DT trait	Humour Style	<i>k</i>	<i>N</i>	<i>r</i>	95% CI		<i>p</i>	Heterogeneity statistics				Level of heterogeneity ¹
					Lower	Upper		<i>Q</i> (<i>df</i> = <i>k</i> -1)	<i>p</i>	<i>Tau</i> ²	<i>I</i> ²	
PSY	Affiliative	9	1761	-.035	-.181	.112	.641	76.11 (8)	<.001	.045	89.49	Very High
	Self-enhancing	9	1761	.037	-.029	.103	.276	15.02 (8)	.059	.005	46.74	Moderate
	Aggressive	11	2363	.458***	.392	.519	<.001	37.58 (10)	<.001	.013	73.39	High
	Self-defeating	9	1761	.208***	.102	.310	<.001	41.11(8)	<.001	.022	80.54	Very High
NAR	Affiliative	14	2732	.128**	.049	.205	.001	55.70 (13)	<.001	.017	76.66	Very High
	Self-enhancing	13	2605	.104***	.052	.155	<.001	21.33 (12)	.046	.004	43.74	Moderate
	Aggressive	14	2972	.233***	.171	.293	<.001	39.58 (13)	<.001	.010	67.16	High
	Self-defeating	13	2605	.106*	.011	.199	.029	71.12 (12)	<.001	.025	83.13	Very High
MACH	Affiliative	7	1578	-.047	-.131	.038	.280	16.29 (6)	.012	.008	63.17	High
	Self-enhancing	6	1198	-.005	-.064	.054	.866	5.27 (5)	.384	.000	5.10	Low
	Aggressive	9	2180	.444***	.370	.513	<.001	33.57 (8)	<.001	.014	76.17	Very High
	Self-defeating	6	1198	.235***	.164	.303	<.001	7.87 (5)	.164	.003	36.43	Moderate

****p*<.001, ***p*<.01, **p*<.05. ¹ Level of heterogeneity interpreted using thresholds suggested by Higgins and Thompson (2002): <25% = low, 25–50% = moderate, 50–75% = high, and >75% = very high heterogeneity. **PSY**= psychopathy, **NAR**= narcissism, **MACH**= Machiavellianism.

Publication Bias

Publication bias was assessed using the 'trim and fill' method (Duval & Tweedie, 2000) on funnel plots depicting standard error by Fisher's Z. No plots appeared to suggest the presence of substantial publication bias; but it was considered that plots may have limited power in cases in which there were a low number of studies (i.e. <10) and high heterogeneity (Sterne et al., 2011). One sample was added to the left of the funnel plot in the relationship between psychopathy and affiliative humour. Three samples were added to the right of the funnel in the relationship between psychopathy and self-enhancing humour, aggressive humour, and self-defeating humour. This may be suggestive of potential publication bias; however, this is difficult to determine due to the low number of studies (ranging from 9 to 11). One study was added to fill the right of the funnel plot in the relationship between narcissism and self-enhancing humour, and one was added in the relationship between Machiavellianism and self-enhancing humour. See plots in Appendix G.

Sensitivity analysis

Implementation of the leave-one-out method did not appear to largely influence the overall effect size or significance in most relationships explored. However, the result observed between narcissism and self-defeating humour was observed to become non-significant when seven out of the thirteen effect sizes were individually removed, with the largest reduction in effect size ($r=.11$ to $r=.09$) being observed with the removal of Duarte's (2020) study. As the change in effect

size was observed to be minimal, no studies were considered to significantly influence the overall effect.

Comparing subscale outcomes

Some studies included subscale scores, where the overall scores for a DTe construct encompassed different characteristics. This included both narcissism (PNI) and psychopathy (PPI-R, SRP-III & LSRP) measures. It was considered pertinent to examine these differences, to explore their distinct relationships with humour styles, as compared to the overall construct, and as a potential cause for high heterogeneity. However, due to a limited number of studies presenting subscale scores ($n=8$), such analysis was only considered suitable for studies presenting PNI subscale scores, i.e. vulnerable and grandiose narcissism, as the most commonly occurring ($n=4$).

Results suggested significant differences between grandiose and vulnerable narcissism with regard to their relationship with affiliative humour ($Q=25.91$, $p<.001$) and self-enhancing humour ($Q=24.63$, $p<.001$). Average effect sizes for each outcome suggested a positive relationship between grandiose narcissism and affiliative and self-enhancing humour and a negative relationship between vulnerable narcissism and affiliative and self-enhancing humour (see Appendix H). However, these outcomes are considered non-independent, as they represent within-group measures of an overall construct and have shown a significant correlational relationship, e.g. $r=.6$ in Besser and Zeigler-Hill's (2011) research. Therefore, the precision of these averaged effect sizes is limited (Borenstein, Hedges, Higgins & Rothstein, 2009). No significant differences between grandiose

and vulnerable narcissism were observed with regards to their positive relationship with aggressive and self-defeating humour.

Discussion

Psychopathy and humour styles

Findings show a positive relationship between psychopathy and both aggressive and self-defeating humour styles. Lobbestael and Freund (2021) predicted this finding, due to the evidenced relationship between psychopathy and behavioural aggression (Reidy, Zeichner, Miller & Martinez, 2007). Further subfactor findings suggest that aggressive, and potentially self-defeating humour, are largely driven by self-centred impulsivity and therefore representative of more disinhibited antisocial traits (Lobbestael & Freund, 2021). Martin and colleagues' (2012) subscale findings suggested that those with high 'callous affect' may not be concerned as to how aggressive humour affects others, those with high 'interpersonal manipulation' may use it to put down and manipulate others, and the suggestion that those with high level of 'erratic lifestyle' use aggressive humour, again suggests a link to impulsivity. The subscale of 'callous effect' was observed to solely relate to aggressive humour, suggesting that this subfactor may be most integral to humour directed at others (Martin et al., 2012). Aggressive humour use may also heighten dependent on social circumstances, e.g. when feeling socially excluded (Masui et al., 2013). Subscales of 'interpersonal manipulation' and 'erratic lifestyle' were also found positively related to self-defeating humour, suggested by Martin and colleagues (2012) as a potential means to superficially charm others. A non-significant negative

relationship was observed with affiliative humour and a non-significant positive relationship with self-enhancing humour.

Narcissism and humour styles

Narcissism showed a positive relationship with affiliative, self-enhancing, aggressive and self-defeating humour styles. Although the latter effect size reduced to non-significance without the inclusion of studies using the PNI, in which an average coefficient was calculated from both grandiose and vulnerable narcissism scores. Veselka and colleagues (2010) suggest that those with high narcissism may heighten their self-esteem and popularity using affiliative humour and may show self-enhancing styles of humour due to their greater optimism (Hickman, Watson & Morris, 1996). Marino (2011) suggests that initial use of affiliative humour may explain why those with high narcissism appear to be charming and popular at first sight (Back, Schmukle & Egloff, 2010). However, Lobbestael and Freund (2021) suggested that more injurious styles are also used by individuals showing high entitlement and exploitation, potentially in response to ego-threat (Bushman, Baumeister, Thomaes, Ryu, Begeer & West, 2009). Martin and colleagues (2012) agree that entitlement and exploitation appear related to aggressive humour, with a further association with 'superiority/arrogance' suggestive that this humour style may be used as a means to enhance their own self-worth and superiority (Stucke & Sporer, 2002). The positive relationship between narcissism and self-defeating humour suggests that they do still utilise this, despite this humour style conflicting with the self-love and admiration shown by narcissists, potentially as an attempt to be accepted by others. Research exploring humour styles as mediators offer further insight as to

how the relationship between narcissistic traits and both stress (Besser & Zeigler-Hill, 2011) and self-esteem (Zeigler-Hill & Besser, 2011) can be influenced by humour use, with injurious styles found to be potentially damaging to an individual's own wellbeing.

These findings show uniqueness to narcissism, compared to other DTe traits, due to its relationship with more benign humour styles (affiliative and self-enhancing). This may partly be explained by the differences observed when exploring the relationship between subscales of narcissism and humour use, in that those with high grandiose traits may be more likely to utilise more benign styles, whereas those with vulnerable traits may be less likely; with both grandiose and vulnerable traits positively related to injurious styles (aggressive and self-defeating). However, it is possible that findings related to narcissism and humour use may continue to present as inconsistent between studies, due to context-dependant behaviour, in which optimism can change to hostility when the ego is threatened (Witte, Callahan & Perez-Lopez, 2002).

Machiavellianism and humour styles

A positive relationship was observed between Machiavellianism and aggressive and self-defeating humour styles. Veselka and colleagues (2010) suggest that those with high Machiavellianism may use aggressive humour as a way of controlling others for their own gain. When exploring subfactors, Martin and colleagues (2012) suggest that those high in 'interpersonal tactics' may use aggressive humour to manipulate others, those with a high 'cynical view of human nature' may enjoy jokes based on more negative stereotypes, and a high

'disregard for conventional morality' may enjoy the less socially acceptable nature of aggressive humour. The association between a 'cynical view of human nature' and self-defeating humour styles (Martin et al., 2012) was also not surprising, due to the pessimistic nature of this humour style. Negative, but non-significant, relationships were found between Machiavellianism and both affiliative and self-enhancing humour styles, which may be due to a focus on using others to their advantage rather than building affiliative bonds.

Overall discussion

The aims of this review were to examine the relationship between each DTe construct and humour styles. Meta-analysis results showed that each DTe construct has a unique relationship with humour styles. Psychopathy and Machiavellianism were found significantly and positively related to more injurious styles. This supports our initial hypothesis, that the relationship between DTe and injurious humour styles largely corresponds with that observed in negative agreeableness (Plessen et al., 2020). However, narcissism differed, in that it was found to positively predict all humour styles. Further exploration into subscales of DTe constructs, i.e. the grandiose and vulnerable narcissism subscales of the PNI, suggested that, not only does each DTe construct show a unique relationship with humour styles, but subscales within these constructs may also display contradictory findings. This may contribute to the substantial heterogeneity observed and requires further exploration when more subscale data is made available.

Due to an insufficient number of studies available to conduct a meta-analysis examining the relationship between sadism and humour styles, further research is required in this area. A summation of results from the two studies available, suggests that sadism may be a positive predictor of aggressive humour (Međedović & Bulut, 2017), with authors proposing that these traits may not only relate to enjoyment of others in physical, but also psychological, pain. However, Torres-Marín and colleagues (2022 [Study 1]) did not support these findings. It is unclear at this stage whether a unique independent relationship exists between sadism and humour styles.

Some findings provided insight as to how the relationship between dark traits and humour styles interact in the space of other variables. For example, Zeigler-Hill and Besser (2011) found that benign humour styles (affiliative and self-enhancing) mediated the positive relationship between grandiose narcissism and self-esteem, whereas injurious styles (aggressive and self-defeating) mediated the negative relationship between vulnerable narcissism and self-esteem. Masui and colleagues (2013) also found that the positive relationship between psychopathy and aggressive humour was mediated by social exclusion. This suggests that future research incorporating related variables may allow for more precision in understanding the relationship between DTe traits and humour styles in a real-World context.

Studies also explored self-reported humour styles, compared to those perceived by others. For example, Zeigler-Hill and colleagues (2013 [Study 1]) suggested that self-reported humour styles appear to largely correspond with perceived humour styles, although there did appear to be more difficulty in perceivers

distinguishing between affiliative and self-enhancing styles. Marino (2011) explored whether those with high narcissistic traits may overestimate the amount that they use affiliative humour; however, they were unexpectedly perceived by others to use this humour style more than self-reported. This suggests some slight variation between self-reported and perceived humour styles, which may be beneficial to distinguish between in future research.

Limitations

One limitation of the meta-analysis is the limited number of effect sizes in each synthesised group, which may limit the overall power of the analysis. However, as raised by (Goh, Hall & Rosenthal, 2016) there are several advantages to conducting a meta-analysis with a small number of studies, including more emphasis on the reliability and replicability of the research, and finding effects only detectable in cumulative study; acknowledging that published meta-analyses have incorporated far fewer studies (Hugenberg & Bodenhausen, 2004; Williams & DeSteno, 2008). Due to the correlational nature of each study, the overall *N* is relatively high, and considering that no previous meta-analysis has explored the current research question, it may be argued that the benefits may outweigh the limitations; whilst acknowledging such.

Some studies included were also indicative of very high heterogeneity. As suggested by Cochrane guidance (Ryan, 2016), a random-effects model was therefore implemented, in which calculations incorporate these differences between studies. The consequence of using this model, is that an average effect with a larger confidence interval is obtained, rather than the best estimate. Further

investigation, looking at differences between subscale effect sizes also identified potential explanations for this heterogeneity in narcissism, although it is acknowledged that similar analysis for both psychopathy and Machiavellian constructs would have been beneficial.

As a multi-cultural review, it was surprising to see that the general trend of psychopathy and Machiavellian traits relating to more injurious humour styles, remained relatively consistent. However, narcissism continues to show inconsistency. For example, Besser and Zeigler-Hill (2011) who studied pathological narcissism and humour styles in an Israeli sample found a positive relationship between grandiose narcissism and benign humour and between vulnerable narcissism and injurious styles. However, when Hollandsworth (2019) replicated this in a US sample, vulnerable narcissism was found to be negatively correlated with aggressive humour. The reliability and validity of the HSQ has been shown to be weaker in some countries (see chapter 3), so it is possible that findings may be influenced by cultural biases.

A risk of other biases was also identified, particularly related to the use of self-report measures, convenience sampling and the inability to account for non-responders; suggesting that results should be interpreted with caution. However, this is the existing nature of research in this area, as cross-sectional research offers large sample sizes, vital in measuring a diverse concept such as humour. It should also be noted that all studies were conducted in non-forensic samples, where a lower level of DTe may be observed, suggesting that future research in clinical populations may provide further insight.

Conclusion, implications and future direction

Findings suggest that individuals with malevolent needs and impulses may express them in the form of harmful humour styles, either directed at themselves or others. Disguising such needs within the socially accepted medium of humour may be sufficient to avoid such individuals being rejected from society, but likely affects factors required to develop closer interpersonal relationships (e.g. romantic desirability; Zeigler-Hill, Besser & Jett [Study 2]). Findings unique to narcissism also present a difficulty in identifying an individual with high narcissism from observing their humour style, which may heighten the risk of others falling victim to their more harmful actions. This insight into the relationship between DTe traits and humour styles may not only help in recognising individuals with such traits, but also questions attempts to justify harmful humour as 'just a joke', recognising that there may be malevolent intent behind such. Although it appears that in recent years there has been an increasing trend in exploring the relationship between DTe traits and humour styles, much more data, particularly focusing on sadism and subscales of DTe constructs, will be beneficial in gaining a clearer picture as to how dark traits associate with the use of humour.

Chapter Three: Psychometric Critique

A critique of the Humor Styles Questionnaire in adult community samples

Abstract

The Humor Styles Questionnaire (HSQ; Martin, Puhlik-Doris, Larsen, Gray & Weir, 2003) was developed to measure the functions of different humour styles in everyday life and their relationship with psychosocial wellbeing. The questionnaire is based on a four-factor model of humour which identifies benign humour styles used to enhance relationships with others (affiliative humour) or oneself (self-enhancing humour), and injurious humour styles potentially damaging to others (aggressive humour) or oneself (self-defeating humour). As perhaps the most widely used measure for humour styles, translated and used across a multitude of countries, the reliability and validity of this measure have frequently been assessed. This critique draws together findings, in conjunction with normative data, to critique the psychometric properties of the HSQ and identify any limitations that may need addressing. A systematic search was conducted to identify studies focused on assessing the reliability and validity of the measure, with a total of 20 papers identified. Normative data was found to be comprehensive, but with several limitations. Overall, findings from the identified studies suggest that the HSQ shows good reliability and validity. However, further refinement may be required for use across different countries. Lower internal consistency and construct validity in the injurious humour styles, particularly aggressive humour, were prominent. Due to many of the identified studies being conducted across different countries, it was concluded that more contemporary research exploring psychometric properties of the scale within a North American population may be beneficial in order to tease apart cultural differences from issues with the measure itself and assess any revisions required, before further refining the scale for use in different countries.

Introduction

Humour styles

It is suggested that an individual's "sense of humour" is somewhat accounted for by individual personality traits (Ruch, 1996), resulting in varied preferences and use of humour styles. Although the experience of humour can be considered *stable*, with behaviours tending to occur habitually, it is also described as *temporal*, being mood or mental state dependent (Ruch, 1996). This raises challenges in developing a reliable and valid scale for measuring the experience of humour. Martin, Puhlik-Doris, Larsen, Gray and Weir (2003) describe an individual's 'sense of humour' as multifaceted traits related to the experience of humour, including cognitive ability, habitual behaviour (e.g. tendency to laugh frequently) and aesthetic response (e.g. enjoyment of particular material), whereas humour 'styles' refers to the form of humour used due to the specific function it offers.

Numerous scales measure aspects of the humour experience. However, Martin and colleagues (2003) recognised that few considered both benign and injurious uses of humour. The existing Humorous Behavior Q-sort Deck (HBQD; Craik, Lampert & Nelson, 1993) measured positive and negative dimensions; however, as originally designed for use by trained observers, Martin and colleagues (2003) perceived limitations in its use as a self-report scale.

Development of a Four-Factor Model

Martin and colleagues (2003) aimed to develop a multidimensional measure of humour styles, including dimensions that enhance or damage psychosocial wellbeing, as the injurious effect of humour (e.g. Janes & Olsen, 2000; Kubie, 1971) had been largely disregarded by prior measures. The authors' literature review identified that humour can be used to enhance the self or one's relationships with others and can be accepting (benign) or potentially damaging (injurious). This led to development of a 2x2 four-factor model describing everyday functions of humour (see Figure 2 and Table 7 for style descriptions).

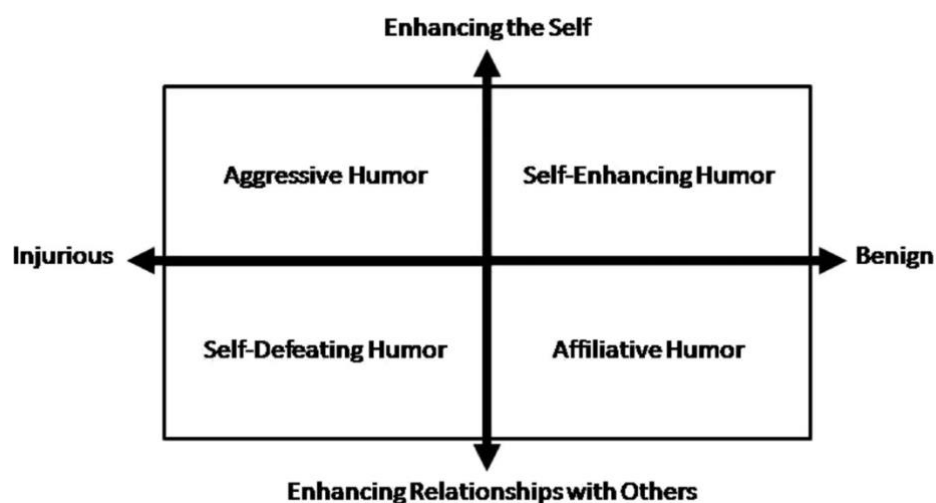


Figure 2. *Humour styles as described by Martin and colleagues (2003), diagram retrieved from Besser and Zeigler-Hill (2011).*

Table 7. *Description of four humour styles identified by Martin and colleagues (2003).*

Humour style	Descriptions
Affiliative humour	Tendency to say funny things and engage in spontaneous witty banter to amuse others, facilitate relationships, and reduce interpersonal tensions.
Self-enhancing humour	Tendency to have a humorous outlook on life, frequently amused by the incongruities of life, and maintain a humorous outlook even in the face of adversity.
Aggressive humour	Tendency to use sarcasm or disparagement humour, or to tease, ridicule, deride or “put-down” others. May use humour to manipulate others.
Self-defeating humour	Tendency to excessively use self-disparaging humour, attempting to amuse others at one’s own expense as a means of gaining approval from others. Allowing oneself to be the “butt” of others’ jokes and laughing along when ridiculed by others.

Scale

Questionnaire format

Based on these four humour styles, the Humor Styles Questionnaire (HSQ; Martin et al., 2003) has a total of 32 items, with 8 measuring each style (see Appendix I). Participants are asked to indicate how much they agree or disagree with each statement on a 7-point Likert scale, ranging from “1 - totally disagree” to “7 - totally agree”. The scale includes eleven reverse-scored items, intended to reduce response style bias (Nunnally, 1978; Paulhus, 1991), i.e. when participants respond without paying attention to content. A separate score is gained for each humour style with higher scores suggesting a greater tendency to experience or express humour in that style (see item examples in Table 8). The scale takes approximately 10 minutes to complete. The questionnaire is in self-report form

and, although competence in psychometric testing is always advised (British Psychological Society [BPS], 2022), no specialist training is required for administration.

Table 8. *HSQ example items for each humour style*

Humour style	Number of items	Example items
Affiliative humour	8	"I laugh and joke a lot with my closest friends" "I enjoy making people laugh"
Self-enhancing humour	8	"Even when I'm by myself, I'm often amused by the absurdities of life" "My humorous outlook on life keeps me from getting overly upset or depressed about things"
Aggressive humour	8	"When telling jokes or saying funny things, I am usually not very concerned about how other people are taking it" "If I don't like someone, I often use humour or teasing to put them down"
Self-defeating humour	8	"I will often get carried away in putting myself down if it makes my family or friends laugh" "When I am with friends or family, I often seem to be the one that other people make fun of or joke about"

The HSQ assesses one specific aspect of an individual's sense of humour; the functions that humour serves in everyday life. Therefore, Martin and colleagues (2003) recommend that the HSQ is used in conjunction with other measures, e.g. humour appreciation ratings (Ruch & Hehl, 1998) for a wide-ranging 'sense of humour' assessment. It is suggested that the HSQ be used to explore both benign and injurious styles of humour and their relationship with psychosocial wellbeing.

Normative Data

When developing the HSQ, Martin and colleagues (2003) administered the assessment on three occasions to four samples including Canadian University and High School students. Items were then refined, largely based on inter-item correlations. The questionnaire was first administered to 117 psychology undergraduates (76 female, 41 male, mean age=19.8 years), and secondly to 258 participants including 165 psychology undergraduates (94 female, 71 male, mean age=19.8 years) and 93 members of a senior continuing education programme (72 female, 21 male, mean age=71.8 years). During the final stage, the questionnaire was administered to 485 participants, including 340 psychology undergraduates (192 female, 148 males, mean age=19.3 years) and 145 high school students from grades 9-12 (92 female, 53 male, mean age = 15.4 years). Martin and colleagues (2003) presented normative data on all 1195 participants (725 women and 470 men), with ages ranging from 14 to 87 years (mean=25, SD=15.68), providing an average distribution on which to compare future data.

Younger participants (below aged 19; M=16.9 years, SD=1.39) showed much higher affiliative and aggressive humour than older participants (above aged 25; M=49.7 years, SD=18.53). Males showed significantly higher scores than females on all humour styles, with very minor differences observed with affiliative and self-enhancing humour. Males appeared more likely than females to engage in injurious humour styles. However, certain factors suggested to influence the use of humour between genders may have contributed to these observations. For example, the HSQ does not specify audience gender, yet Lampert and Ervin-Tripp

(2006) found that males may avoid using aggressive humour, i.e. teasing, towards females whereas females may increase teasing humour in the presence of males.

The HSQ's relationship with both personality traits and psychosocial wellbeing outcomes, including measures of mood and mental state, was also assessed (view the latter in Table 14).

Aims

Since its development in 2003, the HSQ is perhaps the most widely used humour style measure, included in more than 125 published empirical studies (Martin, 2015). The measure's reliability and validity across various countries, both in English and translated form, has frequently been assessed. This critique aims to draw together these findings, in conjunction with the normative data, to critique the psychometric properties of the HSQ and identify any limitations that may need addressing.

Method

A systematic search was conducted to identify papers assessing the psychometric properties of the HSQ. A search of Embase, Medline, PsychINFO, Web of Science and hand-searching, was conducted on 25th October 2022 using the following search strategy:

1. "humor style*" OR "humour style*" OR "HSQ" (as 'title')

2. "psychometric propert*" OR "reliab*" OR "valid*" OR "criti*" (as 'keyword' on OVID and 'abstract' on Web of Science)
3. 1 AND 2

The search identified 97 published papers. Duplicates and papers not provided in English were removed and abstracts screened for relevance. As this critique focuses on use of the HSQ in an adult community sample, studies solely consisting of child samples were excluded plus those relating to specific groups e.g. those with diagnosed mood disorder (Carlsh, 2010). Including the scale development paper (Martin et al., 2003), a total of 20 relevant papers were identified.

Results

Reliability

Reliability refers to a measure's "ability to produce a consistent result in time and space" (Souza, Alexandre & Guirardello, 2017).

Internal consistency

This refers to whether questionnaire items measure one construct. Both Cronbach's alpha (α) and McDonald's omega (ω) are statistical measures of internal consistency, with coefficients $>.70$ or above considered good (Kline, 2013). Reliability coefficients for each study are shown in Table 9. Good internal consistency was found for all four humour styles ($\alpha=.77$ to $.81$) in the Canadian normative data (Martin et al. 2003). A more recent USA study by Silvia and

Rodriguez (2020), found even higher reliability ($\alpha=.79$ to $.86$) using an adapted 5-point HSQ response scale (see 'content validity' for further description).

Regarding studies aiming to validate the HSQ in different countries, reliabilities appear relatively consistent and acceptable for affiliative, self-enhancing and self-defeating subscales, although the affiliative and self-defeating constructs did show a lower than 'good' reliability in Lebanon (Taher, Kazarian & Martin, 2008; Kazarian & Martin, 2006; respectively). However, the aggressive subscale appeared most problematic, with less than 'good' coefficients observed in Lebanon (Kazarian & Martin, 2004, 2006; Taher, Kazarian & Martin, 2008), China (Chen & Martin, 2007), Italy (Sirigatti, Penzo, Giannetti & Stefanile, 2014) and Serbia (Branković, Rogoza & Schermer, 2022). Authors hypothesised that cultural differences may negatively influence the consistency between aggressive humour items. For example, Chen and Martin (2007) acknowledged that a Chinese participant may score lower on "when telling jokes or saying funny things, I am usually not very concerned about how other people are taking it", even if habitually using an aggressive humour style, as tolerance and politeness are central to their culture. Taher, Kazarian and Martin (2008) similarly recognised that in a collectivist Lebanese culture, individuals may score lower on some aspects of aggressive behaviour (e.g. teasing) as it risks expulsion from the group. Schermer and colleagues (2019) studied 28 countries, encompassing the HSQ in 21 languages, and generally found better reliabilities in the affiliative, self-enhancing and self-defeating constructs, whereas the aggressive construct frequently showed 'poor' to 'unacceptable' coefficients. One limitation was that many of the HSQ's used had been back-translated without prior validation. These results

suggest that further refinement would be required to reliably use the HSQ in these countries. Issues observed in the HSQ aggressive humour subscale may also question whether all items within this domain measure the intended construct (see 'face validity').

Table 9. *Demographic details of studies identified during systematic search examining the reliability or validity of the HSQ across different countries, including internal consistencies and outcomes from dimensionality reduction techniques.*

Study	Scale	Country	N	Gender	Age (years)	Population	Internal Consistency	Dimensionality reduction techniques
Martin et al., 2003 (Original paper)	HSQ	Canada	1195	725 females, 470 males	M=25, SD=15.68. Ranging from 14 to 87.	High school and undergraduate students, and participants in a senior learning programme	AFH α =.80 SEH α =.81 AGH α =.77 SDH α =.80	PCA: Four-factor model optimum. All items loaded >.40 on their intended factors and <.25 on other factors. CFA: Good fit for four-factor model identified (RMSEA=.048).
Saroglou & Scariot, 2002	HSQ – French version	Belgium	87	72 females, 15 males	Not provided.	Psychology undergraduates	AFH α =.75 SEH α =.73 AGH α =.70 SDH α =.72	PCA: Four-factor model optimum. Factor 1 loadings (AFH) .74 to .43 Factor 2 loadings (SEH) .68 to .22 Factor 3 loadings (AGH) .71 to .31 Factor 4 loadings (SDH) .70 to .53

Study	Scale	Country	N	Gender	Age (years)	Population	Internal Consistency	Dimensionality reduction techniques
Kazarian & Martin, 2004	HSQ – Original	Lebanon	401	55% females, 45% males	M=19.2, SD=1.26.	English-speaking undergraduate students	AFH α =.75 SEH α =.74 AGH α =.56 SDH α =.71	FA: Four-factor model optimum. All items loaded most highly on their intended domain within the four-factor model, aside from two exceptions.
Kazarian & Martin, 2006	HSQ – Armenian version	Lebanon	278	61% females	M=31.7, SD=14.5. Ranging from 12 to 83.	Community sample, 21% students	AFH α =.71 SEH α =.70 AGH α =.60 SDH α =.65	FA: Four-factor model optimum. All items loaded most highly on their intended domain within the four-factor model, aside from three exceptions.
Chen & Martin, 2007	HSQ – Chinese version	China	354	65% female, 35% male	M=23.4, SD=3.6.	Undergraduate and older adult part-time students	AFH α =.81 SEH α =.78 AGH α =.61 SDH α =.72	PCA: Four-factor model optimum. Factor 1 loadings (AFH) .41 to .76 Factor 2 loadings (SEH) .42 to .77 Factor 3 loadings (AGH) .37 to .57 Factor 4 loadings (SDH) .40 to .71 CFA: Four-factor model indicated an acceptable fit (RMSEA= .06).

Study	Scale	Country	N	Gender	Age (years)	Population	Internal Consistency	Dimensionality reduction techniques
Taher, Kazarian & Martin, 2008	HSQ - Arabic version	Lebanon	435	224 females, 211 males	M=33.8, SD=12.09. Ranging from 11 to 80.	Community sample.	AFH α =.67 SEH α =.79 AGH α =.55 SDH α =.76	PCA: Four-factor model optimum. All items loaded most highly on their intended domain within the four-factor model, aside from six exceptions, four of these in AGH.
Sirigatti, Penzo, Giannetti & Stefanile, 2014	HSQ – Italian version	Italy	138	55 males, 83 females	18 to 25.	Young adults	AFH α =.85 SEH α =.76 AGH α =.61 SDH α =.77	CFA: On a larger sample of both young adults and adolescents (n=292). Four-factor model indicated a good fit (RMSEA= .04).
Heintz & Ruch, 2015	HSQ – German version	Switzerland	340	20.3% male	M=28.30, SD=10.06. Ranging from 18-64.	German-speaking undefined population	AFH α =.91 SEH α =.87 AGH α =.74 SDH α =.87	Not applicable.
Martin, 2015	Not applicable – response paper to Heintz & Ruch (2015) regarding challenges of measuring humour styles.							

Study	Scale	Country	N	Gender	Age (years)	Population	Internal Consistency	Dimensionality reduction techniques
Ruch & Heintz, 2016	HSQ German version	Switzerland and Germany	1101	27% males	M=29.37, SD=11.36. Ranging from 16 to 76	Community sample recruited through university researchers.	Switzerland: AFH α =.86 SEH α =.81 AGH α =.70 SDH α =.81 Germany: AFH α =.87 SEH α =.85 AGH α =.72 SDH α =.82	PCA (n =550): Four-factor model optimum. Factor 1 loadings (AFH) .45 to .77 Factor 2 loadings (SEH) .46 to .79 Factor 3 loadings (AGH) .17 to .70 Factor 4 loadings (SDH) .32 to .77 CFA (n =551): Four-factor model indicated an acceptable fit (RMSEA = .06).
Boda-Ujlaky, Séra, Köteles & Szabo, 2017	HSQ – Hungarian version (original 32 item adapted to 22 item)	Hungary	425	56% males, 45% females.	M=31.6, SD=13.51.	Combined student, community and imprisoned sample.	AFH α =.83 SEH α =.85 AGH α =.72 SDH α =.76	PCA (on original 32 item questionnaire): Four-factor model optimum. Factor 1 loadings (AFH) .58 to .75 Factor 2 loadings (SEH) .64 to .79 Factor 3 loadings (AGH) <.1 to .71 Factor 4 loadings (SDH) .32 to .74

Study	Scale	Country	N	Gender	Age (years)	Population	Internal Consistency	Dimensionality reduction techniques
Ruch & Heintz, 2017 – Study 1	HSQ – German version	Switzerland	187	17% males	M=28.81, SD=10.76. Ranging from 17 to 63.	Online sample.	AFH ω =.91 SEH ω =.87 AGH ω =.74 SDH ω =.82	Not applicable.
Study 2	HSQ – German version	Switzerland	261	31% males	M=27.26, SD=10.11. Ranging from 18 to 69.	Online sample.	AFH ω =.88 SEH ω =.84 AGH ω =.70 SDH ω =.88	Not applicable.
Heintz, 2017	HSQ – German version	Switzerland	107	32% males, 68% females	M=24.00, SD=10.95. Ranging from 18 to 68.	Online sample.	ω ranged from .71-.89	Not applicable.
Torres-Marín, Navarro-Carrillo & Carretero-Dios, 2018	HSQ – Spanish version	Spain	Sample 1: 300	159 females, 141 males	M=29.47, SD=11.53. Ranging from 18 to 60	Community sample.	AFH α =.80 SEH α =.75 AGH α =.78 SDH α =.74	PCA: Four-factor model optimum. Factor 1 loadings (AFH) .52 to .70 Factor 2 loadings (SEH) .38 to .84 Factor 3 loadings (AGH) .51 to .71 Factor 4 loadings (SDH) .29 to .70 CFA: Four-factor model indicated a good/acceptable fit (RMSEA= .05).
			Sample 2: 261	153 females, 108 males	M=31.79, SD=10.95. Ranging from 18 to 65.	Online community sample.	AFH α =.80 SEH α =.84 AGH α =.74 SDH α =.74	CFA: Four-factor model indicated an acceptable fit (RMSEA= .07).

Study	Scale	Country	N	Gender	Age (years)	Population	Internal Consistency	Dimensionality reduction techniques
			Sample 3: 238	126 females, 112 males	M=22.99, SD=4.47. Ranging from 18 to 50 years.	Undergraduate students.	AFH α =.80 SEH α =.77 AGH α =.74 SDH α =.76	CFA: Four-factor model indicated an acceptable fit (RMSEA= .06).
			Sample 4: 105	55 females, 50 males	M=22.56, SD=3.75. Ranging from 18 to 39.	Undergraduate students.	AFH α =.78 SEH α =.77 AGH α =.75 SDH α =.73	Not applicable.
			Sample 5: 164	87 females, 77 males	M=28.80, SD=9.52. Ranging from 18 to 63.	Online community sample	AFH α =.77 SEH α =.82 AGH α =.80 SDH α =.72	CFA: Four-factor model indicated an good/acceptable fit (RMSEA= .05).
Heintz, 2019	HSQ – German version	Switzerland	202	72% female, 28% male	M=26.37, SD=11. Ranging from 18 to 75.	Online sample - two thirds were students	ω ranged from .75 for AGH and .88 for SEH.	Not applicable.
Heintz & Ruch, 2019	HSQ – German version	Switzerland	570	70% female, 30% male	M=27.43, SD=10.79. Ranging from 18-75 years.	Online sample, 50% undergraduate students.	AFH α =.87 SEH α =.86 AGH α =.69 SDH α =.83	Not applicable.
Di Fabio, 2019	HSQ – Italian version	Italy	239	40% males, 60% females	M=23.67, SD=2.95. Ranging from 19 to 26.	Not provided.	AFH α =.88 SEH α =.83 AGH α =.80 SDH α =.79	CFA: Four-factor model indicated an acceptable fit (RMSEA= .07).

Study	Scale	Country	N	Gender	Age (years)	Population	Internal Consistency	Dimensionality reduction techniques
Schermer et al., 2019	HSQ adapted into 21 different languages	28 countries including: Bosnia & Herzegovina Brazil Bulgaria Canada Chile Colombia Croatia Estonia Germany Hungary Indonesia Iran Japan Latvia Malaysia Pakistan Poland Portugal South Africa Romania Russia Serbia South Korea Spain Turkey Ukraine United States Vietnam	8361	5238 females, 3107, 16 missing data	M=23.23, SD=6.42. Ranging from 17 to 82.	Non-specified.	AFH α = .47 (Pakistan) to .86 (USA) SEH α = .33 (Malaysia) to .85 (USA) AGH α = .32 (Pakistan) to .73 (Canada) SDH α = .36 (Malaysia) to .85 (Germany)	CFA: Four factor model identified a fit ranging from poor in Iran and Latvia (RMSEA = .10) to acceptable in Indonesia, Bulgaria, Estonia and South Africa (RMSEA = .06).

Study	Scale	Country	N	Gender	Age (years)	Population	Internal Consistency	Dimensionality reduction techniques
Silvia & Rodriguez, 2020	Sample 1: HSQ-adapted 5-point scale.	USA	1210	557 females, 652 males	M=30.90, SD=11.99. Ranging from 18 to 80.	Online community sample	AFH α =.86 SEH α =.82 AGH α =.79 SDH α =.82	Not applicable.
	Sample 2: HSQ – original 7-point scale	USA	532	397 females, 135 males.	M=19.04, SD=2.39. Ranging from 18 to 51.	Psychology students	Not available.	PCA (as part of minimum average partial test): Indicated 1 factor per each HSQ domain.

Study	Scale	Country	N	Gender	Age (years)	Population	Internal Consistency	Dimensionality reduction techniques
Branković, Rogoza & Schermer, 2022	HSQ – Serbian version	Serbia	404	75% female	M=21.73, SD=4.85. Ranging from 18 to 52.	Student sample, mostly young adults.	AFH α =.75 SEH α =.76 AGH α =.64 SDH α =.79	CFA: Four factor model identified an acceptable fit as per the RMSEA (.06). Exploratory structural equation modeling showed most items to correspond to intended factor, but with five observed to be either low or non-consistent. Factor 1 loadings (AFH) .41 to .62 Factor 2 loadings (SEH) .17 to .80 Factor 3 loadings (AGH) .20 to .69 Factor 4 loadings (SDH) .24 to .65

AFH= affiliative humour, **SEH**= self-enhancing humour, **AGH**= aggressive humour, **SDH**= self-defeating humour, **PCA**= principal component analysis, **FA**= factor analysis, **CFA**= confirmatory factor analysis, **RMSEA**= root mean square error of approximation (indicative of model fit, with <.05 suggested as 'good', between .05 and .08 as 'acceptable', between .08 and .1 as 'marginal' and >.1 as 'poor'; Fabrigar, MacCallum, Wegener & Strahan, 1999).

Test-Retest Reliability

This refers to a measure's stability over time; if a measure is used twice with no difference in sample or intervention, the results should be similar. Kline (2013) recommends a minimum correlation coefficient of $r=.80$ between two time points. A limited number of identified studies explored this type of reliability. Martin and colleagues (2003) initially found a good level of test-retest validity ($r=.80$ to $.85$) in a sample of 179 Canadian students over a one-week period. However, Heintz (2017) administered the HSQ-German version to 107 participants in Switzerland, before and after a 5-day behavioural measure, and found test-retest reliability ranged from $r=.74$ to $.88$. Chen and Martin (2007) also examined the HSQ-Chinese version on a sample of 74 students and coefficients were $r=.67$ for affiliative, $r=.64$ for self-enhancing, $r=.57$ for aggressive and $r=.65$ for self-defeating humour. The author still considered these acceptable suggesting that the longer timelapse of four weeks may explain a lower test-retest reliability than in the normative data (Martin et al., 2003). However, this somewhat undermines Ruch's (1996) suggestion of one's humour style being stable to some extent. The suggested temporal aspect, i.e. changes mood and mental state, may provide a more likely explanation for these lower figures. As with many studies in this area, a measure of mental health was included yet the potential influence this may have had on humour styles between the two time points was not directly examined. Longitudinal research, in conjunction with mood state measures, may help to examine the HSQ's stability independent from these variables.

Validity

Validity refers to “the closeness of what we believe we are measuring to what we intended to measure” (Roberts & Priest, 2006).

Face validity

This refers to whether a scale appears, on the surface, to measure the intended construct; in this case the use of four humour styles defined by Martin and colleagues (2003) which either enhance or damage psychosocial wellbeing. No identified studies explicitly mention face validity, yet items appear to reasonably correspond to humour styles defined by Martin and colleagues (2003). However, some aspects do appear to deviate from the intended construct. For example, “when I am with friends or family, I often seem to be the one that other people make fun of or joke about” does not give any indication of one’s *use* of humour. In addition, certain aggressive humour items measure one’s disregard for the impact of their humour on others. Although this does fit with Martin and colleagues’ (2003) definition of aggressive humour, the initial paper provides no direct evidence for this characteristic. Considering the association found between aggressive humour and callous affect (Martin, Lastuk, Schermer, Jeffery, Vernon & Veselka, 2012), it is possible that items such as “when telling jokes or saying funny things, I am usually not very concerned about how other people are taking it” may diverge from measuring the ‘style’ of humour, to traits associated with its use. For example, is aggressive humour being measured across different countries or levels of empathy; with the latter already suggested to differ across countries (Chopik, O’Brien & Konrath, 2017)?

Concurrent validity

This refers to how the measure correlates with other measures of the same construct. Two self-report measures considered most comparable to the HSQ, as they aim to measure humour styles, are the Humor Behaviour Q - Rating Form (HBQ-RF; used in Ruch, Beermann & Proyer, 2009), containing 100 statements from the HBQD (Craik et al., 1993), and the Comic Styles Marker (CSM; Ruch, Heintz, Platt, Wagner & Proyer, 2018) which identifies eight comic styles: fun, benevolent humour, nonsense, wit, irony, satire, sarcasm and cynicism. See Table 10 for correlational data.

The HSQ was found to explain a mean of 76% variance in the ten HBQD humour behaviours, with around one fourth unexplained. Findings for each construct were largely as expected in line with the four-factor model; affiliative and self-enhancing styles showed higher positive correlations with the socially warm, reflective and competent behaviours and aggressive and self-defeating styles with the more mean-spirited, earthy (i.e. jokes about taboo topics) and boorish humour behaviour. Some styles positively correlated with both sides of some dimensions, e.g. reflective and boorish, which could indicate a lack of discrimination between these extremities in the HBQD, or that HSQ constructs encompass these conflicting styles.

Table 10. *Correlational data for studies examining concurrent validity between the HSQ and other humour style measures*

Study	N	Outcome	Subscales	Correlations (r)			
				Affiliative	Self-enhancing	Aggressive	Self-defeating
Ruch & Heintz, 2016	344	HBQ-RF	Socially warm	.65***	.48***	.13*	.18***
			Socially cold	-.54***	-.31***	.18***	.19***
			Reflective	.34***	.32***	.17**	.20***
			Boorish	.28***	.15**	.31***	.35***
			Earthy	.10	-.02	.57***	.36***
			Repressed	-.21***	-.09	-.13*	.09
			Competent	.49***	.19***	.33***	.22***
			Inept	-.19***	-.11*	.20***	.33***
			Benign	.31***	.27***	.08	.07
			Mean-spirited	.08	-.03	.57***	.45***
Heintz & Ruch, 2019	570	CSM	Fun	.64***	.36***	.27***	.19***
			Benevolent	.36***	.64***	.00	.14***
			Nonsense	.31***	.33***	.18***	.11*
			Wit	.54***	.36***	.15***	.07
			Irony	.20***	.08	.38***	.22***
			Satire	.20***	.24***	.25***	.32***
			Sarcasm	.09*	-.02	.56***	.17***
			Cynicism	-.02	-.06	.38***	.20***

HBQ-RF = Humorous Behavior Q – Rating Form (Craig et al., 1993; Ruch, Beerman & Proyer, 2009), **CSM** = Comic Styles Marker (Ruch, Heintz, Platt, Wagner & Proyer, 2018). * $p < .05$, ** $p < .01$, *** $p < .001$.

Heintz and Ruch (2019) compared the HSQ and CSM and found large effect sizes between affiliative humour and fun and wit, between self-enhancing and benevolent and between aggressive and sarcasm. Medium-sized between affiliative humour and benevolent and nonsense, between self-enhancing and fun, nonsense, and wit, between aggressive and irony and cynicism, and between self-defeating and satire; suggesting that these scales encompass similar individual differences in humour styles. Regression analyses also showed that the HSQ accounted for a large proportion of variance (28–46%) in fun, benevolent humour, wit, and sarcasm and a medium proportion (13–17%) in the other CSM scales (overall median = 31.0%). Self-defeating humour showed a much lower overlap in variance with CSM subscales than other HSQ constructs, with authors concluding

that it may inadequately represent a humour style. It was also concluded that, although the HSQ appears to measure humour styles, it may not fully encompass the more comprehensive list of CSM styles.

Predictive validity

This refers to whether a measure can predict the later presence of a variable. Martin and colleagues (2003) predicted how each HSQ style may relate to measures of psychosocial wellbeing (see Table 14). The HSQ accounted for 11% more variance in self-esteem than all other measures put together, including the Coping Humor Scale (CHS; Martin & Lefcourt, 1983), Situational Humor Response Questionnaire (SHRQ; Martin & Lefcourt, 1984) and Sense of Humor Questionnaire (SHQ-6; Svebak, 1996). The HSQ also accounted for significantly more variance than the Multidimensional Sense of Humor Scale (MSHS; Thorson & Powell, 1993) in a multitude of wellbeing outcomes, including depression, anxiety, optimism and psychological wellbeing (19%, 26%, 19%, and 32%, respectively, all $ps < .001$).

However, the above data is cross-sectional, and longitudinal data provides stronger evidence for predictive validity (see data in Tables 11 and 12). Over an eight-week period, Cann, Stilwell and Taku (2010) found that self-enhancing humour positively predicted optimism, hope and happiness and negatively predicted stress, with self-defeating showing the reverse. Other-orientated styles were found to have little importance. Cann and Collette (2014) also explored the relationship between HSQ scores, seven daily affect rating readings and psychological wellbeing measures at the start of the study and over 30 days later.

Self-enhancing humour was the only style significantly predicting outcome measures, showing a positive relationship with life satisfaction, resilience and positive affect and a negative relationship with depression, anxiety, stress and negative affect, suggesting that self-orientated styles may be more predictive of psychosocial wellbeing. However, a cross-sectional study by Cann, Zapata and Davis (2011), showed that other-orientation styles were stronger predictors of relationship satisfaction in romantic partners, which might suggest that these styles could be more predictive of relational outcomes.

Heintz (2017) explored whether the four HSQ styles could predict 20 corresponding humour behaviours. Scores for each style correlated with corresponding diarised humour behaviours over 5 consecutive days, showing a large effect size for affiliative and self-enhancing, small to medium for aggressive humour, and small for self-defeating humour. Injurious styles therefore showed lower predictive validity for corresponding humour behaviours. Ruch and Heintz (2017) suggested that scores on injurious subscales may relate more to the non-humorous context in items. This may explain their lower ability to predict precise humour behaviours absent of context. Affiliative humour showed a strong positive relationship with all humour style behaviours, suggesting that this was not distinct for its corresponding behaviour. However, the authors acknowledged that their list of behaviours may benefit from further refinement.

Table 11. *Correlational data for longitudinal studies examining the predictive validity of the HSQ for outcomes of psychosocial wellbeing across two time points*

Study	Country	Outcome	Correlations (r)	
			Beginning of study ^a	8 weeks later ^b
Cann, Stilwell & Taku (2010) ¹	USA	HOPE	Affiliative .19*	Affiliative .19
			Self-enhancing .35*	Self-enhancing .35*
			Aggressive -.14	Aggressive -.10
			Self-defeating -.24*	Self-defeating -.19
		OHQ-SF	Affiliative .22*	Affiliative .18
			Self-enhancing .41*	Self-enhancing .37*
			Aggressive -.08	Aggressive -.08
			Self-defeating -.25*	Self-defeating -.24*
		LOT	Affiliative .14	Affiliative .10
			Self-enhancing .45*	Self-enhancing .37*
			Aggressive -.20*	Aggressive -.24*
			Self-defeating -.30*	Self-defeating -.25*
		PSS	Affiliative -.19*	Affiliative -.14
			Self-enhancing -.35*	Self-enhancing -.29*
			Aggressive .12	Aggressive .10
			Self-defeating .30*	Self-defeating .24*

^a $n=299$, ^b $n=174$. **HOPE**= The Hope Scale (Snyder et al., 1991), **OHQ-SF**= Oxford Happiness Questionnaire-Short Form (Hills & Argyle, 2002), **LOT**= Life Orientation Test-Revised [optimism] (Scheier, Carver, & Bridges, 1994), **PSS**= Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983). ¹Significance only indicated at the $p<.05$ level.

Table 12. *Further correlational data for longitudinal studies examining predictive validity of the HSQ for outcomes of psychosocial wellbeing and corresponding humour behaviours*

Study	Country	Outcome	Subscales	Correlations (r)			
				AFH	SEH	AGH	SDH
Cann & Collette (2014)	USA	mDES - Mean scores over 7 days ^a	PPA	.17	.32**	-.10	-.03
			PNA	-.13	-.27**	.15	.06
		SWL - over 30 days later than initial HSQ scores ^b		.15	.33**	-.10	.01
		CD-RISC - over 30 days later than initial HSQ scores ^b		.23*	.47**	-.08	-.10
		DASS-21 - over 30 days later than initial HSQ scores ^b		-.14	-.39**	.06	-.04
Heintz (2017)	Switzerland	HSQ humour behaviours (mean scores over 5 days) ^c	AFH behaviours	.54***	.44***	.51***	.48***
			SEH behaviours	.29***	.40***	.28**	.26**
			AGH behaviours	.16	.10	.25**	.13
			SDH behaviours	.01	.06	-.05	.07

*p < .05. **p < .01, ***p < .001. ^an=not provided, ^bn=120, ^cn=123. **AFH**= affiliative humour, **SEH**= self-enhancing humour, **AGH**= aggressive humour, **SDH**= self-defeating humour, **SWL**= Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985), **CD-RISC**= Connor-Davidson Resilience Scale (Connor & Davidson, 2003), **DASS**= Depression, Anxiety, and Stress Scale – Short Version (Henry & Crawford, 2005), **PPA**= Modified Differential Emotions Scale (mDES: Fredrickson, Tugade, Waugh, & Larkin, 2003) peak positive affect, **PNA**= mDES peak negative affect.

Construct validity

This refers to whether the HSQ measures the intended constructs. For example, whether it distinguishes between those with and without each defined humour style. One way to assess this is by examining whether an optimal four-factor model exists using factor analysis and whether each factor has loadings of at least 0.4, a suggested threshold for retaining a factor (Stevens, 1992). Data from numerous countries consistently identified an optimal four-factor model (see Table 9). However, despite also identifying a four-factor model, Silvia and Rodriguez (2020) observed a potential subscale within self-defeating humour which appeared to represent “being the target of others’ laughter and teasing”, suggesting that this requires further exploration.

There were concerns regarding low factor loadings or items loading higher on non-corresponding subscales, most frequently in the aggressive or self-defeating constructs. For example, in both Lebanon and China, item 28 on the self-defeating scale “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” loaded highest on the self-enhancing scale (Kazarian & Martin, 2004, 2006; Taher, Kazarian & Martin, 2008; Chen & Martin, 2007). Chen and Martin (2007) suggested that this may be due to such behaviour often being viewed as self-enhancing within Chinese culture. Taher, Kazarian and Martin (2008) were not surprised that the injurious subscales showed lower construct validity in collectivist cultures, where such behaviour could damage social relationships. It is possible that issues with construct validity may be a consequence of measure translation. However, Ruch and Heintz (2016) suggested that it likely indicates a

poor fit of some items within their defined constructs, particularly as some items in the aggressive and self-defeating subscales were also observed to show lower loadings in Martin and colleagues' (2003) initial study.

Convergent and discriminant validity

Convergent validity refers to whether two measures of constructs that should be related are related, whereas discriminant validity refers to whether two measures of constructs that should not be related, are not. See convergent and discriminant data in Table 13.

Heintz and Ruch (2015) compared HSQ scores to corresponding 'humour style definitions' and 'construct descriptions'. Results showed high convergent validity between HSQ scores and all construct descriptions. High convergence was observed between HSQ scores and humour style definitions for all styles except self-enhancing, for which a low convergence was observed, suggesting a disparity between the subscale's definition and measurement. When assessing discriminative validity, generally correlations appeared strongest between each HSQ construct and its corresponding definition. However, limited discrimination between self- and other-orientated styles led authors to suggest that a two-factor benign versus injurious model may be preferable to four factors. They also found that the HSQ only explained around two-thirds of the variance in the humour style definitions and construct descriptions, suggesting that the HSQ may not encompass some aspects of these humour styles. In response, Martin (2015) criticised Heintz and Ruch (2015) for not using mixed methodology, e.g.

observation and behavioural data, and the dissimilarity between the definition and construct wording in comparison to those in Martin and colleagues' (2003) original paper.

Table 13. *Correlational data examining convergent validity of the HSQ and related constructs.*

Study	N	Outcome	Convergent Validity (r)			
			AFH	SEH	AGH	SDH
Heintz & Ruch, 2015	340	Definitions of the HSQ styles (marginally rephrased from Martin et al., 2003)	.42***	.14**	.35***	.79***
		Construct descriptions of HSQ styles (marginally rephrased from Martin et al., 2003)	.57***	.70***	.69***	.79***
Heintz, 2019	202	HSQ scores from external raters (including friends, relatives, romantic partner or other)	.59***	.48***	.52***	.31***
Ruch & Heintz, 2017 - Study 1 ¹	187	HSQ items adapted to include humour-related terms only.	.91*	.83*	.77*	.61*
		HSQ items adapted to include context-related terms only.	.74*	.75*	.76*	.76*

¹Significance only indicated at the $p < .05$ level. * $p < .05$. ** $p < .01$, *** $p < .001$. **AFH**= affiliative humour, **SEH**= self-enhancing humour, **AGH**= aggressive humour and **SDH**= self-defeating humour.

Several studies have also explored self-reported HSQ scores in comparison to observations rated by a friend, partner or peer (Martin et al., 2003; Findlay & Jones, 2005; Cann, Zapata & Davis, 2011; Zeigler-Hill, Besser & Jett, 2013). There generally appeared to be good convergent validity between self-report and observer ratings, showing small to medium effect sizes, and relatively good discriminant validity between subscales, although less so between affiliative and self-enhancing humour. Heintz (2019) criticised these studies for having brief other-report scales and conducted their own study, adapting the 32 scales of the HSQ into an HSQ 'other-report form'. They found relatively large effect sizes between self- and other-ratings. Using structural equation modelling, they found

good convergence for all humour styles (59.3-81%), aside from self-defeating, for which self-reported scores explained much lower variance in other-reported (21.2%).

Hypothesis-testing validity

This refers to whether the measured concept correlates with other variables hypothesised to be related. Martin and colleagues (2003) largely supported predicted relationships between each humour style and measures of psychosocial wellbeing (see Table 14). However, hostility and aggression were significantly and positively correlated with both injurious styles, not solely aggressive humour. Weaker, yet significant, correlations were observed with social relationship measures. Affiliative humour was most strongly related to intimacy, as expected, but not social support which only showed a positive relationship with self-enhancing humour.

As outlined in Table 15, many of Martin and colleagues' (2003) predictions were largely supported across various countries, with benign humour styles found more closely related to positive psychosocial outcomes. However, there were exceptions, which may partly be explained by cross-cultural differences. For example, although Torres-Marín and colleagues (2018) found benign styles generally more strongly related to positive psychological outcomes in a Spanish sample, self-defeating was also positively related to happiness. They hypothesised that this may be due to self-defeating humour being more commonly used by humorous individuals in Spain. Kazarian and Martin (2004, 2006) used the original and Arabic HSQ in Lebanon and reported weaker correlations between humour

styles and measures of psychological well-being than in the normative sample. Authors suggested that humour styles may be weaker predictors of mental health and wellbeing in non-individualist cultures. However, the data did show strong correlations between affiliative humour and low social avoidance and self-defeating humour and high social anxiety, corresponding with Martin and colleagues' (2003) predictions regarding relational outcomes. Ruch and Heintz (2017 - Study 2) found when controlling for non-humorous context in HSQ items in a Swiss sample, all styles showed no significant relationship with any wellbeing outcomes. Authors suggested that the context of items may be driving the previously identified relationship between HSQ and psychosocial wellbeing.

Table 14. *Hypothesised and evidenced significant relationships between HSQ humour styles and psychosocial wellbeing outcomes by Martin and colleagues (2003)*

Humour style	Hypothesised relationship to psychosocial wellbeing variables	Significant outcomes found in normative data (r)
Affiliative humour	+ cheerfulness	+ Cheerfulness ^a .65***
	+ self-esteem	+ Self-esteem ^{e/d} .21***/.43***
	+ intimacy	+ Social intimacy ^d .25***
	+ relationship satisfaction	+ Wellbeing ^g .26*
	+ general positive moods and emotions	- Seriousness ^a -.31***
		- Bad mood ^a -.33***
		- Anxiety ^d -.27***
		- Depression ^b -.22***
Self-enhancing humour	- negative emotions, e.g. depression and anxiety	- Bad mood ^a -.37***
	+ self-esteem	- Anxiety ^d -.40***
	+ psychological well-being	- Depression ^b -.33***
		+ Self-esteem ^{e/d} .28***/.32***
		+ Wellbeing ^g .46***
		+ Cheerfulness ^a .55***
		+ Optimism ^g .32**
		+ Social intimacy ^d .17*
		+ Social support ^c .30***
Aggressive humour	+ hostility	+ Hostility ^c .29***
	+ anger	+ Aggression ^f .41***
	+ aggression	- Seriousness ^a -.41***

- relationship satisfaction

Self-defeating	+ negative emotions, e.g. depression and anxiety	+ Bad mood ^a	.28**
humour	- psychological well-being	+ Anxiety ^d	.26***
	- self-esteem.	+ Depression ^b	.24***
	- relationship satisfaction	+ Hostility ^c	.38***
		+ Aggression ^f	.28***
		- Wellbeing ^g	-.24*
		- Self-esteem ^{e/d}	-.36***/- .25***
		+ Psychological problems and symptoms of psychopathology ^c	.31***
		- Social intimacy ^d	-.15*
		- Social Support ^c	-.21**

^an=120, ^bn=485, ^cn=168, ^dn=172, ^en=333, ^fn=194, and ^gn=94. Cheerfulness, seriousness and depression measured using the State-Trait Cheerfulness Inventory (Ruch, Kohler & van Thriel, 1996), anxiety measured using the State-Trait Anxiety Inventory (Spielberger, 1983), depression using the Center for Epidemiological Studies Depression Scale (Radloff, 1977), hostility using the Cook–Medley Hostility Scale (Cook & Medley, 1954), aggression using the Buss–Perry Aggression Questionnaire (Buss & Perry, 1992), self-esteem was measured using two measures including the Rosenberg Self-Esteem Inventory (Rosenberg, 1965) and Index of Self-Esteem (Hudson, 1982), optimism using the Life Orientation Test (Scheier & Carver, 1985), wellbeing using the Ryff measure of psychological well-being (Ryff, 1989), psychological problems and symptoms of psychopathology using the Symptom Checklist-90 Revised (Derogatis, 1977), social intimacy using the Miller Social Intimacy Scale (Miller & Lefcourt, 1982) and social support using the Social Support Questionnaire-Satisfaction (Sarason, Levine, Basham, & Sarason, 1983). *p < .05. **p < .01, ***p<.001.

Table 15. *Correlational data from studies examining hypothesis-testing validity of the HSQ identified during systematic search*

Study	Country	N	Outcome	Subscales	Correlations (r)			
					AFH	SEH	AGH	SDH
Kazarian & Martin, 2004	Lebanon	401	Experiences in Close Relationships - Revised (ECR-R; Fraley, Waller, & Brennan, 2000)	Social anxiety	-.08	.01	.07	.44***
				Social avoidance	-.44***	-.10	.02	.13
			Psychological well-being and perceived health (Ontario Ministry of Health, 1992)	Perceived health	.10	.26***	-.06	.00
				Wellbeing	.23***	.40***	-.03	-.09
Kazarian & Martin, 2006	Lebanon	278	Center for Epidemiologic Studies-Depression Scale (CES-D; Radloff, 1977)		-.16	-.10	.05	.07
			Psychological Well-Being and Perceived Health (Ontario Ministry of Health, 1992)	Wellbeing	.21***	.26***	-.06	-.04
				Perceived health	.10	.27***	-.09	-.02
Chen & Martin (2007)	China	354	Symptom Checklist-90 (SCL-90; Derogatis et al. 1974; Derogatis 1994; Wang 1984)	General Symptomatic Index	-.13*	-.24**	.14*	.18**
Taher, Kazarian & Martin, 2008	Lebanon	435	CES-D (Radloff, 1977) translated into Arabic.		-.20***	-.18***	.12**	.20***
			ECR-R (Fraley, Waller, & Brennan, 2000; Hijazi, 2004)	Social anxiety	-.23***	-.18***	.20***	.19***
				Social avoidance	-.10*	-.16**	.11*	.19***
Sirigatti, Penzo, Giannetti et al., 2014	Italy	138	Ryff's Psychological Well-Being Scales (Ryff, 1989; Ruini, Ottolini, Rafanelli, Ryff & Fava, 2003)	Total psychological wellbeing' score	.50***	.34***	.08	-.31***

Ruch & Heintz, 2017 - Study 2 ¹	Switzerland	261	Satisfaction with life scale (SWLS; Diener, Emmons, Larsen & Griffin, 1985)		.28*	.34*	.14*	-.35*
			Positive and negative affect schedule (PANAS; Watson, Clark & Tellegen, 1988)	Positive affect	.25*	.33*	.00	-.20*
				Negative affect	-.20*	-.35*	-.04	.34*
Torres-Marín, Navarro-Carrillo & Carretero-Dios, 2018 (Sample 2)	Spain	261	Psychological Well-Being Scale (Sánchez-Cánovas, 1994)	Happiness	.37**	.48**	.01	.17*
				Hope	.35**	.27**	.01	.04
				Health	.21*	.16*	-.01	-.09
				Sociability	.37**	.28**	.08	.10
				Life Satisfaction	.38**	.31**	.01	-.04
			Beck Depression Inventory (BDI-IA; Beck, Rush, Shaw & Emery, 1979; Sanz, Perdigón, & Vázquez, 2003)		-.31**	-.33**	-.03	.04
Branković, Rogoza & Aitken Schermer, 2022	Serbia	404	Single item measure of Global Self Esteem (Robins, Hendin & Trzesniewski, 2001)		.17*	.24**	Not provided, NS.	-.27**
			Three-Item Loneliness Scale (TILS; Hughes, Waite, Hawkley & Cacioppo, 2004).		-.30**	-.20**	Not provided, NS.	.33**

¹Significance only indicated at the $p < .05$ level. * $p < .05$. ** $p < .01$, *** $p < .001$. **AFH**= affiliative humour, **SEH**= self-enhancing humour, **AGH**= aggressive humour, **SDH**= self-defeating humour, **NS**= non-significant.

Content Validity

This refers to whether the measure content and composition are appropriate for assessing all aspects of the construct being assessed. Minimal studies explicitly mentioned content validity. However, Torres-Marín and colleagues (2018) reported that Content Validity Indexes (CVI) for the Spanish HSQ, a rating determined by four experts in the area, were all above .70 suggesting suitable content validity (Tilden, Nelson & May, 1990). The Kappa index, which refers to the agreement between raters, was also above the moderate range of .40-.59, a threshold suggested by Landis and Koch (1977).

Silvia and Rodriguez (2020) tested whether a 5-point Likert scale would be preferable to the original 7-point. Generalized partial credit models (GPCM), which order curves representing thresholds between each scale response, suggested that a 7-point scale may be excessive, as participants used fewer categories to classify responses. They also explored how the wording of each HSQ item influences the differentiation between participants scoring higher and lower scores (i.e. item discrimination). The affiliative subscale was highly discriminatory between very low and moderately low levels of affiliative humour but provided less information about high scorers, suggesting it may be too easy to score high in this domain, giving scores limited meaning. Item readability scores, on both the Higher Flesch reading ease and Gunning's fog index (based on American grades), suggested that the affiliative subscale was easiest (around 11-12 years) and self-enhancing most difficult (around 17-18 years). All were at a level deemed appropriate for adults although could be problematic for less proficient readers and a consideration for questionnaire translations. All points mentioned suggest

that items may benefit from rewording. Surprisingly, the differential item functioning (DIF) showed no item bias between genders, meaning that each gender showed equal probability of providing certain item responses, which is unexpected within the context of commonly observed gender biases.

Discussion

Kline (2015) states that reliability, validity and discrimination make a good scale, in addition to a good standard of normative data. Martin and colleagues (2003) conducted extensive analysis to obtain normative data, using multiple datasets to examine the reliability and validity of the scale and its relationship with measures of psychosocial wellbeing. Normative data is therefore considered good; however, it was identified that 'middle-aged' participants may be less represented. In fact, the mean age in most research discussed in this critique suggests a focus on younger adults, and more research with older adults may be beneficial.

Overall, this critique shows good evidence of the HSQ's reliability and validity. However, further refinement may be needed for use in some countries. Limitations largely relate to lower internal consistencies and construct validity in injurious humour styles in some countries, particularly aggressive humour, with examination of construct validity showing low factor loadings, or items from one style loading higher on another. Authors have suggested that this may be due to cultural differences. However, as most studies exploring the HSQ's validity are conducted in different countries, it is difficult to distinguish whether this is the cause or that subscales are not accurately measuring intended constructs (i.e. low construct validity). Although international research is beneficial, further studies

exploring the HSQ's psychometric properties in North American samples may be valuable at this stage to separate cultural differences from issues with the measure itself. Longitudinal studies have also shown varied results in the HSQ's ability to predict outcomes related to psychosocial wellbeing, with other-oriented styles (affiliative and aggressive humour) showing less predictive validity. Further studies exploring test-retest reliability and longitudinal studies measuring predictive validity would be beneficial.

Concerns were raised regarding HSQ items. For example, questions were raised as to whether items directly measure humour styles used, or traits related to such styles. It was also suggested that non-humorous context in items may be responsible for the HSQ's relationship with psychosocial wellbeing outcomes (Ruch & Heintz, 2017 - Study 2). Although Martin (2015) identified limitations in the methodology of this study, this requires further exploration as, if accurate, could undermine the basis of the measure. The affiliative humour subscale may benefit from re-wording, to better discriminate between high and low-scoring participants (Silvia & Rodriguez, 2020). Easily scoring high in affiliative humour may have erroneously influenced the examination of this construct's reliability and validity. The readability level of the HSQ could also benefit from more consistency between constructs.

The HSQ is a self-report measure and although there are advantages, such as quick administration to a large sample, the validity of such measures has been questioned (Van de Mortel, 2008) due to issues such as response bias. This may be even more pertinent to studies using the HSQ in conjunction with dark tetrad traits (see chapter 2), where high levels of certain traits, such as dishonesty or

lack of insight, may lead to inaccuracies (Lilienfeld & Fowler, 2006). This limitation should be highlighted by researchers using the HSQ.

Findings on concurrent validity suggest that the measure may encompass a smaller range of humour styles than the HBQD (Craig et al., 1993) and CSM (Ruch et al., 2018). For example, within the context of the four-factor model, it is challenging to pinpoint where 'dark humour' may be located, which has a suggested relationship to psychosocial wellbeing (Ostrower, 2014; Christopher, 2015). Researching more specific styles will require the use of scenarios or rating humour content, until development of more reliable and valid measures.

There has been one unpublished attempt at revising the HSQ, the Humor Styles Revised Questionnaire (HSRQ; Reff, 2006). This implemented a situation response style format, intended to better replicate real-life. The author tested a three-style approach, including 'positive humour', 'self-defeating humour' and 'aggressive humour', suggesting that the lines are blurred regarding the 'self vs. other' aspects of benign styles. However, the author acknowledges that this theory requires reliability and validity testing. Considering the findings in this critique, there may be more prominent issues to address in a revised measure.

Conclusion

Overall, the HSQ showed good reliability and validity. However, further refinements are required for use in certain countries. Studies focusing on the measure's psychometric properties have been conducted across a range of countries. However, considering the timeline since its initial development and

potential issues raised within this critique, more contemporary research may clarify any revisions required before further validation internationally.

Chapter Four: Primary Research Project

An investigation into the relationship between dark tetrad personality traits and
dark humour preference

Abstract

Dark humour makes amusement of disturbing or sinister subjects. It has been suggested as a coping strategy for distressing circumstances but can be problematic and has led to public criticism and, in more extreme cases, prosecution. To gain insight into potentially more harmful aspects of this humour style this study explores the relationship between dark tetrad (DTe) traits, including psychopathy, narcissism, Machiavellianism and sadism, and dark humour preference whilst controlling for core personality traits. Further to this, it examines whether dark humour preference is indicative of use. DTe and core personality traits were measured prior to participants watching dark and non-dark humour content, consisting of internet memes and video clips. Participants were asked to rate how funny and offensive they found each humour stimulus and whether they would share the content with a friend or publicly post it on social media. Regression analysis showed that Machiavellianism was the only DTe trait to positively predict dark humour preference whilst controlling for core personality traits. Correlational data showed that dark humour preference positively relates to sharing the humour content with a friend and posting it on social media (for those using social media more than once per month). As Machiavellianism was the only trait to relate to dark humour preference, it was suggested that this may relate to the cynical characteristics unique to this DTe construct. These findings may suggest a less malevolent intent driving dark humour preference or use, with this style appearing more closely related to a cynical outlook on life than other DTe characteristics. Implications of using this humour style are discussed, including potential harm to others who find it distressing.

Introduction

The relationship between dark tetrad (DTe) personality traits and humour styles using the Humor Styles Questionnaire (HSQ) was explored in chapter two. However, a critique of the measure recognised that it is not clear where more specific styles of humour, such as 'dark humour', might fit within these styles (see chapter 3). This chapter therefore explores the relationship between dark personality traits and dark humour, within the context of findings from chapter two. Remarkably, due to its popularity in the public domain, this genre has seldom been researched in the context of personality.

Dark humour

Dark humour, also known as dark comedy, black humour or gallows humour, is a genre of humour that Baldick (2001, p.36) defines as "*a kind of drama (or, by extension a non-dramatic work) in which disturbing or sinister subjects like death, disease, or warfare, are treated with bitter amusement, usually in a manner calculated to offend and shock*". Two models of humour in particular may explain enjoyment of this humour style. *Relief theory* postulates that humour can facilitate relief from a build-up of psychological tensions. Freud's (1905) theory on humour aligns with this model, suggesting that jokes can provide a temporary cathartic-type release of repressed urges. It is therefore hypothesised that the sinister nature of dark humour jokes may represent unconscious, and perhaps aggressive, urges that would usually be forbidden within society yet may be considered more appropriate in joke form. Another is the *benign violation theory* of humour (McGraw & Warren, 2010), which suggests that humour can occur when a threat

is posed that violates one's beliefs as to how the World should be, which may include moral, cultural or social norms, simultaneous to this threat seeming benign.

Dark humour is commonplace in the media, seen in movies, TV shows, stand-up comedy and even satirical news headlines, but can be considered inappropriate and problematic. The use of dark humour has often led individuals to be publicly criticised, and in some cases prosecuted. For example, one YouTube 'vlogger' was convicted of "inciting racial hatred" for posting a video of himself training a pug dog to act out Nazi salute (Khorsandi, 2018). A professional comedian also found himself on trial before a Human Rights Tribunal due to joking about a singer who suffers from Treacher Collins syndrome, a rare disease that causes facial disfigurement and deafness (Smith, 2021). Despite potentially adverse consequences, the genre of dark humour has gained huge popularity evidenced by the success of comedians such as Ricky Gervais, Frankie Boyle and Jimmy Carr. Seemingly, the public show subjective opinions in determining when such humour 'goes too far'. There appears to be a fine line between whether jokes are considered humorous or cruel, perhaps dependent whether the "amusement" aspect is clearly intended or perceived. One's perception of such humour is likely influenced by a combination of factors including personality characteristics, past experiences and context.

Humour is a highly complex and subjective concept, with dark humour carrying additional intrigue as, despite the potentially negative consequences mentioned previously, literature has also highlighted its role in helping individuals cope with distressing circumstances. For example, some holocaust survivors have accredited

their survival to finding humour in their situation and suggested that gallows humour was fundamental to upholding their morale (Ostrower, 2014). Literature has also suggested that dark humour may be an effective coping strategy for those working in stressful occupations (Christopher, 2015; van Wormer and Boes, 1997), although there are difficulties in evidencing direct causality. For example, paramedics have been suggested to show gradual acclimatisation to the use of dark humour throughout training. However, more students have recently entered the profession straight from university and have found this humour difficult to appreciate (Christopher, 2015), creating conflict between cohorts. Remarkably, at the time of writing this thesis, an increase in dark humour related to the COVID-19 pandemic is clearly obvious in society, potentially as a means of coping with such a difficult situation (Williams, 2020). The suggestion that dark humour can be used as a coping strategy is evident in literature; however, it remains a controversial topic due to its potential to cause harm or distress to others.

Literature Review

DTe traits and humour styles

As observed in chapter two's meta-analysis, several studies have explored the relationship between DTe traits and humour styles using the HSQ. Results found that psychopathy and Machiavellianism were related to more injurious humour styles (i.e. aggressive and self-defeating). However, narcissism positively correlated with all humour styles. Fewer studies were found for sadism and therefore this trait was not included in the meta-analysis; however, initial findings

suggest a positive relationship with the more injurious styles (Torres-Marín, Navarro-Carrillo & Carretero-Dios, 2022 - Study 1).

Despite an array of literature investigating the relationship between dark personality traits and the four-factor model of humour styles (Martin, Puhlik-Doris, Larsen, Gray & Weir, 2003), there is a stark absence of studies specifically examining dark humour. Although it may be perceived as an 'injurious' humour style, due to its morbid nature, we cannot be sure due to its potential positive effects on emotional coping (Christopher, 2015; van Wormer and Boes, 1997; Ostrower, 2014), with benign humour styles more often associated with psychological wellbeing (Martin et al., 2003). It is therefore difficult to predict how this style will relate to personality. One study exploring personality and dark humour preference found that a preference for dark humour positively correlated with extraversion and openness to experience and negatively correlated with neuroticism (Marwah & Chaturvedi, 2018). This positive relationship with the more sociable and creative personality dimensions was surprising and proposed that dark humour may not be comparable to other 'injurious' humour styles, which have been shown to relate to DTe traits (see chapter 2) and core personality traits deemed more problematic, including the negative pole of agreeableness and conscientiousness (i.e. more antagonistic and disinhibited traits) and neuroticism (Plessen et al., 2020). Marwah and Chaturvedi (2018) proposed that, as individuals with high extraversion focus on positive emotions, they may have the ability to enjoy dark humour without being repulsed by disturbing content. Openness to experience is related to education and intelligence, which has been associated with a preference for dark humour (Willinger et al., 2017). These findings, both based on the same definition of dark humour as the current study,

suggest that a preference for dark humour may differ to other humour styles typically perceived as 'negative'.

Rationale and research questions

The relationship between DTe personality traits and dark humour preference has not yet been explored. In fact, there is minimal research exploring the relationship between dark humour and personality in general, particularly studies that may provide insight into the more harmful aspects of this humour style. Considering the interpersonal conflict and legal consequences that can arise from using such humour, exploring whether there is a presence of higher malevolent personality traits in those who enjoy and/or use such humour may provide a basis for further research exploring the motives behind its use, particularly when it may have surpassed the general consensus of what is considered 'appropriate'. For example, do some individuals thrive on the potential harm this humour can cause or do others simply not perceive the distinction between amusement and cruelty? Alternatively, perhaps individuals use it to cope with those things most feared in life, without fully comprehending the effect it may have on perceivers. Relatively little is known about the personality traits of individuals that show a preference for and/or use dark humour and the current study aims to further explore this.

The current study attempts to address limitations identified in previous studies exploring DTe traits and humour styles in the following ways:

- Previous studies have largely presented participants with written material, limiting the application of results to modern society where humour is largely

experienced through visual or online media. The current study will utilise online video excerpts and internet 'memes' to increase relevance to modern society. Memes have become increasingly popular among the millennial generation and typically comprise of humorous text with images. A dark humour trend has emerged in the form of widespread internet memes, leading to concerns that frequent exposure may contribute to the desensitisation of violent or sensitive media (Sanchez, 2020), and/or cause distress to observers.

- Whereas previous research has solely focused on dark triad (DT) traits, the current study will incorporate sadism as a construct of the DTe. This trait, characterised by pleasure in the pain and suffering of others, has been found associated with schadenfreude (Schumpe & Lafrenière, 2016), in which individuals find humour in the misfortune of others. This bares certain similarities to dark humour and incorporating sadism into the current study may therefore provide valuable insight.

The study aims to address the following hypotheses:

- 1) Are DTe traits positively related to dark humour preference, whilst controlling for non-dark humour preference and core personality traits?
- 2) Is dark humour preference positively associated with a likelihood of use?

Method

Participants

The Online Surveys web-based questionnaire was advertised using opportunity sampling through social networks, social media platforms and Reddit communities. The questionnaire included three routing options, two obtaining data relevant to the current study (see Figure 2), with the remaining data used for study 2 (see chapter 5). Pseudo-randomisation was implemented to randomly allocate questionnaire routing, in which participants generated a random number from 1-3 on an embedded 'Integer Widget Wizard' from random.org, prior to selecting the corresponding questionnaire. Routings relevant to this study (1 and 3) gained a total sample of 323 participants. Those providing incorrect responses to 'test questions' ($n=5$) were removed from the data due to a risk of random responding. Data was also removed for those who experienced technical errors with video content ($n=2$) or had difficulty understanding content without subtitles ($n=4$), identified in the additional comments section following each stimulus and considered likely to bias the individual's experience of the humour content. A sample of 312 (164 females, 141 males, 7 other) remained, with mean age of 26.12 ($SD=0.54$), ranging from 18 to 66 years, and a mean of 5.58 ($SD=3.10$) years of education following aged 16. The sample identified as 80.4% White, 4.8% Hispanic or Latino, 1.3% Black or African American, 0.3% Native American or American Indian, 9.3% Asian or Pacific Islander and 3.8% as another ethnicity. With regards to which region participants had spent most time in during the last 10 years, 14.1% indicated United Kingdom, 21.5% Europe (other than UK), 53.5% USA/Canada, 0.3% Indian Subcontinent, 1.9% Middle East/Turkey/North Africa,

0.3% Africa, 2.9% Asia, 3.2% Australia/New Zealand and 2.2% South or Central America. This variable enabled control for regional context on humour preference. The recruited sample size fulfilled suggested requirements on G*Power which recommended a minimum of 86 participants (effect size=0.15, alpha=0.05, power=0.80) for regression analysis.

Design and procedure

In this study, participants were allocated to one of two questionnaires using pseudo-randomisation (see Figure 2). All participants were asked for demographic information and assessed for core personality traits and DTe traits. They were asked how often they re-post/share online content on social media, as a control variable. Participants then observed humour stimuli portraying non-dark and dark humour, rating how 'funny' and 'offensive' they found each stimulus, and whether they would share it with others. Questionnaire 1 presented participants with 'non-dark humour' and then 'dark humour' content, whereas questionnaire 2 reversed this, in an attempt to reduce order bias.

This study used a quantitative cross-sectional correlational design, with core and DTe personality traits as independent variables and dark humour 'funny' ratings as the outcome variable, whilst controlling for non-dark humour 'funny' ratings. A within-participants design was used in which all participants rated both dark humour and non-dark humour content.

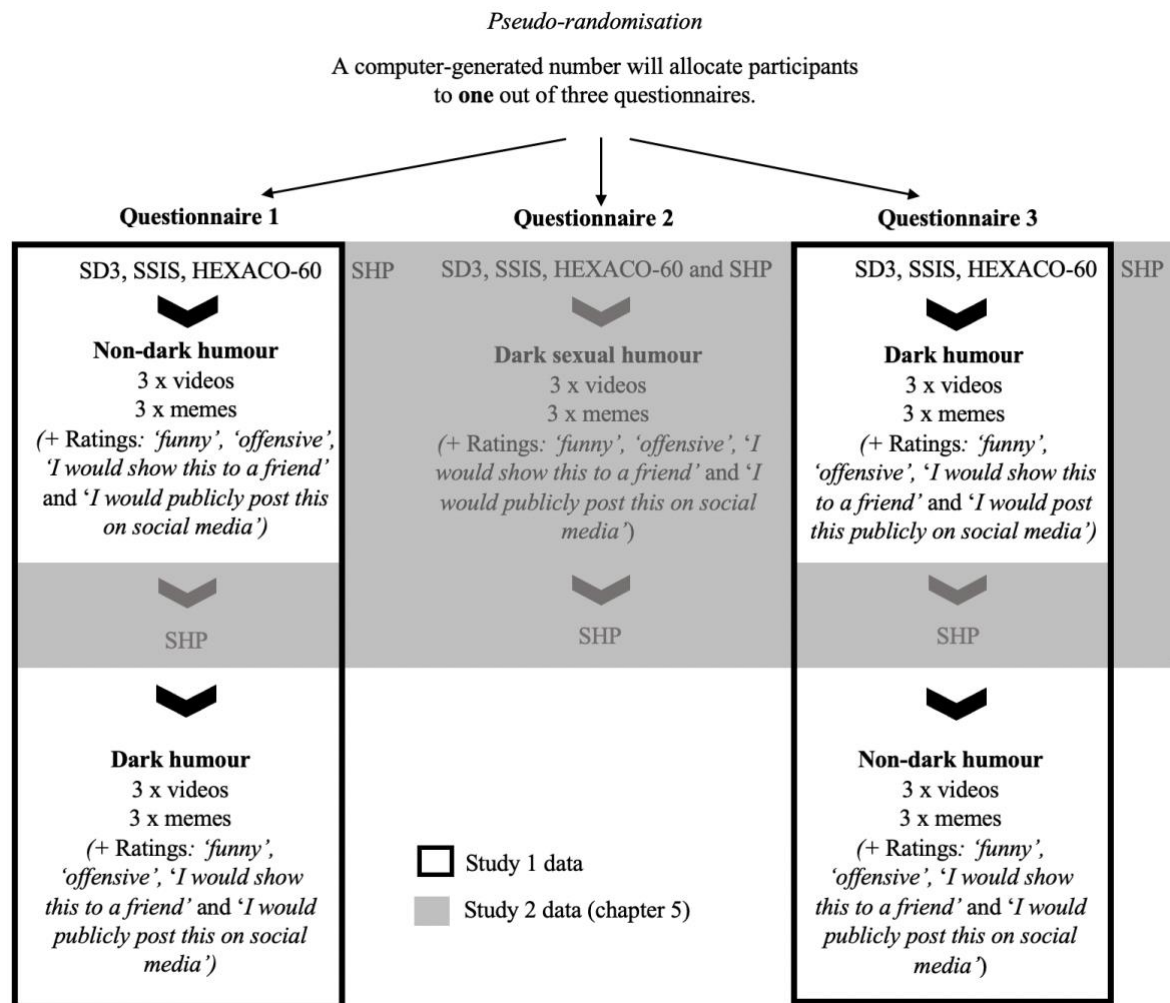


Figure 2. Questionnaire structure for primary research project

Measures

Dimensions of personality

The HEXACO-60 Personality Inventory (HEXACO-60; Ashton & Lee, 2009) is a 60-item self-report which measures six core dimensions of personality: Honesty-Humility, Emotionality, Extraversion, Agreeableness (versus Anger), Conscientiousness and Openness to Experience (scale provided in Appendix J). A series of statements were presented, e.g. "I rarely express my opinions in group

meetings” and measured using a 5-point Likert-type scale (1=Strongly Disagree, 5=Strongly Agree). The self-report form was used, which has previously shown internal consistency reliabilities in the .70s (Ashton & Lee, 2009). The HEXACO model of personality has also been found to best account for the core of DTe constructs (Book et al., 2016), so controlling for these core traits provided further insight as to whether DTe traits have a unique relationship with regard to dark humour preference.

The Dark Tetrad (DTe)

The DT was measured using the Short Dark Triad Scale (SD3; Jones & Paulhus, 2014), which is a 27-item measure with 9 items measuring each DT trait (see scale in Appendix K). For example, the narcissism scale contains items such as “I am likely to show off if I get the chance”. Participants responded on a 5-point Likert-type scale (1=Strongly Disagree, 5=Strongly Agree). The measure has been found to show convergent validity and reliability with alphas ranging from .71 to .80 (Jones & Paulhus, 2014). The SD3 has also been found to cover DT constructs in more breadth than other measures, with incremental validity tests suggesting that the SD3 on average explains 14% of the variance in the DT scales versus 3% for Jonason and Webster’s (2010) Dirty Dozen scale (Maples, Lamkin & Miller, 2014).

Sadism, as the fourth construct of the DTe, was measured using the Short Sadistic Impulse Scale (SSIS; O’Meara, Davies, & Hammond, 2011). The SSIS is a 10-item self-report inventory with a dichotomous scale (0=Unlike Me and 1=Like Me), which contains items such as “I enjoy seeing people hurt” (see scale in Appendix

L). The scale has been found to show good internal consistency (.80) and validity supported by positive correlations with DT traits (Dinić, Allred, Petrović & Wertag, 2020).

Social media activity

Participants were asked to rate the statement 'how often do you post/share content on social media platforms' on a 5-point Likert-type scale (1=Never to 5=At least daily), to control for social media use when assessing the likelihood to post on social media.

Humour stimuli

Due to an absence of research using such real-life methodology, no previous scales were identified containing such content. Humour preference can be incredibly subjective so, when selecting appropriate content for inclusion, a preliminary study was considered necessary to avoid researcher bias. See Appendix M for a full overview of the preliminary study and Appendix N for humour stimuli selected.

Participants were presented with six video clips and six internet memes, three of each representing 'non-dark' humour and three of each representing 'dark' humour. Participants were asked to rate the statements 'I found this funny' and 'I found this offensive' on a 5-point Likert-type scale (1=Strongly Disagree to 5=Strongly Agree) following each stimulus. Higher 'funny' ratings were considered to reflect humour preference, with 'the ability to find things funny' central to the

definition of humour (Cambridge University Press, 2022). 'Offensive' ratings were included as an aversive scale, to further examine the experience of dark humour. Participants were additionally asked to rate the statements 'I would show this to a friend' and 'I would publicly post this on social media' on a 5-point Likert-type scale (1=Strongly Disagree to 5=Strongly Agree), intended to measure their *use* of humour content, both interpersonally and via social media. Participants had the opportunity to provide additional comments following each stimulus.

Ethical Considerations

Ethical approval was gained through The University of Nottingham (see Appendix O). All participants provided informed consent, were given the right to withdraw from the study at any point and were provided with a debrief (see Appendix P). Participants were asked to enter a 7-digit number as identification and offered an opportunity to remove their data. Information regarding the potential adult nature of humour stimuli was provided prior to consent and participants were asked not to continue if they may feel distressed by such content. Participants confirmed they were aged 18 years or above and all humour content used was readily available online, ensuring that participants were not subjected to materials that they would be unlikely to encounter in mainstream media.

Data Analysis

Descriptive statistics, preliminary analyses and reliabilities

Online data were imported to SPSS. All psychometric scales were scored as per corresponding instructions. Means, standard deviations (SD) and reliability alphas of each scale were first assessed. Mean 'funny' and 'offensive' ratings for both humour genres were also explored. Each variable was assessed for normality and outliers. Bivariate correlational analyses then examined the relationship between variables. Pearson's correlation coefficient was used to examine all variables, aside from those showing non-normality or outliers, which were examined using Spearman's Rho correlation coefficient due to its robustness to such matters (Field, 2009).

Multiple regression measuring DTe traits as a predictor of dark humour preference

Prior to the main regression model, potential confounders were first assessed using General Linear Modelling (GLM). This included gender, age, education level, ethnicity and region of residence over the last 10 years; all factors considered to potentially affect humour preference. Ethnicity was collapsed into four groups: 'White', 'Hispanic or Latino', 'Asian or Pacific Islander' and 'Other', with low numbers in the 'Native American or American Indian' and 'Black or African American' being categorised as 'Other' for the purpose of statistical power. Region was also collapsed into six groups: 'UK', 'Europe (other than UK)', 'USA and Canada', 'Australia and New Zealand', 'South and Central America' and 'Other', with low numbers in 'Indian Subcontinent', 'Middle East, Turkey and North Africa,

'Africa' and 'Asia' categorised as 'Other'. Variables showing a change in estimate >10% were considered confounding, as recommended for best performance of the 'change in estimate' strategy (Maldonado & Greenland, 1993). A main regression model was then tested to assess the incremental contribution of DTe traits in predicting dark humour preference. Non-dark humour 'funny' ratings and demographic data were added in the first step, alongside non-dark humour 'funny' ratings to examine *preference* of dark humour over non-dark humour ratings, HEXACO personality traits were introduced in the next step and DTe traits in the final step.

Correlational exploration between 'funny' ratings and use

Correlation analyses were conducted to examine the relationship between dark humour 'funny' ratings and use. Pearson's correlation coefficient was used to examine the relationship between dark humour 'funny' ratings and 'show to a friend'. Spearman's Rho was used when examining the relationship between dark humour 'funny' ratings and 'post on social media', due to the positive skew observed in the latter variable, and only included participants stating that they used social media once a month or more ($n=140$), as regularity of use was considered a potential confounding variable. This threshold was used to indicate 'regular' use, as it is suggested that users aged 18+ share content on average once a month on one of the most frequently used social media platforms (Data Reportal, 2021).

Missing data

There were 8 missing data points (97.5% of the sample had complete data). All missing data points occurred in the following SD3 domains: Machiavellianism ($n=2$), psychopathy ($n=4$) and narcissism ($n=2$) due to non-mandatory responses in these domains. Missing data appeared to be randomly scattered across these domains with only one data point missing for each participant. Pairwise deletion was used for bivariate correlation and listwise deletion for regression analysis. The remaining sample size ($n=304$) for the regression analysis was deemed sufficient to maintain power according to earlier G*Power calculations, which further supported the suitability of listwise deletion (Kang, 2013).

Results

Preliminary analysis and reliabilities

Means, SDs and reliability coefficients of each scale are presented in Table 16. Psychometric scales showed 'acceptable' reliability ($\alpha > .7$), aside from psychopathy which was observed to be borderline 'questionable'. The removal of item 8 ('I enjoy having sex with people I hardly know'), which showed a low item-total correlation (.22), marginally improved psychopathy scale reliability from $\alpha = .69$ to $\alpha = .70$; considered 'acceptable'. Descriptive statistics for non-dark and dark humour ratings can be seen in Table 17.

Table 16. Means, SDs and reliabilities for measured variables.

Scale	<i>n</i>	M	SD	α
Honesty-Humility	312	34.43	6.73	.77
Emotionality	312	32.70	7.19	.80
Extraversion	312	27.66	7.61	.83
Agreeableness	312	31.29	6.67	.79
Conscientiousness	312	34.43	6.06	.75
Openness	312	38.17	6.37	.77
Machiavellianism	310	3.00	0.67	.80
Narcissism	310	2.36	0.64	.74
Psychopathy (minus item 8)	308	2.11	0.59	.70
Sadism*	312	1.55	1.80	.71

*Note that sadism scores are

Table 17. Descriptive statistics for humour stimuli ratings (*n*=312)

Humour genre	Ratings	Mean (SD)	Minimum	Maximum
Dark Humour	Funny	19.62 (4.67)	6	30
	Offensive	12.08 (4.47)	6	25
	Show to a friend	14.16 (5.71)	6	29
	Post on social media	9.21 (3.75)	6	25
Non-dark humour	Funny	18.27 (4.27)	7	30
	Offensive	7.21 (1.96)	6	17
	Show to a friend	13.12 (4.92)	6	28
	Post on social media	9.66 (4.29)	6	27

Data were assessed for normality and outliers. The sadism domain within the SD3, humour genre 'offensive' ratings, and 'post on social media' ratings all showed a positive skew. All other variables appeared to show normality. Z-scores were examined in all variables of interest to assess for univariate outliers using a threshold of $SD \pm > 3.29$ for extreme outliers (Field, 2009). Outliers were found

to be present in openness to experience ($n=2$) and sadism ($n=5$) but believed to be true results on examination. Both outliers and non-normality in sadism have frequently been observed in research on non-clinical samples; thought to be due to such traits being uncommon in the general population (Meere & Egan, 2017; O'Meara et al., 2011).

Results of bivariate correlation analysis using Pearson's correlation coefficient (r) and Spearman's Rho correlation coefficient (ρ) can be seen in Table 18. All DTe traits were positively correlated. Dark humour 'funny' ratings showed a positive correlation with Machiavellianism, a weak but significant negative correlation with honesty-humility, a negative relationship with emotionality and a negative correlation with dark humour 'offensive' ratings. Dark humour 'offensive' ratings showed a positive correlation with emotionality, a positive but weak correlation with openness to experience and a negative but weak correlation with Machiavellianism. With regards to non-dark 'funny' ratings, extraversion and conscientiousness showed a positive but weak correlation. No DTe traits showed a significant positive correlation with non-dark humour 'funny' ratings, yet sadism showed a negative correlation. Non-dark 'funny' ratings positively correlated with dark humour 'offensive' ratings.

Table 18. Correlational analysis between study variables.

	1	2	3	4	5	6 (ρ)	7	8	9	10 (ρ)	11	12	13 (ρ)
HEXACO													
1. HH	1.00												
2. EM	.04	1.00											
3. EX	-.11	-.18*	1.00										
4. AG	.25**	-.07	.09	1.00									
5. CO	.19**	.02	.14*	.10	1.00								
6. OE (ρ)	.08	.11	.18**	.02	.14*	1.00							
DARK TETRAD TRAITS													
7. MAC	-.55**	-.17**	.003	-.23**	-.16*	-.09	1.00						
8. NAR	-.41**	-.09	.62**	-.13*	-.002	.20**	.30**	1.00					
9. PSY	-.41**	-.22**	.05	-.45**	-.31**	-.07	.47**	.33**	1.00				
10. SAD (ρ)	-.28**	-.06	-.05	-.27**	-.19**	-.10	.44**	.25**	.42**	1.00			
HUMOUR RATINGS													
11. ND_F	.03	.07	.11*	.06	.13*	.06	.07	.03	-.06	-.18**	1.00		
12. D_F	-.13*	-.17**	.05	-.06	-.02	.04	.30**	.08	.12*	.09	.34**	1.00	
13. D_O (ρ)	.05	.19**	.09	.05	.03	.13*	-.14*	.08	-.01	-.06	.16**	-.24**	1.00

$n=312$ excluding those which incorporate DT traits, MAC $n=310$, NAR $n=310$, PSY $n=308$. Spearman's Rho correlation indicated by (ρ); all other variables used Pearson's correlation. **HH**= honesty-humility, **EM**= emotionality, **EX**= extraversion, **AG**=agreeableness, **CO**= conscientiousness, **OE**= openness to experience, **MAC**= Machiavellianism, **NAR**= narcissism, **PSY**= psychopathy, **SAD**= sadism, **ND_F**= non-dark humour 'funny' ratings, **D_F**=dark humour 'funny' ratings, **D_O**= dark humour 'offensive' ratings, * $p<.05$, ** $p<.01$, *** $p<.001$ (2-tailed).

Multiple regression measuring DTe traits as a predictor of dark humour preference

When examining for confounding variables using General Linear Modelling (GLM), gender was found to influence both psychopathy and sadism as predictors of dark humour 'funny' ratings. A further one-way ANOVA test found a significant difference between dark humour 'funny' ratings in females ($n=161$, $M=18.99$, $SD=4.86$), males ($n=136$, $M=20.63$, $SD=4.18$) and other ($n=7$, $M=17$, $SD=3.11$) gender groups, $F(2,301)=6.10$, $p=.003$. Bonferroni Post Hoc tests showed that male participants showed significantly higher dark humour 'funny' ratings than females ($p=.006$). No significant difference was observed between 'male' and 'female' versus 'other'. Gender was dummy-coded prior to being entered as a confounder in the regression model (see below), in conjunction with age and education as *a priori* variables. Education was included due to its suggested role in dark humour preference (Willinger et al., 2017).

A blocked multiple regression analysis examined the incremental difference in variance explained by DTe traits whilst controlling for core personality traits. All regression assumptions were met, including multicollinearity, with correlations between variables all below 0.7 (see Table 18) and collinearity statistics considered acceptable, with tolerances ($>.1$) ranging from .42 (DT narcissism) to .98 (gender 'other vs. female') and the variance inflation factor (VIF; <10) ranging from 1.03 (gender 'other vs. female') to 2.39 (DT narcissism). A preliminary model predicting dark humour 'funny' ratings from non-dark humour 'funny' ratings, demographic variables (age and gender) and core personality traits was significant, $R=.47$ (adjusted $R^2=.19$), $F(11, 292)=7.46$, $p=<.001$. The full model adding DTe personality traits was also significant $R=.51$ (adjusted $R^2=.22$), $F(15,$

288)=6.56, $p<.001$, with a significant increase in variance explained, $F(4, 288)=3.43$, $p=.009$. Both standardised and unstandardised beta coefficients for the full model are shown in Table 19. Five variables independently predicted dark humour 'funny' ratings. Non-dark humour 'funny' ratings and gender (male vs. female) positively predicted dark humour 'funny' ratings. With regards to HEXACO domains, emotionality was found to be a negative predictor and openness to experience a positive. Machiavellianism was the only DTe trait to significantly predict dark humour 'funny' ratings whilst controlling for all other variables, showing a positive relationship.

Table 19. *Multiple regression model (step 3) predicting dark humour 'funny' ratings from demographics and non-dark humour 'funny' ratings, core personality traits and DTe traits (n=304).*

Scale	Unstandardised Beta (SE)	Standardised Beta	p	95% Confidence Interval for B	
				Lower bound	Upper bound
Non-dark humour 'funny'	.41 (.06)	.37	<.001***	.288	.527
Age	-.06 (.03)	-.11	.083	-.118	.000
Gender (Male vs. Female)	1.49 (.51)	.16	.004**	.475	2.506
Gender (Other vs. Female)	-1.81 (1.61)	-.06	.261	-4.987	1.359
Education level	-.03 (.08)	-.02	.730	-.193	.136
Honesty-humility	-.02 (.05)	-.02	.715	-.106	.073
Emotionality	-.11 (.04)	-.18	.003**	-.185	-.040
Extraversion	.02 (.05)	.03	.721	-.072	.104
Agreeableness	-.05 (.04)	-.07	.222	-.132	.031
Conscientiousness	-.01 (.04)	-.02	.766	-.097	.071
Openness	.09 (.04)	.13	.021*	.014	.172
Machiavellianism	1.53 (.47)	.22	.001**	.601	2.449
Narcissism	-.48 (.57)	-.07	.400	-1.589	.636
Psychopathy	-.65 (.57)	-.08	.255	-1.757	.468
Sadism	.16 (.17)	.06	.328	-.164	.489

Note. * $p<.05$, ** $p<.01$, *** $p<.001$.

Regression analysis was repeated, following the listwise deletion of 7 univariate outliers and no change in significance was found.

Correlational exploration between 'funny' ratings and use

'I would show this to a friend'

Within the full sample ($n=312$), examination using Pearson's correlation coefficient (r) showed that dark humour 'funny' ratings were positively correlated with 'sharing with a friend', $r(312)=0.75$, $p<0.001$, and dark humour 'offensive' ratings were negatively correlated with 'sharing with a friend', $r(312)=-0.15$, $p=.007$.

'I would post this on social media'

Within a reduced sample ($n=142$), including only participants who reported sharing on social media more than once a month, Spearman's Rho correlation coefficient (ρ) showed a positive correlation between dark humour 'funny' ratings and 'sharing on social media', $\rho(142)=0.55$, $p<0.001$. Dark humour 'offensive' ratings showed no significant relationship to 'sharing on social media'. An overall positive relationship was found between 'sharing with a friend' and 'sharing on social media', $\rho(142)=0.66$, $p<0.001$ in this reduced sample.

Discussion

The primary aim of this study was to explore the relationship between DTe traits and dark humour preference, whilst accounting for core personality traits. Machiavellianism was the only DTe trait to positively predict dark humour preference. This might lead us to hypothesise that enjoyment or use of such

humour may be influenced by the cynical characteristics distinct to this personality construct. Had the preference for such humour been more closely related to self-interest/entitlement or manipulative traits, we may expect to have seen a positive relationship with other DTe traits, e.g. narcissism or psychopathy.

Further observations regarding core traits showed emotionality as a negative predictor and openness as a positive, albeit slightly weaker, predictor of dark humour preference. Emotionality's negative relationship with dark humour preference shares similarities with Marwah and Chaturvedi's (2018) findings, in that those who have an intense experience of emotions may find the content of dark humour disturbing. If those who experience emotion intensely (i.e. high levels of neuroticism or emotionality) may be too distressed by the disturbing content of dark humour to find it amusing, then perhaps a highly cynical individual who sees or expects the worst in others may be less distressed by the amusement of disturbing behaviours or situations. The positive relationship between openness and dark humour preference also supports Marwah and Chaturvedi's (2018) findings, suggesting that this may be due to openness to experience relating to higher intelligence levels. However, in the current study, openness was observed to be a positive predictor whilst controlling for education level which, although not a direct measure of intelligence, may indicate that other characteristics distinct to openness, e.g. creativity and divergent thinking, may contribute to dark humour preference. It could be hypothesised that a certain extent of divergent thinking may be required to make amusement from a topic that more rigid thinkers may categorise as distressing. Extraversion was found to have no relationship with dark humour preference in the current study, a personality trait which has shown inconsistent findings in relation to its role in humour use in general (Howrigan &

MacDonald, 2008; Nusbaum, Silvia, & Beaty, 2017). If dark humour preference does relate to more cynical traits, then it may be possible that the conflicting optimistic nature of extroverts may not find as much amusement in this genre of humour.

When comparing these findings to those observed between DTe traits and the four-factor model of humour styles (see chapter 2), the relationship between Machiavellian traits and dark humour may initially suggest that dark humour may correspond to more injurious humour styles (i.e. self-defeating or aggressive), which have been found to relate to this DTe construct. However, the positive relationship with openness and negative relationship with emotionality more closely fit with Martin and colleagues' (2003) description of self-enhancing humour; a style proposed to help individuals cope with distressing situations (Kuiper, Martin & Olinger, 1993). This suggests a certain uniqueness to dark humour, in that it appears to relate to both Machiavellian traits and characteristics related to coping humour.

The secondary aim of this study was to explore whether dark humour preference is associated with the likelihood of dark humour use, with the latter being more directly related to causing others potential harm and distress. Correlations suggest a positive relationship between preference and use, both in the form of sharing with a friend or on social media (for those who reported using social media more than once a month). Although a negative relationship was observed between humour offensiveness ratings and sharing with a friend, this did not extend to sharing content online. This could suggest less willingness to share humour content perceived as potentially more offensive with friends, perhaps due to fear

of reproach within meaningful relationships. This area requires further exploration, for example, it may be beneficial for future studies to distinguish between sharing with a friend in person or online to assess whether interpersonal distance may influence willingness to share dark jokes at the more offensive end of the spectrum, and whether this is dependent on personality. It may also be interesting for future research to include an anonymous online scenario, where there is no risk of reproach.

Limitations

To control for experimenter bias when selecting humour content, the preliminary study identified humour deemed funny and representative of the intended genre by a community sample. However, participants were routed to rate different genres based on their self-report preference and, as more females selected non-dark humour as their preference than males, the non-dark humour content used may be biased towards a female opinion of what constitutes 'funny'. Further research focusing on gender differences may be beneficial.

A further limitation is the difficulty in controlling for extraneous variables when using existing humour content. For example, the presence of laughter in video clips (Cai, Chen, White & Scott, 2019), the characteristics and demographics of the joke teller or receiver (Strain, Saucier & Martens, 2015; Coolidge, 2020) and whether the observer has seen the humour content previously or enjoys a TV show it's taken from, may all influence 'funny' ratings. Unfortunately, when aiming to include humour content representative of real-life exposure in modern society, controlling for all potentially influencing variables is not a possibility. For example,

new humour content could be created for the purpose of research with unknown individuals performing jokes not previously experienced by participants, allowing better control of extraneous variables. However, this would not be truly representative of one's experience of humour in modern society, as it disregards the suggested priming effect that individuals experience when expecting a known comedian to be funny (Johnson & Mistry, 2013). Although it is recognised that future research could control for some additional variables, e.g. joke teller's gender, to gain further clarity on the true effect between personality traits and humour preference. Due to the cross-sectional nature of this research, it is also pertinent to note that findings are based on correlational relationships and cannot evidence direct causality, yet these findings provide a basis on which to further explore aspects of the dark humour experience.

The extremity of dark humour content also needs to be considered. For ethical reasons, only dark humour content from mainstream media was used, not exposing participants to extreme content that they may not otherwise experience, e.g. from the dark web. It is possible that a different relationship may be observed between DTe traits and dark humour at the more extreme end of the spectrum. However, this raises further questions as to where the threshold between amusement and cruelty lies. In the future, it may be interesting to study a wider spectrum of content, with careful considerations around the ethics of such.

The low sample variance on dark tetrad measures, particularly sadism and psychopathy, is a further limitation. The limited prevalence of these traits in a non-clinical population may have impacted on the statistical power of the study and increased the risk of a type II error, in which results could fail to detect an

effect which exists between those with dark tetrad traits and dark humour preference. Although it can be challenging to identify samples high in these traits, it may be beneficial to use more purposeful sampling methods in future research.

One further limitation is the use of self-report measures, the validity of which has been questioned due to issues such as potential response bias (Van de Mortel, 2008). This study explores DTe traits, which include characteristics such as dishonesty or lack of insight which may perpetuate an individual's likelihood of being less open or accurate in their responses (Lilienfeld & Fowler, 2006). Research including observer ratings, e.g. assessing how much dark humour a participant uses, may complement future research. Although, one advantage of a self-report online study is that participants can rate and react to dark humour content with anonymity and no risk of interpersonal judgement.

Implications and future directions

Dark humour is suggested to be a coping strategy for distressing situations (Ostrower, 2014; Christopher, 2015) but can also cause conflict. These findings help us to further explore the personality traits driving the preference and use of such humour. Machiavellian traits can certainly be problematic but, the lack of association between other DTe traits and dark humour preference may indicate that it is less pathognomonic and perhaps more aligned with a cynical perspective on life. However, this is an initial hypothesis and requires further exploration. The lack of association between other DTe traits and dark humour preference may be reassuring, considering the frequent use of such humour in 'caring' occupations, e.g. paramedic or social worker (Christopher, 2015; Van Wormer & Boes, 1997).

It may indicate that its use is less motivated by traits such as a lack of empathy or gaining pleasure in the distress of others. Staff in such occupations are generally exposed to distressing events and may therefore be more likely to rely on dark humour as a coping strategy. However, if dark humour is deemed distressing by others, particularly those who experience emotions more intensely, then this requires appropriate management in occupations and contexts where its use has become habitual. It may be beneficial to further explore the origins of dark humour preference, particularly within an occupational context. Are those with personality traits related to dark humour preference, e.g. low emotionality, more likely to go into jobs that use dark humour as a coping strategy, e.g. occupations comprising of distressing situations? Or alternatively, do such roles alter one's outlook on life to the extent that dark humour becomes more amusing, or does preference for dark humour simply increase due to repeated exposure?

These findings have a direct application to forensic settings. Firstly, it provides staff with awareness of the subjectivity of dark humour. Briggs and Owen (2022) identified that humour within the therapist-patient relationship can be a 'minefield' and the use of gallows humour requires careful navigation, such as the therapist not initiating but perhaps welcoming such humour if the client requires this to lighten the mood. Considering that those with heightened emotions may be more averse to such humour, any initiation of dark humour by the therapist could be perceived as insensitive and potentially distressing, particularly to those experiencing a decline in their mental health. With regards to dark humour use among staff, potential coping benefits need to be balanced against the potential harm this humour style may cause to some staff. The suggestion that dark humour preference may be related to cynical traits is a further consideration in forensic

settings. Cynicism, although perhaps perceived as less interpersonally harmful than some other DTe traits, e.g. pathological lying, could have a damaging effect on the milieu of a ward or wing, where a belief in positive change is central to the staff's work. Cynicism has also been suggested by nurses to be a weakness when working with individuals diagnosed with personality disorder, potentially indicative of counter-transferential responses to challenges when working with this population (Bowen & Mason, 2012). A causal direction has not been established, and it is therefore possible that dark humour use in forensic settings could perpetuate a cynical mentality in staff. Further research in forensic settings is required.

The current findings question whether, in extreme cases, individuals should be prosecuted for use of such humour. If driven by a cynical outlook and used as a potentially helpful way of coping with difficult situations, this may suggest less harmful intent. Further to this, if those with low neuroticism are not personally distressed by such humour and experience the amusement aspect more intensely, they may not understand why it can be so distressing to others. This does not excuse such behaviour but may explain why there appears to be such inconsistency in what is considered acceptable. Although these initial findings suggest less malevolent intent, within the context of DTe traits, further examination regarding different extremities of dark humour and its relationship with other potentially hostile traits is required for a more comprehensive understanding.

Chapter Five: Secondary Research Project

An experimental study examining the effect of sexual offence-related dark humour exposure on sexual harassment proclivity within the context of dark tetrad personality traits

Abstract

Sexual harassment can violate one's dignity, create an intimidating and hostile environment, and encompasses a continuum of behaviours in which the most severe meet the legal equivalent of rape. This offence type is largely enmeshed with the use of humour, with indecent jokes constituting sexual harassment behaviour, and the label of 'joke' or 'banter' often used in an attempt to justify such actions. Prior research has found dark tetrad traits, including psychopathy, narcissism, Machiavellianism and sadism, to relate to sexual aggression. The observation of sexist jokes has also been suggested to lead to proclivity for sexual aggression, e.g. rape, particularly in those who may already be predisposed to such. However, there is limited research combining the above factors and exploring the effects of humour exposure on sexual harassment proclivity. The current study examines the following three research questions. Do dark tetrad traits relate to sexual harassment proclivity, does exposure to dark sexual humour (i.e. humour suggestive of sexual harassment or assault) increase sexual harassment proclivity across genders, and do a high level of dark tetrad traits relate to increased sexual harassment proclivity following exposure to dark sexual humour? Dark tetrad and core personality traits were measured prior to participants being randomly allocated to dark, non-dark or dark sexual humour exposure groups, consisting of internet memes and video clips. Participants ($N=483$) were asked to observe each humour stimulus and rate how funny and offensive they found each. They completed a measure of sexual harassment proclivity pre- and post-humour stimuli. Results showed that psychopathy, narcissism and Machiavellianism positively related to sexual harassment proclivity pre-humour stimuli, with no significant relationship observed for sadism. Sexual

harassment proclivity was found to decrease following exposure to all humour genres, with no significant difference observed between the three groups, and higher sexual harassment proclivity observed in males compared to females both pre- and post- exposure. In those exposed to dark sexual humour, narcissism was the only dark tetrad trait to show significantly reduced sexual harassment proclivity post-humour exposure. Findings suggest that humour in general, regardless of genre, may decrease sexual harassment proclivity, and this decrease may be most prominent in those with more narcissistic traits. These initial findings suggest that exposure to humour suggestive of sexual harassment or assault may not increase the observer's proclivity to act out comparable behaviours. However, as an under-researched area, further research is recommended to explore the influence of humour on other antisocial behaviours, particularly with those showing a predisposition to such.

Introduction

Further to chapter four, which examined the relationship between Dark Tetrad (DTe) personality traits and dark humour preference, the current research study aims to explore the effect of observing such humour on behaviour; specifically, whether dark humour suggestive of sexual harassment or assault can affect proclivity for sexual harassment in those with high DTe traits.

Sexual harassment

Sexual harassment is defined as *'unwanted conduct of a sexual nature, which is intended to, or has the effect of, violating someone's dignity or creating an intimidating, hostile, degrading, humiliating or offensive environment for them'* (Equality and Human Rights Commission, 2018). The term encompasses a continuum of behaviours in which the most severe constitute the legal equivalent of rape (Quina, 1996). A poll conducted by the Trades Union Congress (TUC, 2016) found that 52% of women had experienced some form of sexual harassment including indecent jokes or remarks, circulation of pornography and in some cases penetrative sexual assault. The poll also found that women feared making complaints about sexual harassment might be perceived as an inability to "take a joke" (TUC, 2016). Although women are suggested to be almost three times more likely to be a victim of sexual harassment (Eurofound, 2012), it is important to acknowledge male victimisation. The 2017 '#MeToo' movement advocated for victims of sexual harassment or abuse to speak out and, encouragingly, a US survey found that between 2016 and 2018 reports of sexual coercion had fallen

from 25% to 16% (Johnson, Keplinger, Kirk & Barnes, 2019). However, such behaviour remains prevalent and further progress is required.

Humour is closely interrelated with sexual harassment, with inappropriate jokes considered a form of sexual harassment and labels such as 'joking' or 'banter' used to justify such (Page, Pina & Giner-Sorolla, 2015). Jokes about sexual harassment and/or sexual assault are prevalent in the media and often minimise the seriousness of sexual assault by not labelling them as an offence or portraying consequences (Halffield, 2017). Rape jokes are common within the genre of dark humour. For example, in 2012 a female audience member disapproved of a rape joke told by a well-known US comedian, stating "rape jokes are never funny", to which he responded, "*wouldn't it be funny if that girl got raped by like five guys right now?*" (Solnit, 2015); which unsurprisingly attracted huge public criticism.

What motivates sexual harassment behaviour?

There are different perspectives when attempting to understand sexual harassment. The biological model proposes that males have a disposition to mate and reproduce, presenting as sexual harassment when females are uninterested in their advances (Diehl, Rees, & Bohner, 2018). The socio-cultural gender perspective instead suggests that it's a consequence of the current social context in which males may feel a need to demonstrate masculinity and dominance and view females as 'sexual objects' (Galdi, Maass & Cadinu, 2014), particularly in the presence of other males (Mikorski & Szymanski, 2017). The vulnerable victim hypothesis suggests that victims of sexual harassment are often low in power and social status (McLaughlin, Uggen & Blackstone, 2012), recognising that females

may more likely be victims due to their perceived vulnerabilities compared to males. The power threat meaning model also suggests that females who threaten the status quo, i.e. powerful females, may more likely be targeted for males to assert and maintain dominance (Berdahl, 2007). Many of these theories attempt to understand male perpetration; however, it is not implausible that similar dynamics may be relevant to female perpetration with an increasing power balance between genders in some societies. A more detailed overview of these theories can be found in Burn's (2019) paper.

The influence of media content on behaviour

An ongoing debate exists regarding the effect of media content on one's proclivity to perpetrate antisocial acts, with inconsistent findings largely being attributed to difficulty defining causality and methodological restrictions, such as limited control over extraneous variables, or studies being laboratory-based and not true to real-life experiences (Savage, 2004; Coyne, 2007). However, a meta-analysis by Bushman and Huesmann (2006) found greater short-term effects of media violence on aggression in adults compared to children; with authors suggesting that a predisposition for such behaviour (i.e. existing aggression scripts) may heighten the response.

Regarding sexual media content, a positive relationship has been found between violent X-rated media content and sexual violence (Ybarra & Mitchell, 2013). The effects of pornography on sexual violence causes much debate, with specialists concluding that, although it appears that pornography does not increase sexual violence in most men, frequent use may activate and reinforce sexually coercive

tendencies (Malamuth, Addison & Koss, 2000) and acceptance of violence against women in those predisposed to such (Malamuth, Hald & Koss, 2012). Others suggest that an observed inverse relationship between increased accessibility to pornography and a decline in recorded incidents of rape may suggest a release in which one “gets it out of their system” rather than needing to act on it, or perhaps a de-mystification of sex (D’Amato, 2006). However, a decline in Police reports does not necessarily confirm lower incidence, as numerous other factors may contribute to this. A retrospective study found that males convicted of rape reported lower levels of adolescent exposure to pornography than controls (Goldstein, Kant, Judd, Rice & Green, 1971), which may further question pornography use increasing sexual aggression.

Humour and propensity for sexual aggression

Past research has examined the effects of sexual humour on behaviour. Ford, Wenzel and Lorion (2001) found that males with high hostile sexism showed increased tolerance of sexist events (e.g. sexual harassment) following exposure to sexist humour, in comparison to non-humorous sexist communication or neutral humour. This corresponds to previous findings that certain predispositions may determine effects of media exposure on behaviour. Ford and Ferguson (2004) suggested a ‘prejudiced norm theory’ in which exposure to sexist humour creates a nonserious mindset, decreasing the need to criticise and increasing personal tolerance of discrimination towards the targeted group. They use the term ‘disparagement humour’ to encompass humour that denigrates, belittles or maligns an individual or social group (e.g., Janes & Olson, 2000; Zillmann, 1983), and suggest that reaction to such humour may be dependent on a person’s initial

levels of prejudice. Findings by Thomae and Viki (2013) may further this theory, in that men with high hostile sexism exposed to sexist jokes, compared to non-sexist jokes, reported higher levels of rape proclivity than those with low hostile sexism. Romero-Sánchez, Durán, Carretero-Dios, Megías and Moya (2010) replicated these findings but found this association only present when aversiveness to humour was low. Romero-Sánchez, Carretero-Dios, Megias, Moya and Ford (2017) presented moderately and highly violent rape scenarios to men following exposure to sexist jokes. They found that males with high hostile sexism showed a higher self-reported willingness to rape a woman following exposure to jokes, particularly when delivered by a female. This effect was only observed in the moderately violent rape scenarios and not the highly violent. This led to the suggestion that participants may have been less likely to rely on rape myths in a highly violent scenario, where there was more clearly a 'right' way to answer, as opposed to a more ambiguous moderately violent description in which they may be led by prejudice norms (Bohner, Eyssel, Pina, Siebler & Viki, 2009). Contrary to previous findings, Rogers (2018) found that observation of videos showing sexist jokes, compared to non-sexist jokes, had no significant short-term effect on sexual harassment attitudes in both males and females.

The dark tetrad (DTe) and sexual aggression

As discussed previously, DTe are four closely inter-related personality traits, consisting of the dark triad (DT) (psychopathy, narcissism and Machiavellianism) plus sadism, which is believed to act in similar way to dark triad traits (Buckels, Jones & Paulhus, 2013; Book et al., 2016). High DT traits have been related to exploitative short-term mating strategies, particularly in those with high

psychopathy (Jonason, Webster & Schmitt, 2009; Jonason, Valentine, Li & Harbeson, 2011), exploitative mating behaviours, rape-enabling attitudes and sexual coaxing (Jonason, Girgis, & Milne-Home, 2017; Jones & Olderbak, 2014). Narcissism and psychopathy have specifically been found to be associated with sexual coercion (Bushman, Bonacci, van Dijk, & Baumeister, 2003; Jones & Olderbak, 2014) and, although less researched in the context of sexual harassment, research has found an association between sadism and sexual offences (Marshall & Kennedy, 2003).

Considering the overlap suggested between perpetrators of sexual aggression and sexual harassment behaviours (Pryor, 1987) it is unsurprising that Zeigler-Hill, Besser, Morag and Campbell (2016) found that DT traits each showed a unique positive relationship with proclivities for sexual harassment behaviour in a study of both genders using the Sexual Harassment Proclivities Scale (Bartling & Eisenman, 1993). All three DT traits were positively associated with sexual harassment proclivity for men, but in women only psychopathy and Machiavellianism indicated significant results. Although still significant, lower correlation coefficients were seen between narcissism and sexual harassment proclivity in men compared to psychopathy and Machiavellianism. Zeigler-Hill and colleagues (2016) suggested that this relationship may be more complex, perhaps due to narcissistic men only resorting to sexual harassment when initial attempts to seduce a woman are denied, in an egoistic attempt to avoid rejection (Baumeister, Catanese & Wallace, 2002).

Overall, past findings suggest that sexist humour may increase proclivity for sexual aggression, particularly in those predisposed to such behaviour, and that

individuals with high DTe traits may be more inclined to engage in sexually aggressive behaviour. However, there is limited research exploring the effect of media content on the relationship between DTe traits and sexual aggression. One exception is a recent study by Lyons, Rowe, Waddington and Brewer (2022), examining the effect of sexist tweets on rape cognitions. They found that psychopathy positively predicted all outcomes, including rape-supportive attitudes, victim blame and hostile masculinity and narcissism positively predicted rape-supportive attitudes. Although those with high DT traits found sexist tweets to be more acceptable and humorous, observation did not increase outcomes. In fact, there was no significant change observed in all participants, irrelevant of DT traits, contradicting the suggestion that sexually objectifying media can increase hostile sexism and tolerance of sexual violence (LaCroix, Burrows & Blanton, 2018; Ward, 2016). Despite this study using non-humorous sexist content, those with high DT traits perceived stimuli as humorous, so this may offer insight into the influence of humour on sexual aggression in such individuals.

Rationale and research question

This study explores whether those with high DTe traits show increased proclivity towards sexual harassment behaviour following exposure to dark humour suggestive of sexual harassment or assault (defined as 'dark sexual humour' for the purposes of the current study). Previous studies have focused on sexist humour, considered 'a form of disparagement humour which derogates and belittles women as a group, often initiated by men' (Thomae & Pina, 2015), e.g. jokes about women ironing. This may include aspects of dark sexual humour but may not directly refer to harmful acts of sexual aggression, whereas the current

study focuses on this more severe end of the spectrum. Due to ongoing prevalence of such jokes in the media, it is vital to explore the influence of such content on behaviour, particularly in those with more malevolent personality traits.

Many prior studies measuring short-term effects in this area have solely measured proclivities post-stimuli, whereas the current study measures sexual harassment proclivity (SHP) both pre- and post-stimuli, with potential to be more indicative of causality. As in research study 1 (see chapter 4), the study uses video clips and internet memes that are readily available in the public domain, to increase real-life applicability. Female participants are also included, often disregarded from such research despite being found to perpetrate sexual harassment (Lipson, 2001) and demonstrate sexual harassment proclivity (Bartling & Eisenman, 1993), albeit to a lesser degree than males. Rogers (2018) explored the influence of sexist humour on sexual harassment attitudes within an Irish sample, attempting to address some aforementioned limitations through the use of video clips and a gender inclusive sample. However, there was a lack of a preliminary analysis to explore whether the humour content used was considered both funny and representative of the intended genre, which the current study incorporates, and limited variation in content (i.e. only one video for each genre). This is addressed in the current study, using varied videos and internet memes, aiming to increase inclusivity for individual preference.

The current study aims to address the following research questions:

- 1) Are DTe traits related to SHP?

- 2) Does exposure to sexual dark humour, compared to non-dark humour and non-sexual dark humour, increase SHP across different genders?
- 3) Are high DTe traits related to increased SHP following dark sexual humour exposure?

Method

Participant sample

The Online Surveys web-based questionnaire was advertised using opportunity sampling through social networks, social media platforms and Reddit communities. Data for this study was obtained using the same questionnaire as study 1 (see chapter 4) but, whereas study 1 only used data from two routing options, the current study used data from all three (see Figure 3). Participants were randomly allocated to routings. Routings relevant to this study obtained a total sample size of 496. Those providing incorrect responses to 'test questions' ($n=7$) were removed from the data due to a risk of random responding, in addition to those who experience technical difficulties with video content ($n=1$) or difficulty understanding content without subtitles ($n=5$). A sample of 483 (262 females, 205 males and 16 other) remained, mean age 26.53 ($SD=9.03$), ranging from 18 to 66 years, and a mean of 5.65 ($SD= 3.04$) years of education following aged 16. The sample identified as 81.4% White, 5.6% Hispanic or Latino, 1.7% Black or African American, 0.4% Native American or American Indian, 7% Asian or Pacific Islander and 3.9% as another ethnicity. Sexual orientation was also included in demographics, as considered a potential confounder of SHP, with 59.4% heterosexual/straight, 5.4% homosexual/gay/lesbian, 20.3% bisexual, 6.2%

pansexual, 6.4% asexual, 2.3% 'other' or 'prefer not to say'. The recruited sample size fulfilled suggested requirements on G*Power which recommended a minimum of 86 participants (effect size=0.15, alpha=0.05, power=0.80) for regression analysis and a minimum of 158 participants (effect size=0.25, alpha level=0.05, power=0.95) for ANOVA analysis.

Design and procedure

Participants were allocated to one of three questionnaires using pseudo-randomisation (see Figure 3). All participants were asked for demographic information and assessed for DTe traits, core personality traits and SHP. They were then asked to observe three joke video clips and three internet memes, which they rated in terms of how 'funny' and 'offensive' they were. The genre of humour observed was dependent on questionnaire routing, with participants viewing either non-dark humour, dark sexual humour or dark humour. Following observation of these stimuli, participants were again assessed for SHP.

This study used a correlational and experimental design. There were three between-participants groups, dependent on the humour genre observed, and two within-participants groups, measuring SHP score before and after humour exposure.

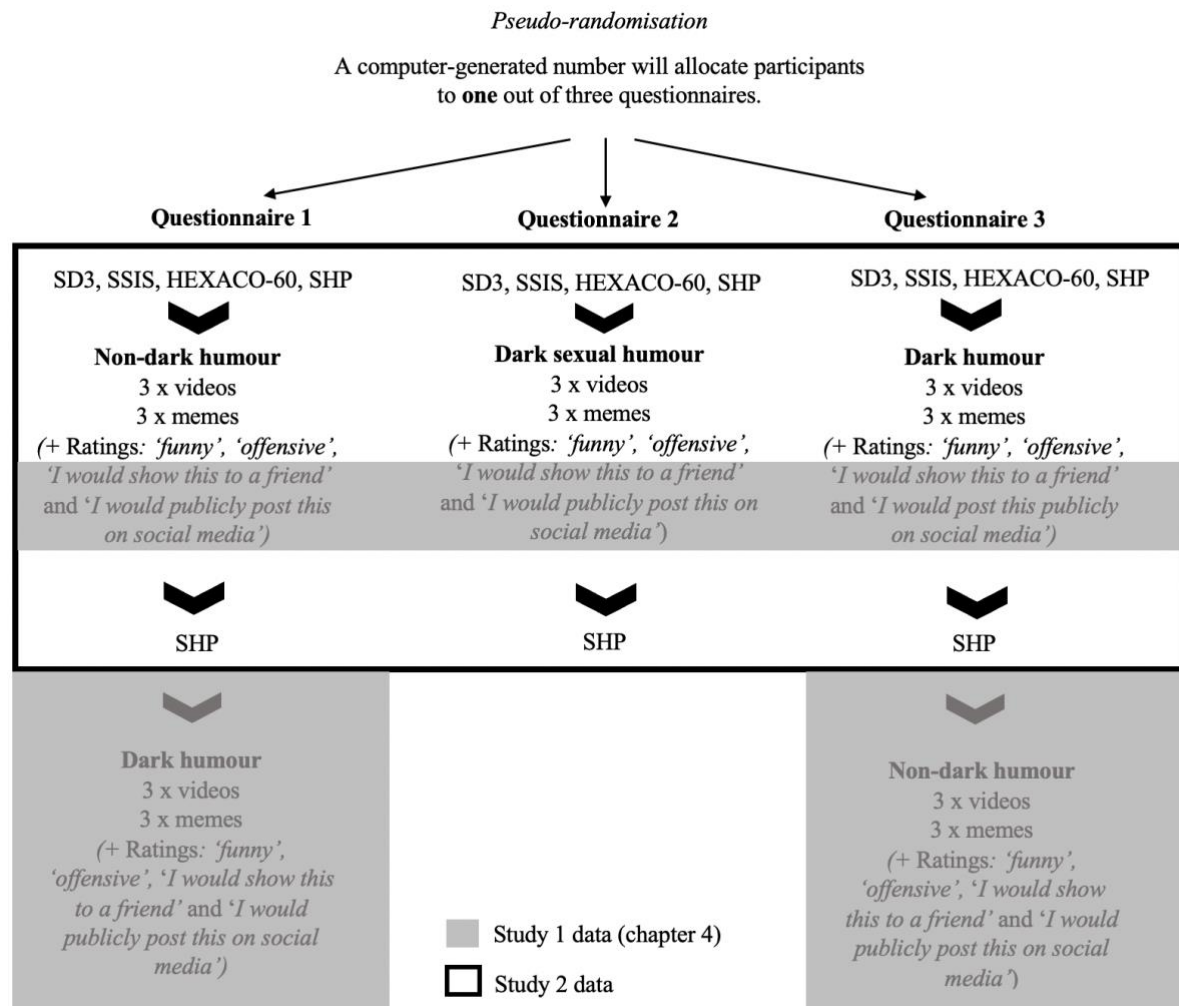


Figure 3. Questionnaire structure for secondary research project

Measures

The following measures of core and DTe personality traits were used. See study 1 (chapter 4) for a more thorough description, including findings on the reliability and validity of these measures.

Dimensions of Personality

The HEXACO-60 Personality Inventory (HEXACO-60; Ashton & Lee, 2009) was used, which is a 60-item self-report questionnaire measuring six core dimensions of personality: Honesty-Humility, Emotionality, Extraversion, Agreeableness (versus Anger), Conscientiousness and Openness to Experience.

The Dark Tetrad (DTe)

The Short Dark Triad Scale (SD3; Jones & Paulhus, 2014) was used, which is a 27-item measure of each DT trait (narcissism, psychopathy and Machiavellianism). The Short Sadistic Impulsive Scale (SSIS; O'Meara, Davies, & Hammond, 2011) was also used, which is a 10-item measure of sadistic personality traits.

Sexual Harassment Proclivity Scale (SHP)

Attitudes suggestive of a tendency to engage in sexual harassment behaviours were measured using the SHP Scale (SHP; Bartling & Eisenman, 1993). This consists of 10 items, e.g. "women are often inconsistent in terms of their non-verbal communications with men", with responses on a 5-point Likert-type rating (1=Strongly Disagree, 5=Strongly Agree). This scale has been found to be valid for measuring the likelihood of sexual harassment in both males and females, with coefficient alphas .86 for men and .74 for women (Bartling & Eisenman, 1993). Whereas others feature extreme exploitation, for example Pryor's (1987) former measure of SHP, this incorporates the more subtle aspects of sexual harassment.

Romero-Sánchez and colleagues (2017) suggested that measures using more subtle scenarios may be more effective in measuring the effects of sexist humour on sexually aggressive behaviour as there may be more room for interpretation when faced with ambiguous sexual assault scenarios. Therefore, it was considered that questions relating to the subtleties of SHP may be more effective in measuring the influence that dark sexual humour may have on behaviours within the spectrum of sexual violence. SHP questions prior to stimuli exposure were disguised (i.e. integrated) within the HEXACO-60 questions, which use an identical response scale, attempting to minimise the likelihood of participants recalling initial responses when re-tested following the stimuli. For item 8 of the scale, “highly attractive individuals (opposite in gender to me) ‘drive me crazy’ and I sometimes do or say things around them that I can’t help”, bracketed content was marginally adapted to instead read “(the gender of my sexual preference)”. This aimed to increase inclusivity for different sexual orientations yet retain the original meaning. See scale with adaptation in Appendix Q.

Humour stimuli

Content used for the humour stimuli was identified in a preliminary study (See Appendix M). Between-subject groups were each presented with three video clips and three internet memes representing one humour genre: non-dark humour (group 1), dark sexual humour (group 2) or dark humour (group 3). For the current study, participants were asked to rate how ‘funny’ and ‘offensive’ they found each stimulus to be, to control for how amusing or aversive participants found the content.

Ethical Considerations

For an overview of ethical considerations related to dark humour use, see study 1 (chapter 4). The inclusion of dark sexual humour was an additional consideration due to the potential distress this could cause, particularly to victims of sexual violence. As in study 1, information regarding the potential adult nature of the humour stimuli was provided prior to consent, including a warning that humour content related to sexual assault may be included. Participants were asked not to continue if they may find such content distressing.

Data Analysis

Descriptive statistics, preliminary analysis and reliabilities

Online data was imported to SPSS. All measures were scored as per corresponding instructions. Means, standard deviations (SD) and reliability alphas of each scale were first assessed. Each variable was assessed for normality and outliers. Bivariate correlational analyses then examined the relationship between variables. Pearson's correlation coefficient was used to examine all variables, aside from those showing non-normality or outliers, which were examined using Spearman's Rho correlation coefficient due to being more robust to such matters (Field, 2009).

Research question 1: multiple regression measuring DTe traits as a predictor of SHP

Potential confounds on the relationship between personality and SHP were first assessed using General Linear Modelling (GLM) including gender, sexual orientation, age, education level and ethnicity. Confounds were identified using the 'change in estimate' >10% method. A main regression model was then tested to assess the incremental contribution of DTe traits in predicting SHP (pre-stimuli). Potential demographic confounds were added in the first block, HEXACO personality traits in the next and DTe traits in the last block. Further to this, the same model (minus 'gender' as a predictor variable) explored results in male and female-only samples, allowing for gender comparison.

Research question 2: ANOVA analysis measuring SHP pre- and post-humour stimuli

A two-way mixed design ANOVA examined the SHP ratings pre- and post-humour stimuli (*Time*) across humour genre groups and gender. The gender group 'other' (n=16) was omitted from the analysis due to unequal sample size between groups and variance, which can dramatically affect statistical power and Type I error rates (Rusticus & Lovato, 2014).

Research question 3: Regression analyses exploring the relationship between DTe traits and SHP change in those exposed to dark sexual humour

One variable of 'SHP change' was computed from post-humour stimuli SHP scores minus pre-humour stimuli SHP scores. This allowed for exploration into the influence of DTe traits on SHP change as an outcome variable, in those exposed to dark sexual humour. Data was assessed for potential confounds on the relationship between DTe traits and SHP change. A full regression model included demographic confounds and DTe traits as predictors of SHP change. Humour 'funny' and 'offensive' ratings were also included as potential confounds in the full model as research suggests an interactive effect between humour experience and behavioural proclivity following exposure (Romero-Sánchez et al., 2010).

Missing Data

There were 9 missing data points (98% of the sample had complete data), all in the following SD3 domains: Machiavellianism ($n=2$), psychopathy ($n=5$) and narcissism ($n=2$). Missing data appeared to be randomly scattered across these domains with each participant missing only 1 data point. Pairwise deletion was used for initial correlations and listwise deletion for regression analysis. The remaining sample size ($n=474$) for the regression analysis was deemed sufficient to maintain power according to earlier G*Power calculations, which supported the suitability of listwise deletion (Kang, 2013). Domains containing missing data points were not incorporated in the main ANOVA analysis, so the full sample ($n=483$) was used.

Results

Preliminary analysis and reliabilities

Means, standard deviations (SDs) and reliability coefficients of each scale are presented in Table 20. Psychometric scales all showed 'acceptable' reliability ($\alpha > .7$), aside from psychopathy which was found to be lower ($\alpha = .685$). The removal of item 8 ('I enjoy having sex with people I hardly know'), which showed a low item-total correlation (.24), improved psychopathy scale reliability ($\alpha = .691$); considered borderline 'acceptable'. This improvement was marginal, yet study 1 also indicated issues with this item, contributing to the decision to remove. The removal of item 8 on the SHP, which had been adapted to increase inclusivity (see 'method'), marginally increased reliability ($\alpha = .827$) in both the SHP administration pre- and post-stimuli and showed a low item-total correlation compared to other items, particularly in SHP pre-stimuli (.297). This item was therefore removed from analyses.

Table 20. Means, SDs and reliabilities for measured variables.

Scale	<i>n</i>	<i>M</i>	<i>SD</i>	<i>α</i>
Honesty-Humility	483	34.46	6.70	.766
Emotionality	483	32.70	7.09	.793
Extraversion	483	27.27	7.68	.834
Agreeableness	483	31.29	6.57	.784
Conscientiousness	483	34.28	6.38	.787
Openness	483	38.18	6.11	.744
Machiavellianism	481	2.98	0.67	.797
Narcissism	481	2.32	0.62	.720
Psychopathy (minus item 8)	480	2.08	0.58	.691
Sadism	483	1.45	1.77	.721
Sexual Harassment Proclivity (pre-stimuli)	483	18.90	6.14	.827
Sexual Harassment Proclivity (post-stimuli)	483	17.92	6.35	.855

Data was assessed for normality and outliers. As in study 1, sadism showed a positively skewed distribution, in addition to SHP scores pre- and post-stimuli. All other scales showed normality. Examination of Z-scores showed 10 univariate outliers >3.29 in conscientiousness ($n=1$), openness ($n=2$), psychopathy ($n=1$) and sadism ($n=6$).

Bivariate correlation analysis was run examining Pearson's correlation coefficient (r) for most variables and Spearman's Rho correlation coefficient (ρ) for those displaying non-normality and outliers (see Table 21). Machiavellianism showed a negative correlation with honesty-humility, emotionality and agreeableness, and a weak but significant negative correlation with openness. Narcissism showed a negative correlation with honesty-humility, emotionality and agreeableness, and a positive correlation with extraversion and openness. Psychopathy showed a negative correlation with honesty-humility, emotionality, agreeableness and conscientiousness. Sadism showed a negative correlation with honesty-humility, agreeableness and conscientiousness, and a weak but significant negative correlation with extraversion. All DTe traits positively correlated with each other. SHP (pre-stimuli) scores both showed positive correlations with all DTe traits, which were slightly higher for DT traits, and negative correlations with honesty-humility and emotionality. SHP post-stimuli showed results comparable to pre-stimuli.

Table 21. *Correlational analysis between study variables.*

	1	2	3	4	5 (ρ)	6 (ρ)	7	8	9 (ρ)	10 (ρ)	11	12
1. HH	1.00											
2. EM	0.08	1.00										
3. EX	-0.08	-0.17**	1.00									
4. AG	0.26**	-0.08	0.11*	1.00								
5. CO (ρ)	0.15**	0.01	0.14**	0.04	1.00							
6. OE (ρ)	0.11*	0.07	0.14**	0.05	0.07	1.00						
7. MAC	-0.57**	-0.23**	-0.06	-0.24**	-0.08	-0.10*	1.00					
8. NAR	-0.40**	-0.15**	0.60**	-0.14**	0.03	0.15**	0.27**	1.00				
9. PSY (ρ)	-0.41**	-0.21**	-0.003	-0.40**	-0.25**	-0.06	0.45**	0.33**	1.00			
10. SAD (ρ)	-0.26**	-0.06	-0.10*	-0.24**	-0.14**	-0.06	0.40**	0.19**	0.42**	1.00		
11. Pre-SHP (ρ)	-0.22**	-0.22**	0.08	-0.05	-0.03	-0.09	0.28**	0.27**	0.27**	0.14**	1.00	
12. Post-SHP (ρ)	-0.25**	-0.20**	0.07	-0.05	-0.06	-0.09	0.27**	0.26**	0.27**	0.14**	0.93**	1.00

$n=483$ aside from correlations incorporating DT traits, MAC $n=481$, NAR $n=481$, PSY $n=480$. Spearman's Rho correlation indicated by (ρ), all other variables used Pearson's correlation (r). **HH**= honesty-humility, **EM**= emotionality, **EX**= extraversion, **AG**= agreeableness, **CO**= conscientiousness, **OE**= openness to experience, **MAC**= Machiavellianism, **NAR**= narcissism, **PSY**= psychopathy, **SAD**= sadism, **Pre-SHP**= sexual harassment proclivity pre-stimuli, **Post-SHP**= sexual harassment proclivity post-stimuli, * $p<.05$, ** $p<.01$, *** $p<.001$ (2-tailed).

Correlations split between male and female participants, specific to DTe traits and SHP can be seen in Table 22. In the male sample, all DTe traits significantly positively correlated with SHP pre- and post-humour exposure, albeit with weaker correlations observed for sadism. In the female sample, all DT traits significantly positively correlated with SHP pre- and post-stimuli, albeit weaker for Machiavellianism, with no significant relationship observed between sadism and SHP.

Table 22. *Correlational analysis between DTe traits and SHP in males (n=205) and females (n=262).*

	1	2	3	4	5 (ρ)	6 (ρ)
1. MAC N	1 260	0.29** 260	0.47** 258	0.42** 260	0.14* 260	0.16* 260
2. NAR N	0.21** 203	1 260	0.38** 260	0.24** 262	0.25** 262	.23** 262
3. PSY N	0.41** 204	0.26** 202	1 260	0.49** 260	0.16** 260	0.18** 260
4. SAD (ρ) N	0.31** 205	0.11 203	0.35** 204	1 262	0.06 262	0.06 262
5. Pre-SHP (ρ) N	0.42** 205	0.28** 203	0.32** 204	0.15* 205	1 262	0.92** 262
6. Post-SHP (ρ) N	0.36** 205	0.28** 203	0.339** 204	0.16* 205	0.85** 205	1

Correlations for females displayed above the diagonal and for males displayed below. Spearman's Rho correlation indicated by (ρ), all other variables used Pearson's correlation (r). **MAC**= Machiavellianism, **NAR**= narcissism, **PSY**= psychopathy, **SAD**= sadism, **Pre-SHP**= sexual harassment proclivity pre-stimuli, **Post-SHP**= sexual harassment proclivity post-stimuli, *p<.05, **p<.01, ***p<.001 (2-tailed).

Research question 1: multiple regression measuring DTe traits as a predictor of SHP

Testing for demographic confounds

The data was assessed for potential demographic confounds influencing the relationship between DTe traits and SHP (pre-stimuli) using General Linear Modelling (GLM). This included gender, sexual orientation (collapsed into 2 groups for the purposes of regression: 'heterosexual/straight' and 'other or prefer not to say'), age, education level and ethnicity (collapsed into 4 groups: 'White', 'Hispanic or Latino', 'Asian or Pacific Islander' and 'Other', with low numbers in the 'Native American or American Indian' and 'Black or African American' being categorised as 'Other' for the purpose of statistical power). The addition of sexual orientation appeared to have a confounding effect on narcissism and sadism as predictors of SHP (pre-stimuli). Gender also appeared to have a confounding effect on Machiavellianism and psychopathy as predictors of SHP (pre-stimuli). A one-way ANOVA explored the nature of these confounds. A significant difference was found between SHP (pre-stimuli) scores in female, male and other gender groups, $F(2,471)=19.30$, $p<.001$. Due to unequal variance and sample size, Games-Howell post hoc tests were used and showed that male SHP (pre-stimuli) scores ($M=18.85$, $SD=5.94$) were significantly higher than female scores ($M=16.04$, $SD=5.41$), $p<0.001$, and 'other' gender scores ($M=12.75$, $SD=3.07$), $p<0.001$. Female scores were also significantly higher than 'other' gender scores, $p=0.002$. SHP scores ranged between 9-36 in males, 9-35 in females and 9-19 in 'other'. A t-test further examined the nature of sexual orientation's confounding effect and showed that SHP (pre-stimuli) scores were significantly higher in the

'heterosexual/straight' group ($M=20.26$, $SD=6.41$) than in the 'other or prefer not to say' group ($M=18.26$, $SD=6.09$), $t(460.15)=5.61$, $p<.001$. Both gender and sexual orientation were incorporated in the final regression model, alongside age as an a priori.

Regression Analysis

A blocked multiple regression analysis examined the incremental difference in variance explained by DTe traits whilst controlling for core personality traits. The data showed heteroscedasticity and, as data transformation was ineffective in addressing this, a weighted least squares multiple regression was conducted effectively 'weighing down' data points with high variability to maintain the assumption of homoscedasticity. Collinearity statistics were considered acceptable, with tolerances ($>.1$) ranging from .46 (narcissism) to .86 (openness to experience) and the variance inflation factor (VIF; <10) ranging from 1.16 (openness to experience) to 2.16 (narcissism). A regression model predicting SHP (pre-stimuli) included three steps, adding demographic variables (age and gender), core personality traits, and then DTe traits. Demographic variables and core traits were found to significantly predict SHP (pre-stimuli), $R=.48$ (adjusted $R^2=.21$), $F(10, 473)=13.74$, $p<.001$. The full model adding DTe personality traits was also significant $R=.56$ (adjusted $R^2=.29$), $F(14,473)=14.78$, $p<.001$, with a significant increase in variance explained, $F(4, 459)=13.63$, $p<.001$. See beta coefficients in Table 23. Eight variables independently predicted SHP (pre-stimuli). 'Female versus male' gender and age were found to be positive predictors and sexual orientation was found to be a negative predictor of SHP. With regards to core personality traits, emotionality was found to be a negative predictor.

Machiavellianism, narcissism and psychopathy were all found to be positive predictors of SHP (pre-stimuli), with no significance found for sadism. Regression analysis was repeated following the removal of 10 univariate outliers. No significant change was observed in the variables of interest.

Table 23. *Weighted least squares multiple regression predicting SHP pre-humour stimuli ratings from demographics, core personality traits and DTe traits (n=474).*

Scale	Unstandardised Beta (SE)	Standardised Beta	p-value	95% Confidence Interval for Beta
Gender (Female vs. Male)	1.14 (.48)	.10	.018*	[-.194, 2.08]
Gender (Female vs. Other)	-1.40 (.81)	-.07	.083	[-2.99, .186]
Sexual Orientation	-1.67 (.48)	-.15	.001**	[-2.61, -.731]
Age	.08 (.03)	.10	.017*	[-.014, .137]
Honesty-humility	.04 (.04)	.05	.366	[-.044, .119]
Emotionality	-.10 (.03)	-.13	.003**	[-.160, -.033]
Extraversion	-.07 (.04)	-.10	.060	[-.145, .003]
Agreeableness	.003 (.04)	.004	.937	[-.070, .075]
Conscientiousness	.01 (.04)	.02	.725	[-.057, .082]
Openness	-.07 (.04)	-.08	.053	[-.149, .001]
Machiavellianism	1.47 (.42)	.19	<.001**	[-.646, 2.288]
Narcissism	1.99 (.52)	.22	<.001**	[-.976, 3.008]
Psychopathy	1.26 (.54)	.13	.020*	[-.200, 2.310]
Sadism	.06 (.14)	.02	.693	[-.222, .334]

Note. *p<.05, **p<.01, ***p<.001.

These results were further explored by separating female and male participants. As in the prior model, sexual orientation and age were included in step 1, HEXACO traits in step 2 and DTe traits in step 3. When exploring results only in males, Machiavellianism and narcissism were found to be significant positive predictors of SHP (pre-stimuli) (see Table 24), with psychopathy observed to be a non-significant positive predictor. When exploring results only in females, narcissism

was found to be the only DTe trait showing as a significant positive predictor of SHP (pre-stimuli) (see Table 25).

Table 24. *Weighted least squares multiple regression (step 3) predicting SHP pre-humour stimuli ratings from demographics, core personality traits and DTe traits in males (n=200).*

Scale	Unstandardised Beta (SE)	Standardised Beta	p-value	95% Confidence Interval for Beta
Machiavellianism	2.69 (.62)	.30	<.001***	[1.477, 3.912]
Narcissism	1.60 (.69)	.17	.021*	[-.247, 2.950]
Psychopathy	1.49 (.77)	.15	.055	[-.032, 3.011]
Sadism	-.06 (.23)	-.02	.802	[-.513, .397]

Note. *p<.05, **p<.01, ***p<.001.

Table 25. *Weighted least squares multiple regression (step 3) predicting SHP pre-humour stimuli ratings from demographics, core personality traits and DTe traits in females (n=258).*

Scale	Unstandardised Beta (SE)	Standardised Beta	p-value	95% Confidence Interval for Beta
Machiavellianism	.48 (.57)	.07	.404	[-.645, 1.595]
Narcissism	2.26 (.77)	.27	.004**	[-.735, 3.782]
Psychopathy	.13 (.72)	.01	.862	[-1.294, 1.545]
Sadism	.09 (.22)	.03	.669	[-.338, .526]

Note. *p<.05, **p<.01, ***p<.001.

Research question 2: Analysis of variance examining SHP scores pre- and post-humour stimuli between humour genre groups and gender

A 3x3 mixed ANOVA was conducted to explore two between-sample groups, consisting of *Humour Group* (non-dark humour, dark sexual humour and dark humour) and *Gender* (male and female) and within-sample levels of *Time*, consisting of SHP (pre-stimuli) and SHP (post-stimuli). Within-group analysis revealed a main effect of *Time*, $F(1, 461)=100.62$, $P<.001$ (see Figure 4). Within-

group interaction effects between *Time and Gender*, $F(1, 461)=.709$, $p=.400$, and *Time and Humour*, $F(2, 461)=.108$, $p=.898$, were both non-significant. A significant between-group main effect of *Gender* was observed, $F(1, 461)=24.39$, $p<.001$.

Further t-tests showed that SHP scores were significantly higher in males than females both pre-stimuli, $t(411.89)=5.10$, $p<.001$, and post-stimuli, $t(411.15)=4.61$, $p<.001$ (see Figure 5). See descriptive statistics in Table 26 for SHP scores by gender and humour stimuli group.

Table 26. *Sample size, mean and standard deviation for SHP pre- and post-humour stimuli by humour group and gender.*

Humour Group	Gender	N	SHP Pre-Stimuli scores		SHP Post-Stimuli scores	
			M	SD	M	SD
Non-Dark humour	Male	76	19.66	6.16	18.67	6.52
	Female	81	15.72	5.55	14.90	5.56
	Total	157	17.62	6.16	16.73	6.31
Dark Sexual humour	Male	65	18.28	5.80	17.15	5.88
	Female	97	16.48	5.25	15.89	5.53
	Total	162	17.20	5.53	16.40	5.69
Dark Humour	Male	64	18.17	5.93	17.33	6.17
	Female	84	15.85	5.25	14.76	5.47
	Total	148	16.85	5.66	15.87	5.90
Total Sample	Male	205	18.76	5.99	17.77	6.22
	Female	262	16.04	5.33	15.22	5.53
	Total	467	17.23	5.78	16.34	5.97

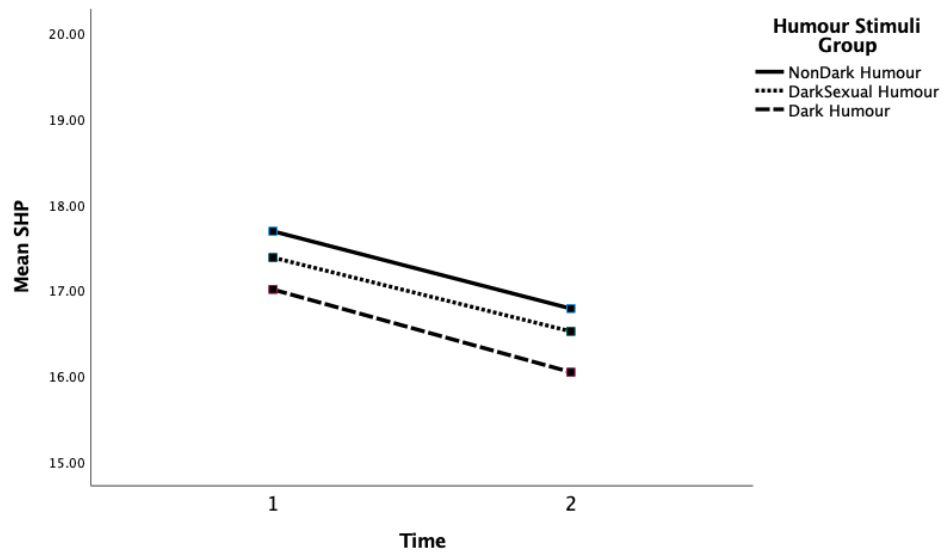


Figure 4. ANOVA analysis showing change in SHP pre- and post-humour stimuli between humour genres ($n=467$).

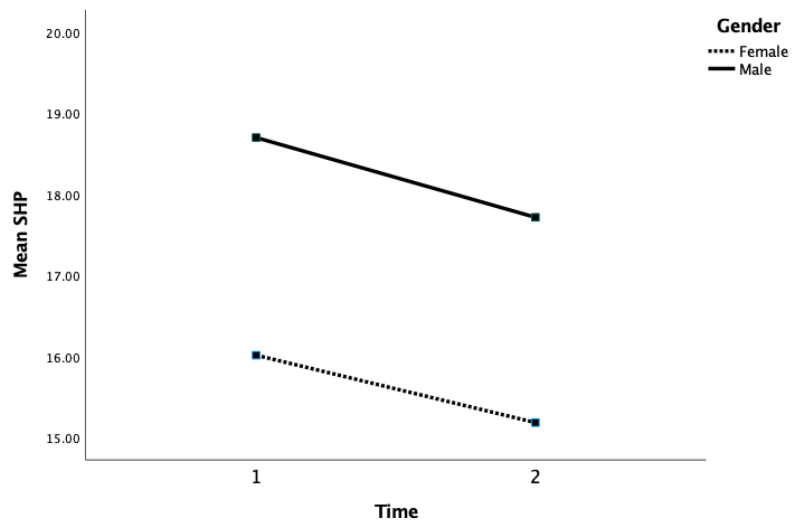


Figure 5. ANOVA analysis showing change in SHP pre- and post-humour stimuli between genders ($n=467$).

Research question 3: Regression analysis exploring the relationship between DTe traits and SHP change following exposure to dark sexual humour

Preliminary analysis with 'SHP change' as the outcome variable

The newly computed variable of SHP change showed normality and on examination of Z-scores 2 univariate outliers < -3.29 were found for SHP change and 2 for sadism. Correlational analysis explored the relationship between variables of interest and SHP change in participants exposed to dark sexual humour (see Table 27). Neither humour 'funny' nor 'offensive' ratings were found significantly related to SHP change.

Table 27. *Correlational analysis between study variables in participants exposed to dark sexual humour stimuli (n=170).*

	1	2	3	4 (ρ)	5
1. Machiavellianism	1.00				
2. Narcissism	.197*	1.00			
3. Psychopathy	.435**	.341**	1.00		
4. Sadism (ρ)	.337**	.095	.354**	1.00	
5. SHP change	-.091	-.159*	.009	.001	1.00

Spearman's Rho correlation indicated by (ρ), all other variables used Pearson's correlation (r), * $p < .05$, ** $p < .01$, *** $p < .001$ (2-tailed).

Testing for demographic confounds

GLM analyses explored potential confounding effects of demographic variables on the relationship between DTe traits and SHP change, including gender, sexual orientation, age, education and ethnicity. Beta adjustments $> 10\%$ suggested that gender and sexual orientation may have a confounding effect on the relationship between both Machiavellianism and psychopathy with SHP change. Sexual

orientation also appeared to have a potential confounding effect on the relationship between SHP change and both narcissism and sadism and was therefore included in the regression model.

Regression Model

Regression analysis examined DTe traits as predictors of SHP change. Gender, sexual orientation and age as an a priori were added as potential confounds, in addition to humour 'funny' and 'offensive' ratings. All regression assumptions were met, including collinearity statistics which were considered acceptable, with tolerances ($>.1$) ranging from .65 (psychopathy) to .88 (age) and the variance inflation factor (VIF; <10) ranging from 1.14 (age) to 1.55 (psychopathy).

Table 28. *Multiple regression predicting change in SHP pre- and post-humour stimuli from demographics and DTe traits (n=170¹).*

Scale	Unstandardised Beta (SE)	Standardised Beta	p-value	95% Confidence Interval for Beta
Gender (female vs. male)	-.518 (.34)	-.130	.134	[-1.199, .162]
Gender (female vs. other)	.089 (.72)	.010	.902	[-1.337, 1.515]
Sexual orientation	.444 (.33)	.113	.185	[-.214, 1.103]
Age	.008 (.02)	.039	.631	[-.026, .043]
Humour funny ratings	.011 (.04)	.030	.746	[-.058, .081]
Humour offensive ratings	-.023 (.04)	-.059	.523	[-.095, .049]
Machiavellianism	-.364 (.26)	-.128	.159	[-.873, .144]
Narcissism	-.595 (.30)	-.174	.048*	[-1.185, -.005]
Psychopathy	.553 (.33)	.159	.096	[-.100, 1.206]
Sadism	-.051 (.10)	-.045	.603	[-.244, .142]

Note. * $p<.05$, ¹based only on participants exposed to dark sexual humour stimuli.

The full model was non-significant, $R=.27$ ($R^2=.07$), $F(10, 169)=1.22$, $p=.284$. However, narcissism was found to be a significant negative independent predictor of SHP change, with all other DTe traits showing no significant relationship with SHP change (see Table 28). Examination of plots showing the relationship between narcissism and SHP scores pre- and post-dark sexual humour exposure revealed that, despite high narcissism predicting a significant reduction in SHP post-humour stimuli, a positive relationship remained between narcissism and SHP scores both pre- and post-dark sexual humour exposure, i.e. no directional change was observed (see Figure 6).

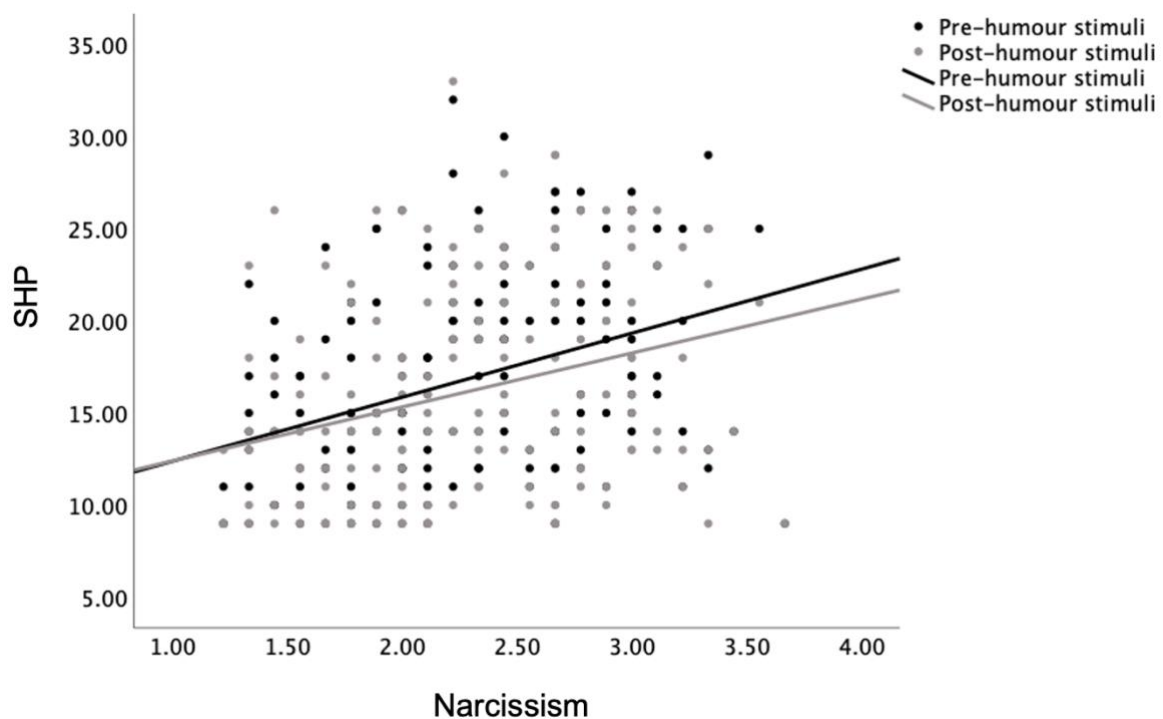


Figure 6. *Correlational relationship between narcissism and SHP pre- and post-humour exposure in those who observed dark sexual humour content.*

When repeating the regression following removal of the univariate outlier identified in SHP change, narcissism was no longer found to be a positive predictor of SHP change. However, as outliers were believed to be true values on further exploration, results were reported with these data points.

Discussion

Research question 1

Results showed Machiavellianism, narcissism and psychopathy to be independent positive predictors of SHP (pre-stimuli), corresponding with earlier findings by Zeigler-Hill and colleagues (2016). Yet the weaker relationship between narcissism and SHP observed by Zeigler-Hill and colleagues (2016), was not found in the current study, with psychopathy observed to be the weakest predictor of SHP out of the DT traits. Sadism, not previously tested as a predictor, showed no relationship to SHP. This is surprising, considering the construct's similarities with other DT traits (Buckels et al., 2013; Book et al., 2016) and the tendency for those high in sadistic traits to enjoy eliciting fear, humiliation or mental harm in others; likely experienced by victims of sexual harassment. It could be suggested that the types of behaviours measured in the SHP scale, which pertain to the subtleties of sexual harassment behaviour, may not be sufficiently extreme to appeal to those with high sadistic traits, suggested to often require a degree of violence to experience sexual excitement (Sadoff, 1986). However, note that initial correlations did indicate a positive correlation between sadism and SHP (pre-stimuli), so a low prevalence of this trait within non-clinical samples, suggested by frequent positive skew observed in sadism data (O'Meara, Davies & Hammond, 2011; Meere & Egan, 2017), may have led to a lack of power in the current study and a potential relationship between these factors cannot be disregarded.

With regards to gender differences, males showed a higher level of SHP than females, with males showing Machiavellian traits to be the strongest positive predictor of SHP, which agrees with Zeigler-Hill and colleagues (2016). However, Machiavellianism was not found to predict SHP in females. This difference between genders may support the sociocultural gender model of sexual harassment, considering the suggested association between Machiavellianism and hegemonic (i.e. dominant) masculinity (Waddell, Van Doorn, March & Grieve, 2020), in that masculine dominance and a willingness to control others may drive sexual harassment behaviours. Narcissism was found to positively predict SHP in both genders; in fact, the only construct to predict SHP in females, which conflicts with Zeigler and colleagues' (2016) findings that Machiavellianism and psychopathy were the only DT traits found related to SHP in females. It could be hypothesised that females showing a perceived superiority, preoccupation with power and/or belittlement of others may act out similar sexual harassment behaviours towards other genders or their own to gain dominance and power over those they perceive as more vulnerable, as suggested by the vulnerable victim hypothesis of sexual harassment. Psychopathy and sadism showed no significant relationship with SHP in either gender group.

It should be noted that SHP scores for both genders were observed to be low in comparison to previous findings (Bartling & Eisenman 1993, Zeigler-Hill et al., 2016). For example, Key and Ridge's (2011) tertile split of SHP scores in males, defined low SHP as ≤ 26 and high SHP as ≥ 30 , portraying lower averages than expected in the current study among both genders in comparison. However, scores ≥ 30 were observed in the male and female sample, suggesting that the sample was still inclusive of those showing high SHP. It could be hypothesised

that the lower mean SHP observed in the current study may be an outcome of the ‘#MeToo’ movement, in that behaviour constituting sexual harassment may be more easily recognised, leaving less space for interpretation. Another explanation could be sampling bias, in that individuals showing a willingness to participate in an online study about humour, may show a particular open-mindedness incongruent with the prejudicial beliefs often observed in sexual harassment behaviours.

Research question 2

Results showed a decline in SHP following exposure to all humour genres (non-dark, dark sexual and dark humour), with no difference between groups. Results again showed males generally scoring higher in SHP than females both pre- and post-exposure. This decline was unexpected and differs from prior studies which found an increased proclivity for sexually aggressive behaviour following exposure to sexist jokes (Thomae & Viki, 2013; Romero-Sánchez et al., 2017). It appears that amusement, in general, may lead to a decline in SHP.

There are several potential explanations to consider why humour may lead to decreased SHP. In the context of humour theories discussed in research study 1 (see chapter 4 ‘introduction’), findings could hypothetically align with Freud’s (1905) theory which suggests that humour facilitates a release of tensions, hostility or aggression. Freud (1905) suggests that this release relates to one’s unconscious desires, e.g. an individual with aggressive impulses may use or enjoy aggressive humour, in which case we may have expected to see a sharper decline in SHP in the dark sexual humour group, compared to other genres. However,

humour and/or laughter in a broader sense has been found by some in older literature to diminish feelings of aggression evoked by frustration (Ziv, 1987), regardless of the humour content (Dworkin & Efran, 1967; Singer, 1968). Therefore, within the context of the sociocultural gender theory of sexual harassment, it could also be hypothesised that humour may partly diminish aggressive male dominance and/or hostile views towards females. This does not explain why a decline in SHP was also observed in females, although plausible that females may show a different type of intra-gender hostility. The relatively comparable decline in SHP between genders may suggest an explanation relevant to both.

Another potential area to consider are the physiological changes elicited by humour. Neuroimaging techniques have shown humour to trigger the mesolimbic dopaminergic system (Mobbs, Greicius, Abdel-Azim, Menon & Reiss, 2003), a reward system that provides us with pleasure but is also related to motivated behaviours such as sex (Balfour, Yu & Coolen, 2004). If the experience of humour activates and elicits pleasure in the same neurological system as sexual motivation then perhaps, to some extent, this could replace the need to activate this pleasure response through other means (i.e. sexual harassment behaviour).

Research question 3

In the group exposed to dark sexual humour, those with high narcissism showed a significant reduction in SHP from pre- to post-humour exposure (i.e. SHP change), with no directional change observed (see Figure 6). No significant relationship was observed between other DTe traits and SHP change. These

findings are surprising, considering studies have shown that those with pre-existing antagonistic traits, i.e. hostile sexism, display *higher* sexual aggression following sexist humour exposure (Thomae & Viki, 2013; Romero-Sánchez et al., 2017). However, the concepts measured in this study differ. DTe traits, although found to be significantly related to SHP, have unique characteristics, e.g. lack of affect or grandiosity, that vastly differ from hostile sexism. Individuals high in these traits may therefore respond differently to humour exposure. It could be hypothesised that the more sinister nature of dark sexual humour, compared to other genres, may surpass a threshold considered too 'extreme' for norm tolerance in line with the prejudiced norm theory (Ford & Ferguson, 2004). This may lead individuals to reject the proposed norm, i.e. acceptability of sexual harassment, leading to a reduction or conscious suppression of SHP.

Considering that research question 1 found narcissism to be the strongest significant predictor of SHP when compared to other DTe traits, if those with a heightened disposition to sexual harassment behaviour may be more susceptible to sexual aggression following observation of associated humour stimuli, then we may have expected to see a positive change in SHP post-dark sexual humour exposure in those with high narcissistic traits, rather than negative. However, when considering the 'release' hypothesis within the context of Freud's (1905) theory of humour, if those with high narcissistic traits have more prominent desires to engage in sexual harassment behaviour, then perhaps observation of sexual dark humour may provide a greater release for such desires than for those with other DTe traits.

Another consideration is whether observing dark sexual jokes in a humorous context, alongside a laughter soundtrack, may have prompted realisation that such behaviours are sufficiently shocking to meet the threshold of humour. The *benign violation theory* of humour (McGraw & Warren, 2010), described in chapter four, states that the discrepancy between one's behaviour and social norms is what generates amusement. This may lead individuals with high narcissism to reduce responses on the SHP scale post-humour stimuli, following a re-evaluation of what is acceptable. If so, it is unclear as to whether this would be a longer-term learning response or a temporary mask driven by social desirability bias. Changes in response could also be reflective of narcissism's heightened fragility compared to other DT traits, which may explain varying strengths of the trait's relationship with SHP compared to prior studies (Zeigler et al., 2016).

Although there are several potential hypotheses which may explain a reduction in the relationship between narcissism and SHP scores post-stimuli, a small effect size was observed in the full regression model ($R^2=.07$) and the relationship between narcissism and SHP change was observed to become non-significant on the removal of one SHP outlier. It therefore remains a possibility that this occurred by chance (Type 1 error), despite meeting the required sample size suggested by G*Power analysis, potentially due to the smaller sample size used in this analysis ($n=170$). It would be beneficial for future research to examine this relationship within a larger dataset.

Limitations

One potential limitation is the use of self-report measures and potential social desirability bias. The SHP scale was administered to participants on two occasions. Firstly, disguised within the personality scales and secondly, as a singular questionnaire administered following humour exposure. These were likely more noticeable in the latter, possibly leading participants to minimise responses due to social desirability. Although findings around DT traits and social desirability have been inconsistent (Kowalski, Rogoza, Vernon & Schermer, 2018; Pineda, Sandín & Muris, 2020), research has found a positive correlation between narcissism and social desirability, compared to a negative correlation between psychopathy and Machiavellianism and social desirability (Kowalski, Rogoza, Vernon & Schermer, 2018). This could offer a potential explanation as to why those with high narcissistic traits may show a change in SHP (i.e. decrease) post-exposure. Incorporating a social desirability scale, e.g. Social Desirability Scale - 17 (Stober, 2001), in future research may be beneficial.

The SHP scale has various strengths outlined in the method. However, one item appeared outdated and required adaptation to increase the inclusivity of all sexual orientations. It was acknowledged that this can undermine scale validity, and the item later required removal from analysis to improve reliability. One item was also removed from the SD3 (Jones & Paulhus, 2014) psychopathy domain for the same reason. Refined scales both showed a good level of internal consistency and, although this could have a potential effect on content validity, it was considered that sufficient items remained in each scale to minimise impact.

As discussed in research study 1 (see 'discussion' chapter 4), other considerations include the vast subjectivity of humour preference and various other extraneous

variables e.g. likeability of the joke teller or whether the content has been seen before. The preliminary study (Appendix M) was conducted to identify humorous stimuli representative of the intended genre. However, the dark sexual humour genre was rated marginally lower than other genres in both funny and genre representation scores. Less amusing content in this genre could lead to biased results. However, scores remained above neutral for 'funny' ratings (mean=3.38) and genre representation (mean=3.42) and, considering the difficulty in obtaining higher-scoring content, it is possible that the lower scores may be representative of this genre's popularity. One further limitation is that, although the study strives to stimulate real-life experience of humour, it is acknowledged that artificial aspects remain in a clinical study.

Implications and future directions

This study has provided insight into the influence of dark sexual humour exposure on one's proclivity to engage in sexual harassment, within a modern societal context using online videos and memes. The disturbing content of dark sexual humour, which has become prominent within society, has unsurprisingly been criticised in the media and concerning as to how exposure may influence behaviour. However, current findings propose that the content of dark sexual humour may not increase proclivity for the observer to act out comparable behaviour, compared to other genres, and that amusement in general may actually reduce such proclivities. These are initial findings in an under-researched area, with further exploration required. It is also important not to disregard the potential emotional response of observers who find the content distressing. With regards to DTe traits, this study has further supported the hypothesis that those

with high DT traits show increased SHP and, although initial findings suggest observation of dark sexual humour to have minimal effect on this relationship, limitations have been identified and further research is recommended.

As the current study only explores the short-term effects of dark sexual humour on SHP it may be beneficial for longitudinal research to examine potential longer-term effects. For example, a replication of the current research with a follow-up measurement of SHP a week later. The current research is also specific to 'observation' of jokes and it may be valuable to explore the influence of regular 'use' of such humour on SHP; particularly considering potential reinforcement of problematic norms if others perceive the content as amusing. It may also be beneficial to conduct further analyses within a larger sample size to increase power or explore the influence of humour solely on participants showing initially high levels of SHP. It is recommended for future research to examine the effect dark humour content may have on one's proclivity to act out other antisocial behaviours, to gain an increased understanding into the potential impact of dark humour exposure.

Chapter Six: Discussion

This chapter summarises overall findings from this thesis, as well as identifying limitations. The implication of findings and future directions are discussed before arriving at an overall conclusion.

Discussion

Key Findings

The aim of this thesis was to examine the relationship between personality and the use of humour, focusing on potentially more harmful perspectives of humour use. Various forms of research were conducted to answer the questions outlined in the introduction of this thesis. Key findings from each are summarised below.

A systematic review and meta-analysis were conducted to explore the relationship between dark tetrad (DTe) traits and humour styles, as measured by the Humor Styles Questionnaire (Martin, Puhlik-Doris, Larsen, Gray & Weir, 2003). Key findings showed that psychopathy and Machiavellianism positively related to injurious styles of humour (i.e. aggressive and self-defeating). Further examination of psychopathy subscale data suggested that factors such as impulsivity and the manipulation of others may contribute to use of these humour styles (Martin, Lastuk, Schermer, Jeffery, Vernon & Veselka, 2012; Lobbestael & Freund, 2021). It was also suggested that individuals using aggressive humour may have less concern as to how it affects others. Further examination of Machiavellian subscale data in one study suggested that factors such as the manipulation of others, and amusement of negative stereotypes and less socially accepted material, may be contributing to the use of this humour style (Martin et al., 2012). Narcissism was unique, in that it was found to relate to both injurious and benign (i.e. affiliative and self-enhancing) styles. Two hypotheses may potentially explain this. Firstly, narcissistic individuals may use more positive humour styles to heighten their self-esteem and popularity (Veselka, Schermer,

Martin & Vernon, 2010), yet resort to more injurious styles at times when their ego is threatened (Lobbestael & Freund, 2021). Alternatively, as suggested by subscale analysis outcomes, those with grandiose traits may use benign styles, whereas those with vulnerable traits may use injurious styles. There were an insufficient number of studies exploring sadism and humour styles for inclusion in the meta-analysis, suggesting that more research is required in this area. One study suggested a possible relationship between sadism and aggressive humour (Međedović & Bulut, 2017), yet this was not supported in another (Torres-Marín, Navarro-Carrillo & Carretero-Dios, 2022 - Study 1). Overall, these findings suggest that there may be malevolent motivation behind the use of both aggressive and self-defeating humour styles.

A critique of the Humor Styles Questionnaire (HSQ; Martin et al., 2003) aimed to assess the psychometric properties of this measure, used to obtain data for the prior systematic review and meta-analysis. The scale showed relatively good reliability and validity, yet limitations were observed regarding the use of this measure in some countries. It is therefore pertinent for studies implementing this measure, as in chapter two, to report such limitations. Findings suggest that revisions may be beneficial prior to further adaptations for its use in different countries. This critique also recognised that the HSQ appears to measure a smaller range of humour styles than other existing measures, such as the HBQD (Craig, Lampert & Nelson, 1993) and CSM (Ruch, Heintz, Platt, Wagner & Proyer, 2018), and is not applicable for assessing more precise humour styles, such as dark humour.

Two empirical research studies aimed to further explore dark humour, due to minimal research exploring this potentially harmful humour style within the context of personality. The first research study aimed to examine the relationship between DTe traits and dark humour preference, and whether preference pertained to use. Machiavellianism was the only DTe trait to positively predict dark humour preference (i.e. 'funny' ratings), and it was suggested that preference for this type of humour may therefore be related to the cynical characteristics distinct to this personality construct. Findings relating to core personality traits also supported those by Marwah and Chaturvedi (2018), in that individuals who experience emotion more intensely may not perceive amusement in the distressing content of dark humour. Overall, findings suggest that enjoyment of dark humour may be related to a cynical outlook on life. It was hypothesised that individuals with a general perception or expectation of the worst in others may be less distressed by the content of dark humour and therefore more able to appreciate its amusement. The lack of relationship with other DTe traits (i.e. narcissism, psychopathy and sadism) suggests that dark humour shows a certain uniqueness which appears less driven by a malevolent purpose than injurious styles in the HSQ (i.e. aggressive and self-defeating humour), which were found to relate to multiple DTe traits (see chapter 2). The relationship between dark humour and Machiavellianism, in conjunction with its relationship to more positive traits including openness and the negative pole of emotionality, which are more often related to self-enhancing humour, also suggests that dark humour does not neatly fit into one of the four styles defined in the HSQ. This could be a potential critique for both the original four-factor model suggested by Martin and colleagues (2003), but also Heintz and Ruch's (2015) suggestion of a two-factor model (i.e. benign versus injurious humour styles) (see chapter 3), as dark humour appears

to encompass both injurious and coping aspects. Further to this, preference appeared to be correlated to use, both within the context of sharing with a friend or on social media. However, it is recognised that there are other types of use, e.g. posting online anonymously, in which the use of dark humour may differ in those with high DTe traits. Further exploration into the relationship between DTe and uses of dark humour among different contexts, whilst controlling for potential mediators (e.g. 'funny' ratings) may be beneficial.

A second empirical study aimed to explore whether observation of dark humour content suggestive of sexual harassment or assault increased short-term proclivity for sexual harassment behaviours. This was intended to be an initial indication as to whether the subject of dark humour content may influence antisocial behaviour. The first step was to examine whether DTe traits independently predicted sexual harassment proclivity (SHP) and, as previously found by Zeigler-Hill Besser, Morag and Campbell (2016), the three dark triad (DT) traits were found to be positive predictors. A non-significant relationship was found between sadism and SHP. This questions whether the subtleties of sexual harassment behaviour, compared to more explicitly violent actions, may not have been sufficient to appeal to those with sadistic traits or, alternatively, whether the low prevalence of these traits in community samples may have influenced findings. The study also aimed to examine whether the observation of dark humour content suggestive of sexual harassment or assault (i.e. dark sexual humour content) elicited any short-term increase in SHP. All humour styles (dark sexual, dark and non-dark humour) were found to decrease SHP, potentially supporting the view that the experience of humour, regardless of the type, may decrease aggressive or hostile attitudes (Ziv, 1987; Dworkin & Efran, 1967; Singer, 1968). However, these findings offer no

insight into potential longer-term effects, so future longitudinal research in this area is recommended. As some studies have found that those with hostile attitudes may show a higher proclivity to sexual aggression following exposure to sexist humour (Thomae & Viki, 2013; Romero-Sánchez, Durán, Carretero-Dios, Megías & Moya, 2010), in combination with the positive relationship observed between DT traits and SHP, it was examined whether DTe traits predict change in SHP following exposure dark sexual humour content. Only narcissism showed a significant reduction in SHP pre- to post-exposure. As narcissism was initially found to be the strongest predictor of SHP, the 'release' hypothesis, which suggests that aggressive tendencies are released through humour (Freud, 1905), may explain a reduction in SHP unique to this personality construct following dark sexual humour exposure. Yet it was acknowledged that this relationship showed a small effect size and may have been influenced by factors such as social desirability bias. The findings of this empirical study suggest that the observation of dark humour content, at least in the short-term, may be more likely to have a beneficial influence in reducing proclivities for antisocial behaviour. However, this study solely focuses on DTe traits and sexual harassment proclivities, and future research including other personality dispositions and types of antisocial proclivities is required.

Limitations

There are limitations of the methodology used in this thesis. Firstly, it should be acknowledged that the critique of the HSQ identified some issues that require addressing, particularly when used across different countries, indicating a limitation of the systematic review and meta-analysis synthesising findings based

on the use of the HSQ across numerous countries. The generalisability of findings to other cultures is a consideration across all chapters. Samples in both the systematic review and both empirical studies included a multitude of nationalities yet showed a greater percentage of white participants, compared to other ethnicities, and more American-based participants. This limits the generalisability of findings to different cultures, particularly due to suggestions that humour is perceived and used differently across countries (Jiang, Li & Hou, 2019). However, considering these cultural differences, it was perhaps unexpected to see that findings regarding the relationship between dark humour and core personality traits in India (Marwah & Chaturvedi, 2018) largely corresponded with those in the preliminary research project, which had a predominantly westernised sample. With regards to age, it was identified that many studies included in the systematic review relied on younger student samples and, although there were a range of ages, the mean age of participants in both research projects suggest a reliance on a younger sample (mean age= 26.13 and 26.53, respectively). This may limit the generalisability of findings to other age groups.

This thesis also largely relies on self-report data, both in the systematic review and empirical studies. Although this technique allows for easy accessibility to large online samples and more anonymity on behalf of the participant, there is a risk of potential response bias (Van de Mortel, 2008). This may be particularly true of those with high DTe traits, due to related characteristics such as dishonesty or lack of insight (Lilienfeld & Fowler, 2006). Systematic review data was complemented by some studies reviewing perceived traits rated by external observers (Marino, 2011; Zeigler-Hill, Besser & Jett, 2013); however, this data was not included in the meta-analysis due to this measurement likely differing

from self-reported results and potentially distorting findings. No perceived ratings were incorporated into the empirical research projects, and it may be beneficial for future research in this area to include such. Further to this, cross-sectional methodology, used in both systematic review studies and the primary research project, does not define causality. However, these findings can provide a strong basis for future experimental research.

One further limitation is the method used to rate dark humour content in the empirical research projects. Dark humour content representative of what the general population may experience in everyday life was used in the form of both video clips and internet memes. The preliminary study was conducted with the aim of reducing experimenter bias; however, potential extraneous variables were not controlled for. This included whether the participant had seen the joke before, the presence of laughter in video clips (Cai, Chen, White & Scott, 2019), and the characteristics and demographics of the joke teller or receiver (Strain, Saucier & Martens, 2015; Coolidge, 2020). Although it is acknowledged that similar research in the future could control for additional variables, any adaptations to humour content (e.g. removing background laughter) should be carefully considered, in order to maintain a humour experience as realistic possible.

Conclusion, implications, and future directions

This thesis aimed to examine the more harmful use of humour within the context of personality. Overall, findings suggest that the injurious humour styles (i.e. aggressive and self-defeating) defined by Martin and colleagues (2003) may be motivated by more malevolent and problematic traits than the more specific style

of dark humour. Although the latter still has potential to cause harm, it appears to relate to a more cynical outlook on life. Studies examining the relationship between sadism and humour styles are limited and therefore more research is needed in this area.

This thesis raises several key implications for the future. The identified relationship between DT traits and injurious humour styles suggests that there should perhaps be less societal tolerance of such humour when presented under the pretence of being 'just a joke' and that harmful humour styles, particularly aggressive humour due to its typical direction towards others rather than the self, may be more appropriately interpreted as a form of verbal aggression. This would therefore suggest that the response to, or potential reprimand for, more extreme cases of aggressive humour in certain settings, e.g. occupational, should be consistent with other forms of verbal aggression. Within the context of forensic settings, considering that findings suggest that injurious styles may be driven by a more malevolent purpose and may therefore be perceived as such, clinicians should consider avoiding the use of such styles in interactions with both staff and patients; not only due to potential harm to the wellbeing of others, but to prevent negative role-modelling. For clients showing high DTe traits, interventions addressing the harmful aspect of humour may be beneficial in reducing harm caused to themselves or others.

There is no doubt that dark humour has the potential to elicit feelings of distress in others. However, its suggested relationship to the more cynical characteristics of Machiavellianism, perhaps indicates a less malevolent motivation behind its use. The absence of a relationship with narcissism, psychopathy or sadism is reassuring

due to this humour style's habitual use in care-focused occupations, e.g. paramedic or social worker (Christopher, 2015; van Wormer & Boes, 1997). However, it is recognised that the causal direction between Machiavellian traits and dark humour preference is unclear, and therefore we cannot be sure whether the use of dark humour, particularly within the confines of a prison or ward environment, could lead to a more cynical attitude amongst staff and/or patients. The potential distress that some spectators may experience should not be disregarded, and management of dark humour use needs to be carefully considered in such settings. One debate is whether individuals should be prosecuted for more extreme instances of dark humour. If driven by a cynical outlook and used as a potential coping strategy for distressing situations, this may suggest less harmful intent. However, it can be difficult to distinguish the exact genre of a joke, and dark humour could potentially overlap with other genres, including aggressive or disparaging humour (e.g. sexist or racist humour); the latter suggested to relate to an increased tolerance of discrimination (Ford & Ferguson, 2004). Further research into more extreme examples of dark humour is required, perhaps those jokes so abhorrent that they border on cruelty and risk losing the 'humour' aspect, to examine whether the genre's relationship with DTe traits changes dependent on severity. However, careful consideration will need to be required as to whether the ethics of conducting such research can be justified.

Based on the conclusion of this thesis, it is recommended that further education is provided regarding possible motivations for using different humour styles and their potential impact. This could take place in schools and/or occupational settings. Training programmes may support attendees to consider their style of humour and its potential impact on the wellbeing of both themselves and others.

For example, understanding the relationship between injurious humour styles (i.e. aggressive and self-defeating humour) and malevolent personality traits may support individuals to report incidents in which humour has caused distress and potentially impact how management respond to reports of victimisation disguised as 'a joke'. Alternatively, in certain professions (e.g. paramedics), where staff commonly become acclimatised to the use of dark humour, an acknowledgement that those with certain personality traits, e.g. high emotionality, may be more averse to such humour styles, may help to avoid discomfort and/or conflict in the workplace. Within clinical settings, training about how individuals may use or receive humour based on personality, may be beneficial for both the workplace milieu and to minimise any potential distress to staff and patients caused by the use of harmful humour. A collaborative discussion with patients around this topic may be beneficial in identifying their individual views on humour, acknowledging that the use of more benign styles (e.g. affiliative and self-enhancing humour) could potentially support wellbeing.

Jokes regarding sexual assault have been heavily criticised in the media. However, current findings suggest that watching humour of any kind, including dark sexual humour, may reduce a proclivity to act out comparable behaviour. Further research in this area can guide media policies, as to whether such jokes should be shown on TV or streamed on mainstream websites. One might argue that dark sexual humour may elicit some form of tension release, which would not be possible with more stringent media restrictions. However, current findings suggest that other genres of humour may have a similar effect without the risk of causing distress. As this research focused only on immediate short-term effects, more longitudinal research is required.

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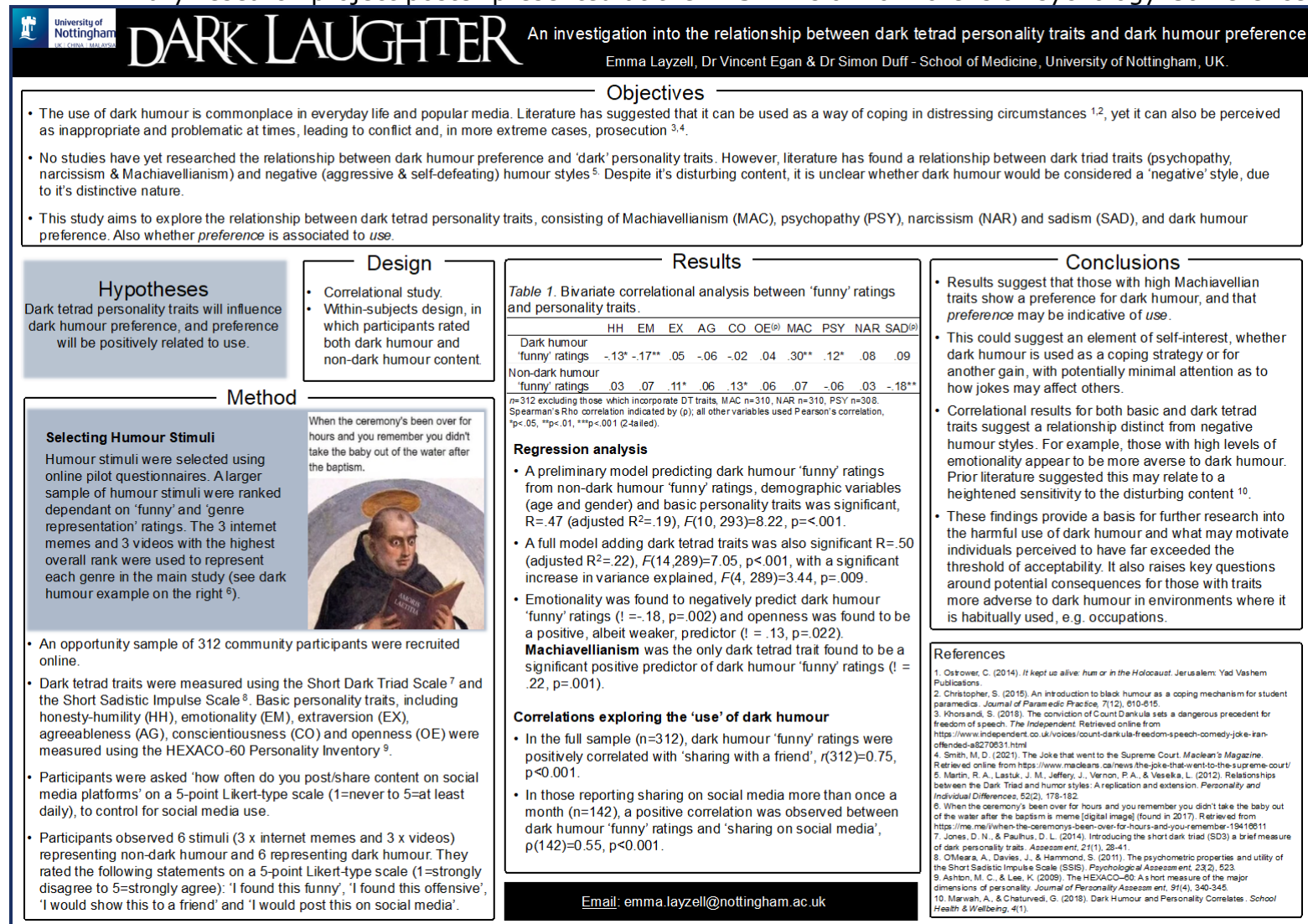
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Appendices

APPENDIX A – Primary research project poster presented at the BPS Division for Forensic Psychology Conference

Appendix B – Search Strategy

Each resource searched:

Database Name	Platform	Date Coverage	Date of Search	# of results
1. Embase	Ovid	1974 - June 19	2 nd June 2022 17:20	46
2. Medline	Ovid	1946 – June 19	2 nd June 2022 17:30	27
3. APA PsycInfo	Ovid	1806 – June Week 3 2020	2 nd June 2022 17:45	157
4. Social Sciences Databases (excluding APA PsycArticles)	ProQuest	See table in No.4	2 nd June 2022 18:00	101
5. Dissertations & Theses Database	ProQuest	1743 – present	2 nd June 2022 18:20	38
6. Cochrane Library	Cochrane	1992 - present	3 rd June 2022 15:30	9
7. Social Sciences Citation Index (SSCI), Science Citation Index Expanded (SCI-EXPANDED), Conference Proceedings Citation Index – Social Sciences & Humanities (CPCI-SSH) and Emerging Sources Citation Index (ESCI)	Web of Science	1956 - present		
11. Open Access Theses and Dissertations	Open Access Theses and Dissertations	1973 - present	3 rd June 22 18:00	3
12. EThOS	British Library	1800 - present	3 rd June 2022 16:00	6

1. Embase (OVID)Date of Search: 2nd June 2022 at 17:20

Number of results: 46

#	Search string	# of results
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1	Exp narcissism/	6176
2	Exp psychopathy/	7866
3	Exp Machiavellian/	739
4	Exp sadism/	881
5	("dark triad" or "dark tetrad" or "psychopathy" or "psychopaths" or "psychopathic" or narcissis* or machiavellian* or sadis* or "dark personalit*" or "dark trait*").mp.	19226
6	1 OR 2 OR 3 OR 4 OR 5	19226
7	Exp humor/	5503
8	(humour* or humor* or "affiliative humo*" or "aggressive humo*" or "self-defeating humo*" or "self-enhancing humo*" or "humor styles questionnaire").mp.	128968
9	7 OR 8	128968
10	6 AND 9	46

2. Medline (OVID)

Date of Search: 2nd June 2022 at 17:30

Number of results: 27

#	Search string	# of results
1	exp narcissism/	3146
2	exp antisocial personality disorder/	10148
3	exp machiavellian/	496
4	exp sadism/	657
5	("dark triad" OR "dark tetrad" OR "psychopathy" OR "psychopaths" OR "psychopathic" OR narcissis* OR machiavellian* OR sadis* OR "dark personalit*" OR "dark trait*").mp.	11442
6	1 OR 2 OR 3 OR 4 OR 5	18298
7	exp "wit and humor as topic"/	4929
8	(humour* OR humor* OR "affiliative humo*" OR "aggressive humo*" OR "self-defeating humo*" OR "self-enhancing humo*" OR "humor styles questionnaire").mp.	91689
9	7 OR 8	91689
10	6 AND 9	27

3. APA PsycInfo (Ovid)

Date of Search: 2nd June 2022 at 17:45

Number of results: 157

#	Search string	# of results
1	exp dark triad/	12072
2	exp sadism/	691
3	("dark triad" or "dark tetrad" or "psychopathy" or "psychopaths" or "psychopathic" or narcissis* or	34035

	machiavellian* or sadis* or "dark personalit*" or "dark trait*").mp.	
4	1 or 2 or 3	34035
5	exp humor/	6031
6	(humour* OR humor* OR "affiliative humo*" OR "aggressive humo*" OR "self-defeating humo*" OR "self-enhancing humo*" OR "humor styles questionnaire").mp.	13028
7	5 OR 6	13226
8	4 AND 7	157

4. Social Sciences Databases (ProQuest) – excluding APA PsycArticles

Date of Search: 2nd June 2022 at 18:00

Only searched the following:

- Conference Papers & Proceedings
- Dissertations & Theses
- Other sources
- Scholarly Journals
- Speeches & Presentations
- Working Papers

Number of results: 101

#	Search string	# of results	
1	NOFT("dark triad" OR "dark tetrad" OR psychopathic OR psychopaths OR psychopathy OR narcissis* OR Machiavellian* OR sadis* OR "dark personalit*" OR "dark trait*") AND NOFT(humour* OR humor* OR "affiliative humo*" OR "aggressive humo*" OR "self-defeating humo*" OR "self-enhancing humo*" OR "humor styles questionnaire")	101	
Split into separate databases			
Social Science Premium Collection		71	1914 – present
Sociology Collection		36	1952 - present
Research Library: Social Sciences		21	Unknown
ProQuest Dissertations & Theses A&I: Social Sciences		19	1939 - current
Sociological Abstracts		21	1952 - current
Psychology Database		20	Unknown
International Bibliography of the Social Sciences (IBSS)		17	1951 – present
Applied Social Sciences Index & Abstracts (ASSIA)		14	1987 - current
Social Science Database		13	Unknown
Criminology Collection		3	1975 - present

Politics Collection	6	1914 - current
Religion database	6	1986- current
Worldwide Political Science Abstracts	6	1975 - current
Sociology Database	7	Unknown
Education Collection	10	1966 - present
Criminal Justice Database	3	Unknown
Political Science Database	1	Unknown
Educational Resources Information Center (ERIC)	9	1966 - present
Education database	1	1988- current
Linguistics Collection	3	1973 - current
Linguistics and Language Behavior Abstracts (LLBA)	3	1973 - present
Linguistics Database	1	1973 - present
PAIS Index	1	1972 - present
Social Services Abstracts	2	1980 - present
Periodicals Archive Online	1	1802 - 2005

5. Dissertation & Theses Database (ProQuest) – Master’s theses and Doctoral dissertations

Date of Search: 2nd June at 18:20

Number of results: 38

#	Search string	# of results
1	NOFT("dark triad" OR "dark tetrad" OR psychopathic OR psychopaths OR psychopathy OR narcissis* OR Machiavellian* OR sadis* OR "dark personalit*" OR "dark trait*") AND NOFT(humour* OR humor* OR "affiliative humo*" OR "aggressive humo*" OR "self-defeating humo*" OR "self-enhancing humo*" OR "humor styles questionnaire")	38

6. Cochrane Library – Trials

Date of Search: 3rd June 22 at 15:30

Number of results: 9

#	Search string	# of results
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1	("dark triad" OR "dark tetrad" OR "psychopathic" OR "psychopaths" OR "psychopathy" OR narcissis* OR Machiavellian* OR sadis* OR dark personalit* OR dark trait*):ti,ab,kw AND (humour* OR humor* OR "affiliative humo*" OR "aggressive humo*" OR "self-defeating humo*" OR "self-enhancing humo*" OR "humor styles questionnaire"):ti,ab,kw (word variations have been searched)	1
2	MeSH 'wit and humor as topic'	60
3	MeSH 'personality'	15474
4	#2 AND #3	9
5	#1 OR #4	10
1 result excluded as listed as a systematic review, so left with 9 trials.		

7. Web of Science

Date of Search: 3rd June at 16:00

Number of results: 94

#	Search string	# of results
1	TOPIC: ("dark triad" OR "dark tetrad" OR "psychopathic" OR "psychopaths" OR "psychopathy" OR narcissis* OR Machiavellian* OR sadis* OR "dark personalit*" OR "dark trait*") AND TOPIC: (humour* OR humor* OR "affiliative humo*" OR "aggressive humo*" OR "self-defeating humo*" OR "self-enhancing humo*" OR "humor styles questionnaire")	94
Split into separate databases		
	Social Sciences Citation Index (SSCI)	66
	Arts and Humanities Citation Index (AHCI)	19
	Sciences Citation Index Expanded (SCI-EXPANDED)	10
	Conference Proceedings Citation Index – Social Sciences & Humanities (CPCI-SSH)	1
	Conference Proceedings Citation Index – Science (CPCI-S)	1
	Emerging Sources Citation Index (ESCI)	12
	Book Citation index – Social Sciences & Humanities (BKCI-SSH)	2

8. Open Access Theses and Dissertations

Date of Search: 3rd June 22 at 18:00

Number of results: 3 (following removal of duplicates within same search)

#	Search string	# of results
1	narcissism narcissistic psychopathy psychopathic machiavellian machiavellianism sadist sadism (any	2

	words in any field) AND humor styles questionnaire (exact phrase in any field)	
2	narcissism narcissistic psychopathy psychopathic machiavellian machiavellianism sadist sadism (any words in any field) AND affiliative humor (exact phrase in any field) OR affiliative humour	1
3	narcissism narcissistic psychopathy psychopathic machiavellian machiavellianism sadist sadism (any words in any field) AND self-defeating humor (exact phrase in any field) OR self-defeating humour	2
4	narcissism narcissistic psychopathy psychopathic machiavellian machiavellianism sadist sadism (any words in any field) AND aggressive humor (exact phrase in any field) OR aggressive humour	2
5	narcissism narcissistic psychopathy psychopathic machiavellian machiavellianism sadist sadism (any words in any field) AND self-enhancing humor (exact phrase in any field) OR self-enhancing humour	1
Not counting papers duplicated within search, i.e. 1 OR 2 OR 3 OR 4 OR 5, total = 3		3

9. EThOS (British Library)

Date of Search: 3rd June 22 at 16:00

Number of results: 6

#	Search string	# of results
1	Humour style OR Humor style OR Humor styles questionnaire (Any word)	6
2	Aggressive humour OR aggressive humor (any word)	1 (duplicate)
3	Affiliative humour OR affiliative humor (any word)	1 (duplicate)
4	Self-enhancing humour OR self-enhancing humor (any word)	1 (duplicate)
5	Self-defeating humour OR self-defeating humor (any word)	1 (duplicate)
Not counting papers duplicated within same search, i.e. 1 OR 2 OR 3 OR 4 OR 5, total = 6		6

Total paper screened = 481

Duplicates removed = 149

Non-duplicated total = 332

Appendix C– Screening and Selection Tool

Reviewer name:

Date:

Author name/study ID:

Year:

Title:

Journal:

Language

Include

- English version

Exclude

- No English version

Patient population

Include

- Participants of all ages

Exclude

- None

Intervention – dark tetrad traits

Include

- Dark tetrad
- Dark triad
- Psychopathy
- Narcissism
- Machiavellianism
- Sadism

Exclude

- Personality traits not defined as a dark tetrad construct
- No personality traits measured

Outcome – humour style

Include

Any of the following, as measured in the HSQ:

- Affiliative humour
- Aggressive humour
- Self-enhancing humour
- Self-defeating humour

Exclude

- No use of the HSQ
- No humour measurement

Defining humour style

For this study 'humour style' has been solely defined as styles measured by the HSQ, i.e. aggressive, self-defeating, self-enhancing and affiliative, as the most widely used assessment for humour styles. This is due to the complexity and subjectivity of determining what constitutes each 'style'.

Study design

Include

- Any study with a quantitative outcome between individual dark tetrad trait(s) and humour style(s) as measured in the HSQ, sufficient for computation of effect size.

Exclude

- No quantitative outcome between dark tetrad traits and humour style(s), as measured in the HSQ
- Only an overall quantitative outcome provided for dark triad or dark tetrad, but not for individual constructs

Overall decision

- Include

- Exclude

Notes:

Appendix D – Studies excluded during full-text screening and reason from exclusion

Reference	Reason for Exclusion
Cowan, M. L. (2014). <i>There's nothing funny about the evolution of humour; The impact of sex, style, and status on humour production and appreciation</i> (unpublished PhD thesis, Stirling University).	No dark tetrad (DTe) traits measured or use of the Humor Styles Questionnaire (HSQ).
Itzhaky, L., Besser, A., & Zeigler-Hill, V. (2014). Not such a funny thing: When humor meets narcissism. In A. Besser (Ed.), <i>Handbook of the psychology of narcissism: Diverse perspectives</i> (pp. 315–332). Nova Science Publishers.	Duplicates studies already included in review (Besser & Zeigler-Hill, 2011; Zeigler-Hill & Besser, 2011).
Lee, S. A. (2019). The Dark Tetrad and callous reactions to mourner grief: Patterns of annoyance, boredom, entitlement, schadenfreude, and humor. <i>Personality and Individual Differences</i> , 137, 97-100.	Measures schadenfreude. No use of the HSQ.
Lu, M., & Fan, H. (2018). I sang, therefore I am! Uses and gratifications of self-mocking memes and the effects on psychological well-being. <i>International Journal of Cyber Behavior, Psychology and Learning (IJCBPL)</i> , 8(2), 35-50.	Measures self-mocking memes. No inclusion of HSQ measure confirmed by email from author.
Masui, K., & Ura, M. (2016). Aggressive humor style and psychopathy: Moderating effects of childhood socioeconomic status. <i>Translational Issues in Psychological Science</i> , 2(1), 46-53.	Duplicates data from another study identified (Masui, Fujiwara & Ura, 2013), but presents data on fewer humour styles.
Stoeber, J. (2015). How other-oriented perfectionism differs from self-oriented and socially prescribed perfectionism: Further findings. <i>Journal of Psychopathology and Behavioral Assessment</i> , 37(4), 611-623.	No DTe traits measured.
Allen, J. J., Ash, S. M., & Anderson, C. A. (2022). Who finds media violence funny? Testing the effects of media violence exposure and dark personality traits. <i>Psychology of Popular Media</i> , 11(1), 35-46.	Measures schadenfreude and humorous response to violent media. No use of the HSQ.
Andarab, M. S., & Mutlu, A. K. (2019). Using humor in language classrooms: Greasing the wheels or putting a spanner in the works? A study on humor styles of Turkish EFL instructors. <i>Eurasian Journal of Applied Linguistics</i> , 5(1), 23-39.	No DTe traits measured.

Bruntsch, R., & Ruch, W. (2017). The role of humor-related traits and broad personality dimensions in irony use. <i>Personality and Individual Differences</i> , 112, 139-143.	No DTe traits measured.
Pundt, A., & Herrmann, F. (2015). Affiliative and aggressive humour in leadership and their relationship to leader-member exchange. <i>Journal of Occupational and Organizational Psychology</i> , 88(1), 108-125.	No DTe traits measured.
Vrabel, J. K., Zeigler-Hill, V., & Shango, R. G. (2017). Spitefulness and humor styles. <i>Personality and Individual Differences</i> , 105, 238-243.	No DTe traits measured.
Yonatan-Leus, R., Tishby, O., Shefler, G., & Wiseman, H. (2018). Therapists' honesty, humor styles, playfulness, and creativity as outcome predictors: A retrospective study of the therapist effect. <i>Psychotherapy Research</i> , 28(5), 793-802.	No DTe traits measured.
Abe, S., & Ota, J. (2021). The Effects of Narcissism and Humor Coping on Anger Expression in Married Couples 1. <i>Japanese Psychological Research</i> , 1-8, doi: 10.1111/jpr.12344	Humor Coping with Interpersonal Stress Scale. No use of the HSQ.
Hasan, R.; Bertenthal, B. I.; Hugenberg, K.; and Kapadia, A. 2021. Your Photo is so Funny that I don't Mind Violating Your Privacy by Sharing it: Effects of Individual Humor Styles on Online Photo-sharing Behaviors. In <i>Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems</i> , CHI'21. ACM.	No DTe traits measured.
Kałowski, P., Szymaniak, K., & Maciantowicz, O. (2021). Exploring the Links Between Trait Anger, Self-Reported Sarcasm Use, and Narcissism. <i>Advances in Cognitive Psychology</i> , 17(4), 261-273.	Measures sarcasm. No use of the HSQ.
Silvia, P. J., Rodriguez, R. M., & Karwowski, M. (2021). Funny selves: Development of the Humor Efficacy and Identity Short Scales (HEISS). <i>Personality and Individual Differences</i> , 182, 111093.	DT traits and HSQ are used to answer different research questions and the direct relationship is not explored.
Navarro-Carrillo, G., Torres-Marín, J., & Carretero-Dios, H. (2021). Do trolls just want to have fun? Assessing the role of humor-related traits in online trolling behavior. <i>Computers in Human Behavior</i> , 114, 106551.	Duplicated data from study already identified (Torres-Marín et al., 2022).

Kfrerer, M., & Schermer, J. (2020). Humor styles and the ten personality dimensions from the Supernumerary Personality Inventory. <i>Current Issues in Personality Psychology</i> , 8(4), 352-360.	No DTe traits measured.
Plate, R. C., Zhao, S., Katz, C., Graber, E., Daley, G., Corbett, N., All, K., Neumann, C. S., & Waller, R. (2022). Are you laughing with me or at me? Psychopathic traits and the ability to distinguish between affiliation and dominance laughter cues. <i>Journal of Personality</i> , 90(4), 631-644.	Measures laughter clips intended to portray affiliative or dominant laughter, not humour itself.
Knight, J. E. (2015). <i>The Role of Social Exclusion as a Mediator of Humor Style Among Dark Triad Personalities</i> (unpublished Doctoral dissertation, Marietta College).	Regression data only, after experimental stimuli. No data showing unmanipulated relationship.
Veselka, L. (2016). <i>When life gives you lemons, squeeze them in people's eyes: humor styles in adaptive and maladaptive contexts</i> (unpublished Doctoral thesis, University of Western Ontario).	Duplicates data from another study identified (Veselka et al., 2016).
Lyons, M., Rowe, A., Waddington, R., & Brewer, G. (2022). Situational and dispositional factors in rape cognitions: the roles of social media and the Dark Triad traits. <i>Journal of Interpersonal Violence</i> , 37(11-12), NP10345-NP10361.	Measures whether one finds sexist and non-sexist tweets humorous. No use of the HSQ.
Young, A. C., & Kyranides, M. N. (2022). Understanding emotion regulation and humor styles in individuals with callous-unemotional traits and alexithymic traits. <i>The Journal of Psychology</i> , 156(2), 147-166.	No DTe traits measured.
Heym, N., Firth, J., Kibowski, F., Sumich, A., Egan, V., & Bloxsom, C. A. (2019). Empathy at the heart of darkness: Empathy deficits that bind the dark triad and those that mediate indirect relational aggression. <i>Frontiers in Psychiatry</i> , 10, 95.	No use of the HSQ.
Proyer, R. T., Flisch, R., Tschupp, S., Platt, T., & Ruch, W. (2012). How does psychopathy relate to humor and laughter? Dispositions toward ridicule and being laughed at, the sense of humor, and psychopathic personality traits. <i>International Journal of Law and Psychiatry</i> , 35(4), 263-268.	No use of the HSQ.

Boddy, C. R., Taplin, R., Sheehy, B., & Murphy, B. (2021). Finding psychopaths in white-collar jobs: a review of the evidence and why it matters. <i>Society and Business Review</i> , 17, 217–235.	No use of the HSQ.
Below excluded at the stage of Google Scholar 'cited by' searches:	
Aghli, E., Ahi, G., & Mansouri, A. (2018). The role of dark triad of personality in predicting psychological well-being and humor styles in nurses. <i>Iranian Journal of Psychiatric Nursing</i> , 6(2), 41-49.	Paper in Farsi only.
Carqueville, M. (2020). <i>Relationship between the personality traits of the dark tetrad and different styles of humor</i> (unpublished thesis FOM Hochschule Hochschulzentrum München).	Paper in German only.
Gan, X. (2019). <i>Testing the mediating role of empathy, humor style and forgiveness in the association between Dark Triad Traits and Romantic Relationship Satisfaction: An actor-partner interdependence approach</i> (Unpublished thesis). The Hong Kong Shue Yan University, Hong Kong. https://doi.org/10.13140/RG.2.2.24389.27362	Effect size for dark triad (DT) as an overall construct, no effect sizes for individual traits.
Below excluded at the stage of quality assessment:	
Williams, A. (2018). <i>Interactions Between Personality Traits and Humor Styles</i> (Unpublished thesis). Alfred University, New York. Retrieved from http://hdl.handle.net/10829/10834	Deemed to have insufficient quality and therefore potential bias.

Appendix E – AXIS quality assessment tool

Study: Date:	YES	NO	DON'T KNOW / COMMENT
INTRODUCTION			
1. Were the aims/objectives of the study clear?			
METHODS			
2. Was the study design appropriate for the stated aim(s)?			
3. Was the sample size justified?			
4. Was the target/reference population clearly defined? (Is it clear who the research was about?)			
5. Was the sample frame taken from an appropriate population base so that it closely represented the target/reference population under investigation?			
6. Was the selection process likely to select subjects/participants that were representative of the target/reference population under investigation?			
7. Were measures undertaken to address and categorise non-responders?			
8. Were the risk factor and outcome variables measured appropriate to the aims of the study?			
9. Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialed, piloted or published previously?			
10. Is it clear what was used to determine statistical significance and/or precision estimates? (eg, p values, CIs)			
11. Were the methods (including statistical methods) sufficiently described to enable them to be repeated?			
RESULTS			
12. Were the basic data adequately described?			
13. * Does the response rate raise concerns about non-response bias?			
14. If appropriate, was information about non-responders described?			
15. Were the results internally consistent?			
16. Were the results for the analyses described in the methods, presented?			
DISCUSSION			
17. Were the authors' discussions and conclusions justified by the results?			
18. Were the limitations of the study discussed?			
OTHER			
19. * Were there any funding sources or conflicts of interest that may affect the authors' interpretation of the results?			
20. Was ethical approval or consent of participants attained?			

* For purpose of quality score, yes=0, no=1 and don't know=0
For all other items, yes=1, no=0 and don't know=0.

Appendix F – Quality assessment ratings

Study	AXIS ITEM																				QA rating (%)	Risk of bias
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
Choi, Ha & Choi (2022)	Y	Y	DK	Y	N	N	N	Y	Y	Y	N	Y	DK	N	DK	DK	Y	Y	N	Y	Medium (55)	Medium
Averitt (2019)	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	DK	NA	Y	Y	Y	Y	DK	Y	High (74)	Low
Besser & Zeigler-Hill (2011) - 1	Y	Y	N	N	N	N	N	Y	Y	Y	N	Y	DK	NA	Y	N	Y	Y	DK	Y	Medium (53)	Medium
Besser & Zeigler-Hill (2011) - 2	Y	Y	N	N	N	N	N	Y	Y	Y	DK	Y	N	NA	Y	N	Y	Y	DK	Y	Medium (53)	Medium
Crysel & Webster (2018)	Y	Y	N	N	DK	N	N	Y	Y	Y	N	Y	DK	NA	Y	DK	DK	Y	N	Y	Medium (53)	Medium
Yee & Lee (2022)	Y	Y	Y	N	N	N	DK	Y	Y	Y	N	Y	DK	NA	DK	DK	Y	Y	N	Y	Medium (55)	Medium
Masui, Fujiwara & Ura (2013)	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	DK	N	DK	Y	Y	Y	N	Y	High (70)	Low
Lobbestael & Freund (2021)	Y	Y	DK	Y	N	N	N	Y	Y	Y	Y	Y	DK	NA	Y	Y	DK	Y	N	Y	High (68)	Low
Veselka, Schermer, Martin & Vernon (2010)	Y	Y	N	N	N	N	N	Y	Y	Y	Y	Y	DK	N	DK	Y	DK	N	DK	DK	Medium (55)	Medium
Martin, Lastuk, Jeffery, Vernon &	Y	Y	N	N	N	N	N	Y	Y	Y	N	Y	DK	N	DK	N	DK	N	DK	Y	Medium (35)	Medium

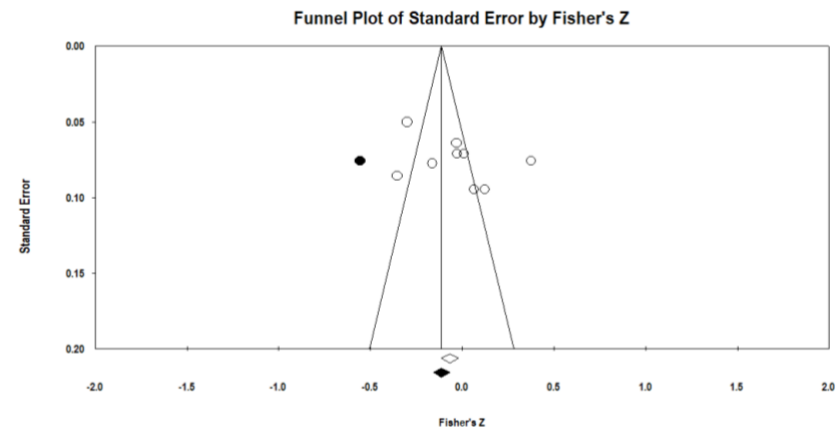
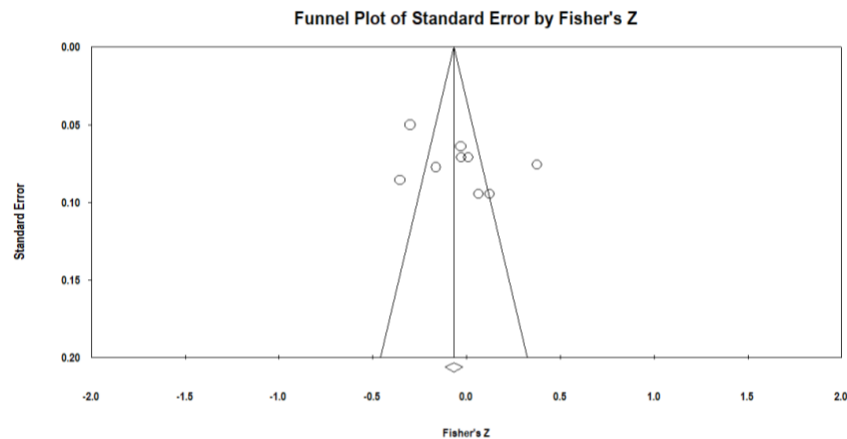
Veselka (2012)																						
Williams (2018)	DK	Y	N	Y	N	DK	N	N	Y	Y	N	N	Y	N	N	N	N	Y	DK	Y	Low (30)	High
Zeigler-Hill, Besser & Jett (2013) - 1	Y	Y	N	N	N	N	Y	Y	Y	Y	N	N	Y	Y	DK	N	DK	Y	DK	DK	Medium (40)	Medium
Marino (2011)	Y	Y	N	N	N	N	DK	Y	Y	Y	N	Y	DK	N	Y	N	Y	Y	DK	Y	Medium (50)	Medium
Duarte (2020)	Y	Y	N	N	Y	N	DK	Y	Y	Y	N	Y	DK	NA	N	N	Y	Y	DK	Y	Medium (53)	Medium
Torres-Marin, Navarro-Carrillo & Carretero-Dios (2022)	Y	Y	Y	N	N	DK	DK	Y	Y	Y	Y	Y	DK	DK	Y	Y	DK	Y	N	Y	Medium (65)	Medium
Hollandsworth (2019)	Y	Y	N	Y	Y	DK	DK	Y	Y	Y	N	Y	DK	N	DK	N	DK	Y	DK	Y	Medium (50)	Medium
Mededovic & Bulut (2017)	Y	Y	N	N	N	N	DK	Y	Y	Y	N	Y	DK	N	DK	N	Y	Y	DK	N	Medium (42)	Medium
Podnar & Martin (2013)	Y	Y	N	N	N	N	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	DK	Y	Medium (60)	Medium
Zeigler-Hill & Besser (2011)	Y	Y	N	N	N	DK	DK	Y	Y	Y	N	Y	DK	N	Y	N	Y	Y	DK	Y	Medium (50)	Medium

Appendix G – Meta-analyses statistical output, forest and funnel plots

Psychopathy and affiliative humour

Model	Study name	Measure	Statistics for each study					Correlation and 95% CI					Weight (Random)
			Correlation	Lower limit	Upper limit	Z-Value	p-Value	-1.00	-0.50	0.00	0.50	1.00	Relative weight
	Yee & Lee (2022)	SD-3	-0.160	-0.304	-0.009	-2.079	0.038						11.09
	Masui, Fujiwara & Ura (2013)	LSRP - Japanese version	-0.340	-0.479	-0.184	-4.129	0.000						10.81
	Lobbestael & Freund (2021)	PPI-R - both Dutch and English	0.360	0.224	0.482	4.971	0.000						11.15
	Veselka, Schermer, Martin & Vernon (2010) [sample 1]	SRP-III	0.066	-0.119	0.247	0.696	0.486						10.48
	Veselka, Schermer, Martin & Vernon (2010) [sample 2]	SRP-III	0.124	-0.061	0.301	1.313	0.189						10.48
	Martin, Lastuk, Schermer, Jeffery, Vernon & Veselka (2012)	SRP-III	-0.028	-0.166	0.111	-0.393	0.694						11.29
	Duarte (2020)	SD3	-0.290	-0.377	-0.198	-5.949	0.000						11.90
	Torres-Marín, Navarro-Carrillo & Carretero-Dios (2022) - Study 1	SD3 - Spanish version	0.010	-0.129	0.148	0.141	0.888						11.30
	Podnar (2013)	SRP-III	-0.030	-0.154	0.095	-0.469	0.639						11.52
Random			-0.035	-0.181	0.112	-0.467	0.641						

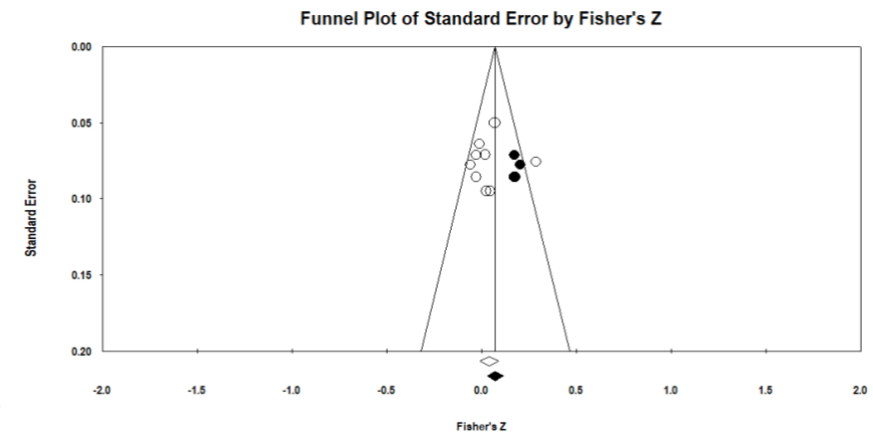
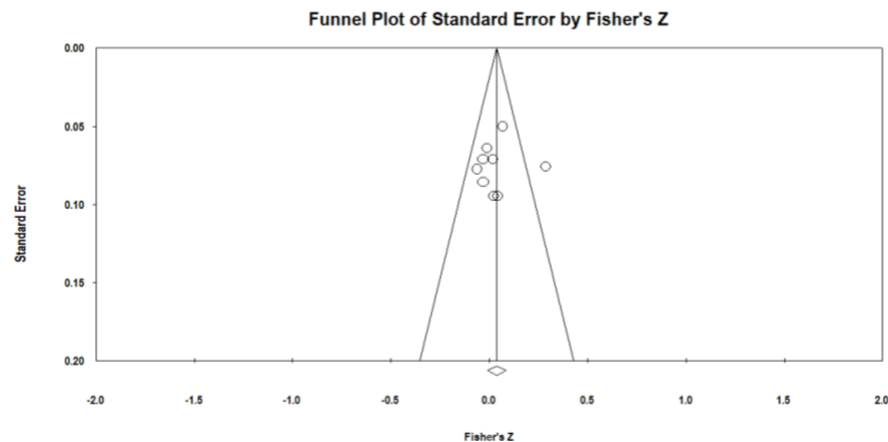
Including 'trim and fill' method



Psychopathy and self-enhancing humour

Model	Study name	Measure	Statistics for each study					Correlation and 95% CI					Weight (Random)
			Correlation	Lower limit	Upper limit	Z-Value	p-Value	-1.00	-0.50	0.00	0.50	1.00	Relative weight
	Yee & Lee (2022)	SD-3	-0.060	-0.209	0.092	-0.774	0.439			+			10.66
	Masui, Fujiwara & Ura (2013)	LSRP - Japanese version	-0.030	-0.196	0.137	-0.350	0.726			+			9.48
	Lobbestael & Freund (2021)	PPI-R - both Dutch and English	0.280	0.138	0.411	3.795	0.000				+		10.94
	Veselka, Schermer, Martin & Vernon (2010) [sample 1]	SRP-III	0.024	-0.161	0.207	0.253	0.800			+			8.33
	Veselka, Schermer, Martin & Vernon (2010) [sample 2]	SRP-III	0.045	-0.140	0.227	0.474	0.635			+			8.33
	Martin, Lastuk, Schermer, Jeffery, Vernon & Veselka (2012)	SRP-III	-0.029	-0.167	0.110	-0.407	0.684			+			11.69
	Duarte (2020)	SD-3	0.070	-0.028	0.167	1.397	0.162			+			15.86
	Torres-Marín, Navarro-Carrillo & Carretero-Dios (2022) - Study 1	SD-3 - Spanish version	0.020	-0.119	0.158	0.281	0.778			+			11.72
	Podnar (2013)	SRP-III	-0.010	-0.135	0.115	-0.156	0.876			+			13.00
Random			0.037	-0.029	0.103	1.089	0.276			+			

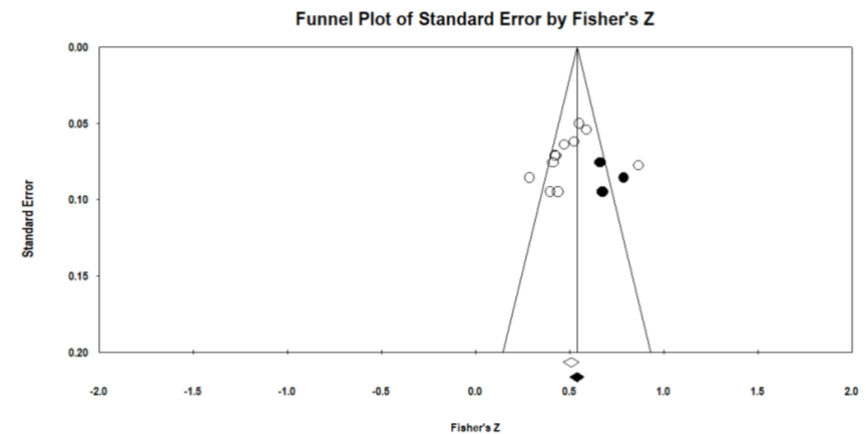
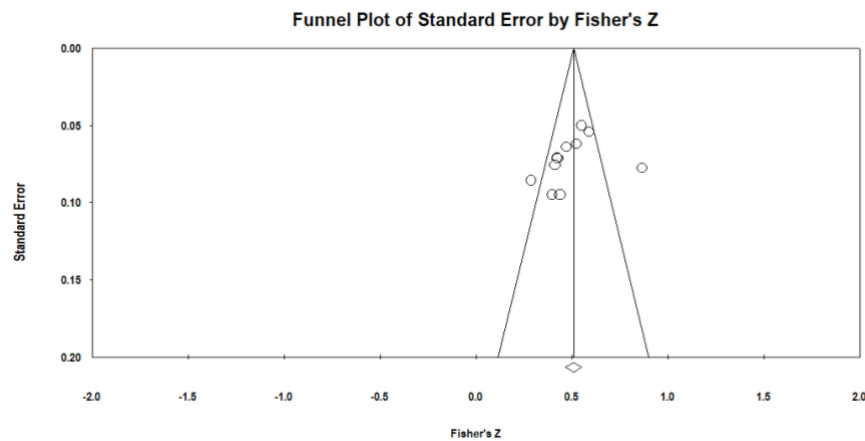
Including 'trim and fill' method



Psychopathy and aggressive humour

Model	Study name	Measure	Statistics for each study					Correlation and 95% CI					Weight (Random)
			Correlation	Lower limit	Upper limit	Z-Value	p-Value	-1.00	-0.50	0.00	0.50	1.00	Relative weight
	Crysel & Webster (2018) - Study 4	DD	0.480	0.381	0.568	8.400	0.000						9.84
	Yee & Lee (2022)	SD-3	0.700	0.614	0.770	11.174	0.000						8.75
	Masui, Fujiwara & Ura (2013)	LSRP - Japanese version	0.280	0.119	0.427	3.355	0.001						8.18
	Lobbestael & Freund (2021)	PPI-R - both Dutch and English	0.390	0.257	0.508	5.432	0.000						8.87
	Veselka, Schermer, Martin & Vernon (2010) [sample 1]	SRP-III	0.378	0.209	0.525	4.190	0.000						7.57
	Veselka, Schermer, Martin & Vernon (2010) [sample 2]	SRP-III	0.413	0.248	0.555	4.627	0.000						7.57
	Martin, Lastuk, Schermer, Jeffery, Vernon & Veselka (2012)	SRP-III	0.402	0.279	0.512	5.980	0.000						9.20
	Duarte (2020)	SD-3	0.500	0.423	0.570	10.945	0.000						10.69
	Torres-Marín, Navarro-Carrillo & Carretero-Dios (2022) - Study 1	SD-3 - Spanish version	0.400	0.277	0.510	5.961	0.000						9.21
	Mededovic & Bulut (2017)	DD	0.530	0.449	0.602	10.850	0.000						10.40
	Podnar (2013)	SRP-III	0.440	0.333	0.535	7.376	0.000						9.72
Random			0.458	0.392	0.519	12.058	0.000						

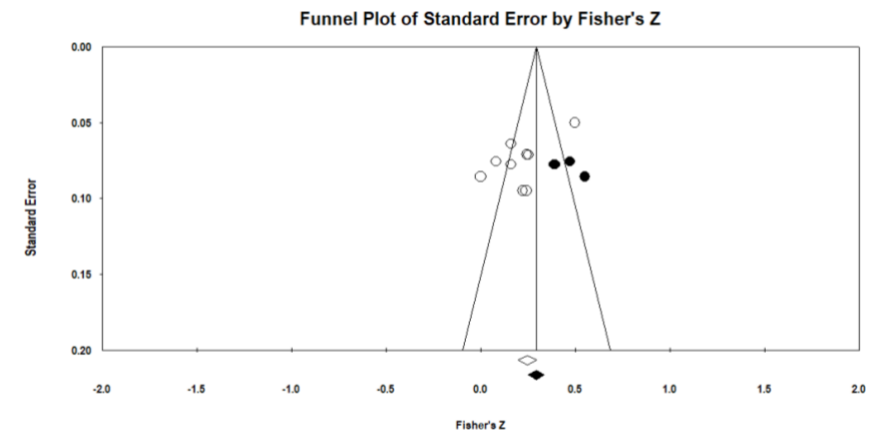
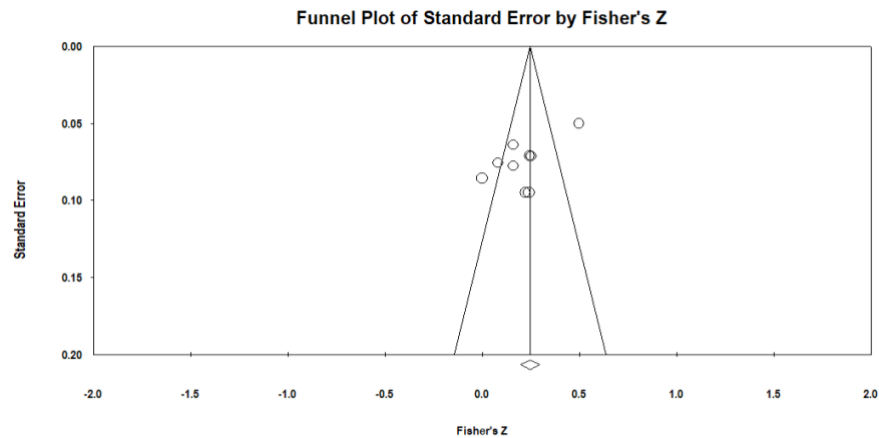
Including 'trim and fill' method



Psychopathy and self-defeating humour

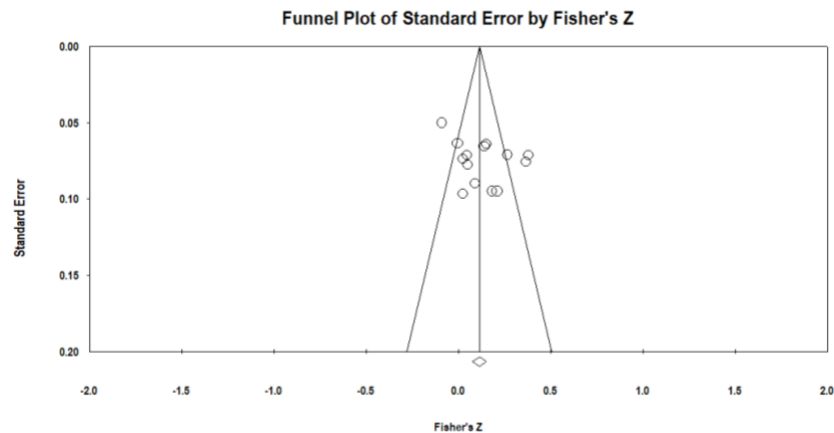
Model	Study name	Measure	Statistics for each study					Correlation and 95% CI					Weight (Random)
			Correlation	Lower limit	Upper limit	Z-Value	p-Value	-1.00	-0.50	0.00	0.50	1.00	Relative weight
	Yee & Lee (2022)	SD-3	0.160	0.009	0.304	2.079	0.038						11.04
	Masui, Fujiwara & Ura (2013)	LSRP - Japanese version	0.000	-0.167	0.167	0.000	1.000						10.54
	Lobbetael & Freund (2021)	PPI-R - both Dutch and English	0.080	-0.068	0.225	1.058	0.290						11.15
	Veselka, Schermer, Martin & Vernon (2010) [sample 1]	SRP-III	0.217	0.034	0.386	2.323	0.020						9.97
	Veselka, Schermer, Martin & Vernon (2010) [sample 2]	SRP-III	0.236	0.054	0.402	2.534	0.011						9.97
	Martin, Lastuk, Schermer, Jeffery, Vernon & Veselka (2012)	SRP-III	0.247	0.112	0.373	3.540	0.000						11.42
	Duarte (2020)	SD-3	0.460	0.379	0.534	9.909	0.000						12.62
	Torres-Marín, Navarro-Carrillo & Carretero-Dios (2022) - Study 1	SD-3 - Spanish version	0.240	0.105	0.366	3.444	0.001						11.43
	Podnar (2013)	SRP-III	0.160	0.036	0.279	2.521	0.012						11.85
Random			0.208	0.102	0.310	3.802	0.000						

Including 'trim and fill' method



Narcissism and affiliative humour

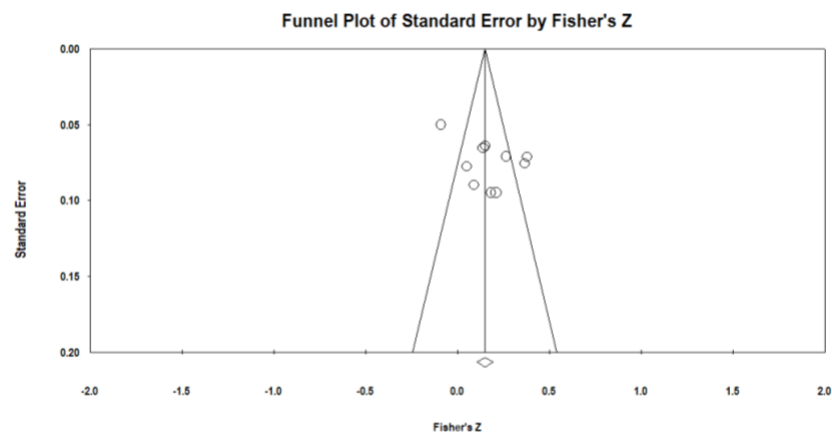
Model	Study name	Outcome	Statistics for each study					Correlation and 95% CI					Weight (Random)
			Correlation	Lower limit	Upper limit	Z-Value	p-Value	-1.00	-0.50	0.00	0.50	1.00	Relative weight
	Averitt (2019)	NPI-16	0.140	0.012	0.263	2.147	0.032						7.62
	Besser & Zeigler-Hill (2011) - Study 1	PNI	0.025	-0.119	0.168	0.339	0.734						7.24
	Besser & Zeigler-Hill (2011) - Study 2	PNI	-0.005	-0.129	0.119	-0.079	0.937						7.71
	Yee & Lee (2022)	SD-3	0.050	-0.102	0.199	0.645	0.519						7.06
	Lobbestael & Freund (2021)	NPI - both Dutch and English	0.350	0.214	0.473	4.821	0.000						7.14
	Veselka, Schermer, Martin & Vernon (2010) [sample 1]	NPI	0.208	0.025	0.377	2.224	0.026						6.25
	Veselka, Schermer, Martin & Vernon (2010) [sample 2]	NPI	0.181	-0.003	0.353	1.928	0.054						6.25
	Martin, Lastuk, Schermer, Jeffery, Vernon & Veselka (2012)	NPI	0.363	0.236	0.478	5.338	0.000						7.35
	Marino (2011)	NPI	0.090	-0.086	0.260	1.005	0.315						6.49
	Duarte (2020)	SD-3	-0.090	-0.186	0.008	-1.798	0.072						8.30
	Torres-Marín, Navarro-Carrillo & Carretero-Dios (2022) - Study 1	SD-3 - Spanish versions	0.260	0.126	0.385	3.744	0.000						7.36
	Hollandsworth (2019)	PNI	0.025	-0.163	0.211	0.259	0.796						6.18
	Podnar (2013)	NPI	0.150	0.026	0.270	2.361	0.018						7.69
	Zeigler-Hill & Besser (2011)	PNI	0.045	-0.094	0.183	0.632	0.527						7.35
Random			0.128	0.049	0.205	3.177	0.001						



No change in plot observed with 'trim and fill' method

Narcissism (not inclusive of studies using PNI) and affiliative humour

Model	Study name	Outcome	Statistics for each study					Correlation and 95% CI					Weight (Random)
			Correlation	Lower limit	Upper limit	Z-Value	p-Value	-1.00	-0.50	0.00	0.50	1.00	Relative weight
	Averitt (2019)	NPI-16	0.140	0.012	0.263	2.147	0.032						10.55
	Yee & Lee (2022)	SD-3	0.050	-0.102	0.199	0.645	0.519						9.90
	Lobbestael & Freund (2021)	NPI - both Dutch and English	0.350	0.214	0.473	4.821	0.000						10.00
	Veselka, Schermer, Martin & Vernon (2010) [sample 1]	NPI	0.208	0.025	0.377	2.224	0.026						8.94
	Veselka, Schermer, Martin & Vernon (2010) [sample 2]	NPI	0.181	-0.003	0.353	1.928	0.054						8.94
	Martin, Lastuk, Schermer, Jeffery, Vernon & Veselka (2012)	NPI	0.363	0.236	0.478	5.338	0.000						10.25
	Marino (2011)	NPI	0.090	-0.086	0.260	1.005	0.315						9.22
	Duarte (2020)	SD-3	-0.090	-0.186	0.008	-1.798	0.072						11.32
	Torres-Marín, Navarro-Carrillo & Carretero-Dios (2022) - Study 1	SD-3 - Spanish versions	0.260	0.126	0.385	3.744	0.000						10.26
	Podnar (2013)	NPI	0.150	0.026	0.270	2.361	0.018						10.63
Random			0.170	0.069	0.268	3.273	0.001						

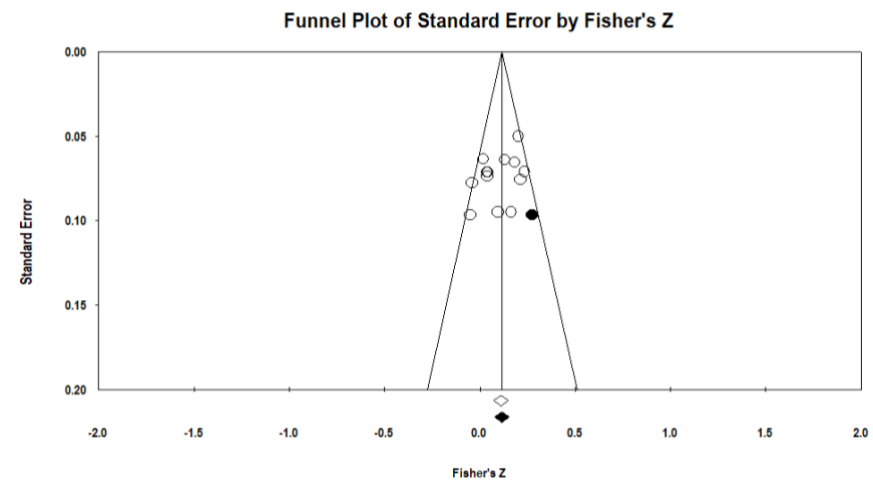
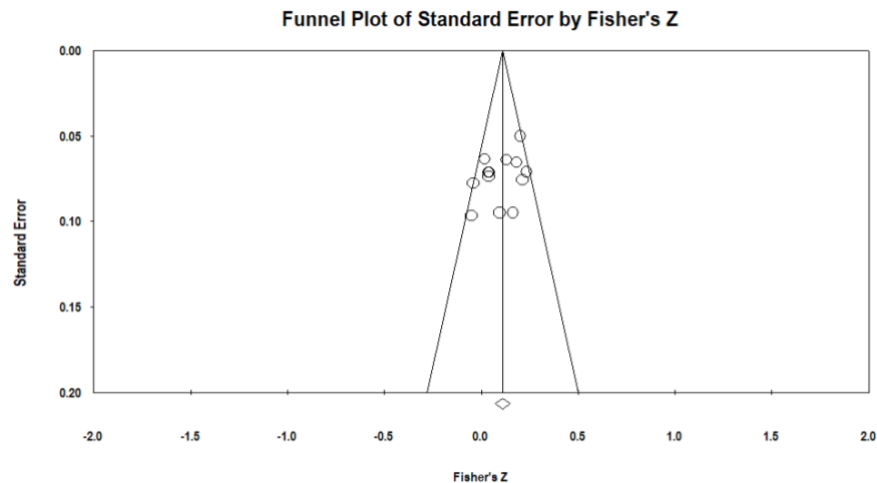


No change in plot observed with 'trim and fill' method

Narcissism and self-enhancing humour

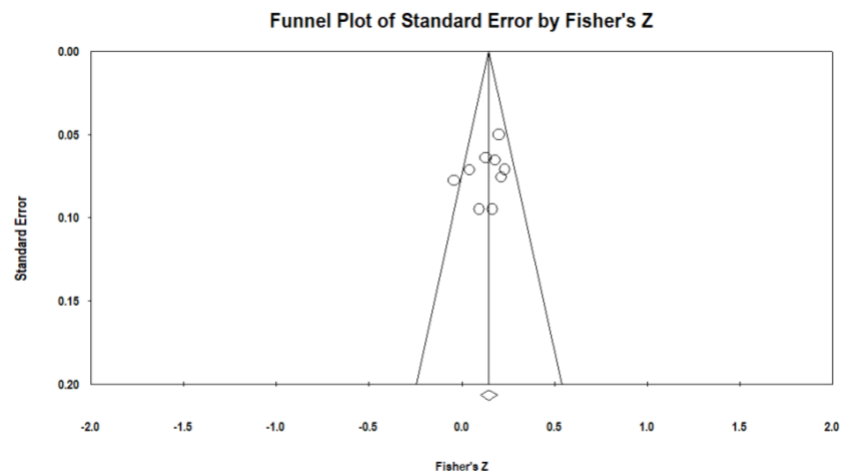
Model	Study name	Outcome	Statistics for each study					Correlation and 95% CI					Weight (Random)
			Correlation	Lower limit	Upper limit	Z-Value	p-Value	-1.00	-0.50	0.00	0.50	1.00	Relative weight
	Averitt (2019)	NPI	0.180	0.053	0.301	2.772	0.006						8.66
	Besser & Zeigler-Hill (2011) - Study 1	PNI	0.040	-0.104	0.182	0.543	0.587						7.63
	Besser & Zeigler-Hill (2011) - Study 2	PNI	0.020	-0.104	0.143	0.315	0.753						8.96
	Yee & Lee (2022)	SD-3	-0.040	-0.190	0.112	-0.516	0.606						7.18
	Lobbestael & Freund (2021)	NPI - both Dutch and English	0.210	0.064	0.347	2.812	0.005						7.38
	Veselka, Schermer, Martin & Vernon (2010) [sample 1]	NPI	0.164	-0.021	0.338	1.744	0.081						5.53
	Veselka, Schermer, Martin & Vernon (2010) [sample 2]	NPI	0.096	-0.089	0.275	1.015	0.310						5.53
	Martin, Lastuk, Schermer, Jeffery, Vernon & Veselka (2012)	NPI	0.042	-0.097	0.180	0.590	0.555						7.93
	Duarte (2020)	SD-3	0.200	0.104	0.292	4.039	0.000						11.05
	Torres-Marín, Navarro-Carrillo & Carretero-Dios (2022) - Study 1	SD-3 - Spanish version	0.230	0.095	0.357	3.295	0.001						7.95
	Hollandsworth (2019)	PNI	-0.049	-0.234	0.140	-0.507	0.612						5.39
	Podnar (2013)	NPI	0.130	0.005	0.251	2.042	0.041						8.89
	Zeigler-Hill & Besser (2011)	PNI	0.036	-0.103	0.174	0.506	0.613						7.93
Random			0.104	0.052	0.155	3.885	0.000						

Including 'trim and fill' method



Narcissism (not inclusive of studies using PNI) and self-enhancing humour

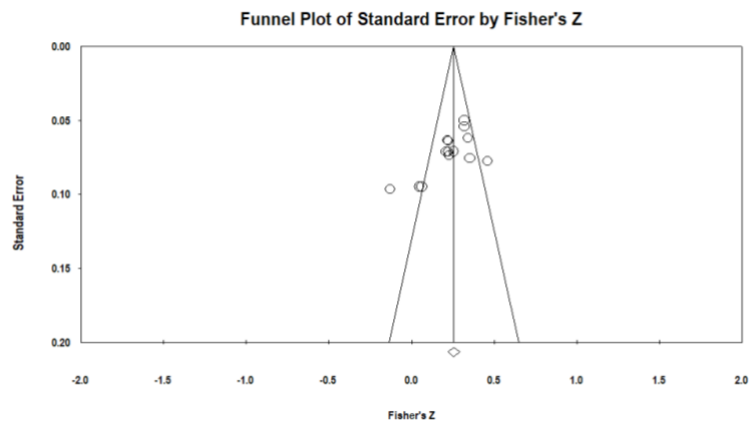
Model	Study name	Outcome	Statistics for each study					Correlation and 95% CI					Weight (Random)
			Correlation	Lower limit	Upper limit	Z-Value	p-Value	-1.00	-0.50	0.00	0.50	1.00	Relative weight
	Averitt (2019)	NPI	0.180	0.053	0.301	2.772	0.006						12.49
	Yee & Lee (2022)	SD-3	-0.040	-0.190	0.112	-0.516	0.606						10.01
	Lobbestael & Freund (2021)	NPI - both Dutch and English	0.210	0.064	0.347	2.812	0.005						10.34
	Veselka, Schermer, Martin & Vernon (2010) [sample 1]	NPI	0.164	-0.021	0.338	1.744	0.081						7.44
	Veselka, Schermer, Martin & Vernon (2010) [sample 2]	NPI	0.096	-0.089	0.275	1.015	0.310						7.44
	Martin, Lastuk, Schermer, Jeffery, Vernon & Veselka (2012)	NPI	0.042	-0.097	0.180	0.590	0.555						11.25
	Duarte (2020)	SD-3	0.200	0.104	0.292	4.039	0.000						16.86
	Torres-Marín, Navarro-Carillo & Carretero-Dios (2022) - Study 1	SD-3 - Spanish version	0.230	0.095	0.357	3.295	0.001						11.28
	Podnar (2013)	NPI	0.130	0.005	0.251	2.042	0.041						12.89
Random			0.141	0.085	0.197	4.847	0.000						



No change in plot observed with 'trim and fill' method

Narcissism and aggressive humour

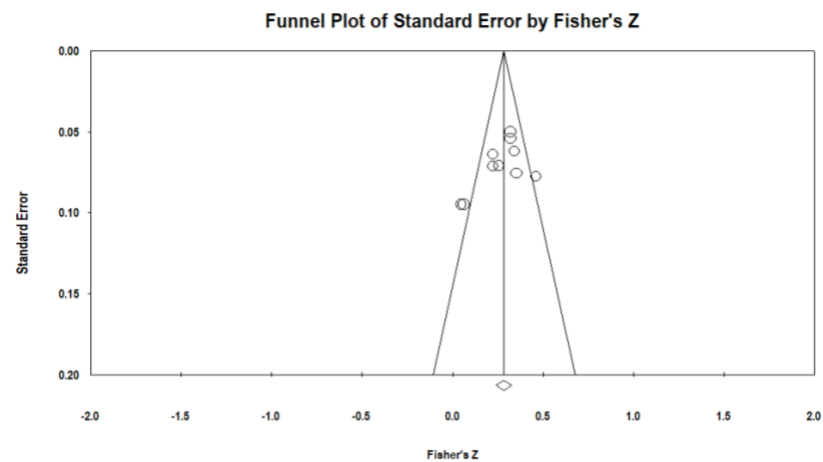
Model	Study name	Outcome	Statistics for each study					Correlation and 95% CI					Weight (Random)
			Correlation	Lower limit	Upper limit	Z-Value	p-Value	-1.00	-0.50	0.00	0.50	1.00	Relative weight
	Besser & Zeigler-Hill (2011) - Study 1	PNI	0.225	0.084	0.357	3.105	0.002				+		7.06
	Besser & Zeigler-Hill (2011) - Study 2	PNI	0.215	0.094	0.330	3.439	0.001				+		7.77
	Crysel & Webster (2018) - Study 4	DD	0.330	0.217	0.434	5.507	0.000				+		7.86
	Yee & Lee (2022)	SD-3	0.430	0.298	0.546	5.925	0.000				+		6.79
	Lobbestael & Freund (2021)	NPI - both Dutch and English	0.340	0.203	0.464	4.671	0.000				+		6.91
	Veselka, Schermer, Martin & Vernon (2010) [sample 1]	NPI	0.048	-0.137	0.230	0.506	0.613			+			5.72
	Veselka, Schermer, Martin & Vernon (2010) [sample 2]	NPI	0.064	-0.121	0.245	0.675	0.500			+			5.72
	Martin, Lastuk, Schermer, Jeffery, Vernon & Veselka (2012)	NPI	0.219	0.083	0.347	3.124	0.002				+		7.23
	Duarte (2020)	SD-3	0.310	0.219	0.396	6.387	0.000				+		8.72
	Torres-Marín, Navarro-Carrillo & Carretero-Dios (2022) - Study 1	SD-3 - Spanish version	0.250	0.116	0.375	3.594	0.000				+		7.24
	Hollandsworth (2019)	PNI	-0.127	-0.307	0.062	-1.321	0.187		+				5.62
	Mededovic & Bulut (2017)	DD	0.310	0.211	0.403	5.893	0.000				+		8.42
	Podnar (2013)	NPI	0.220	0.098	0.336	3.494	0.000				+		7.73
	Zeigler-Hill & Besser (2011)	PNI	0.208	0.071	0.337	2.963	0.003				+		7.23
Random			0.233	0.171	0.293	7.210	0.000				+		



No change in plot observed with 'trim and fill' method

Narcissism (not inclusive of studies using the PNI) and aggressive humour

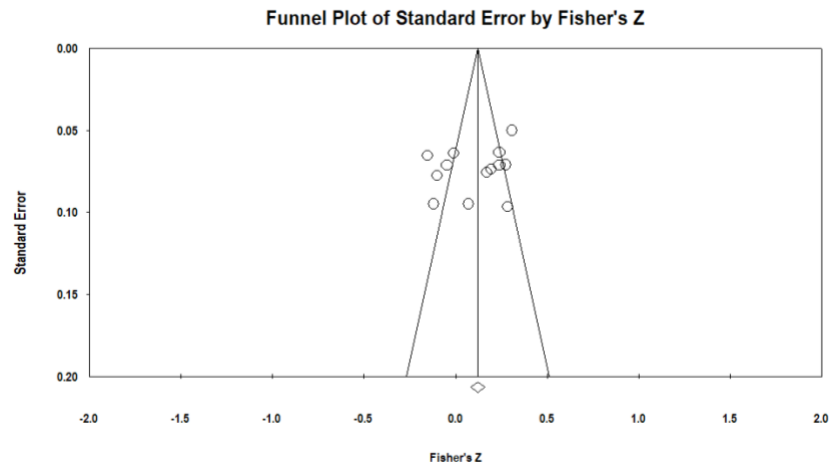
Model	Study name	Outcome	Statistics for each study					Correlation and 95% CI					Weight (Random)
			Correlation	Lower limit	Upper limit	Z-Value	p-Value	-1.00	-0.50	0.00	0.50	1.00	Relative weight
	Crysel & Webster (2018) - Study 4	DD	0.330	0.217	0.434	5.507	0.000				+		11.08
	Yee & Lee (2022)	SD-3	0.430	0.298	0.546	5.925	0.000				++		9.15
	Lobbestael & Freund (2021)	NPI - both Dutch and English	0.340	0.203	0.464	4.671	0.000				+		9.36
	Veselka, Schermer, Martin & Vernon (2010) [sample 1]	NPI	0.048	-0.137	0.230	0.506	0.613			+			7.37
	Veselka, Schermer, Martin & Vernon (2010) [sample 2]	NPI	0.064	-0.121	0.245	0.675	0.500			+			7.37
	Martin, Lastuk, Schermer, Jeffery, Vernon & Veselka (2012)	NPI	0.219	0.083	0.347	3.124	0.002				+		9.91
	Duarte (2020)	SD-3	0.310	0.219	0.396	6.387	0.000				+		12.79
	Torres-Marín, Navarro-Carrillo & Carretero-Dios (2022) - Study 1	SD-3 - Spanish version	0.250	0.116	0.375	3.594	0.000				+		9.94
	Mededovic & Bulut (2017)	DD	0.310	0.211	0.403	5.893	0.000				+		12.18
	Podnar (2013)	NPI	0.220	0.098	0.336	3.494	0.000				+		10.85
Random			0.267	0.205	0.327	8.139	0.000				+		



No change in plot observed with 'trim and fill' method

Narcissism and self-defeating humour

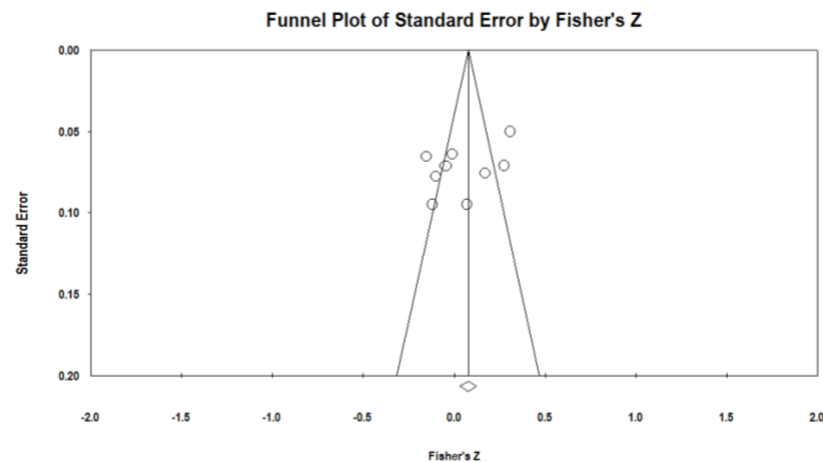
Model	Study name	Outcome	Statistics for each study					Correlation and 95% CI					Weight (Random)
			Correlation	Lower limit	Upper limit	Z-Value	p-Value	-1.00	-0.50	0.00	0.50	1.00	Relative weight
	Averitt (2019)	NPI	-0.150	-0.273	-0.022	-2.302	0.021			+			8.03
	Besser & Zeigler-Hill (2011) - Study 1	PNI	0.191	0.049	0.326	2.623	0.009				+		7.74
	Besser & Zeigler-Hill (2011) - Study 2	PNI	0.235	0.115	0.349	3.771	0.000				+		8.11
	Yee & Lee (2022)	SD-3	-0.100	-0.247	0.052	-1.293	0.196			+			7.59
	Lobbestael & Freund (2021)	NPI - both Dutch and English	0.170	0.023	0.310	2.264	0.024				+		7.66
	Veselka, Schermer, Martin & Vernon (2010) [sample 1]	NPI	0.071	-0.114	0.252	0.749	0.454				+		6.93
	Veselka, Schermer, Martin & Vernon (2010) [sample 2]	NPI	-0.120	-0.297	0.065	-1.270	0.204			+			6.93
	Martin, Lastuk, Schermer, Jeffery, Vernon & Veselka (2012)	NPI	-0.045	-0.183	0.094	-0.632	0.527			+			7.83
	Duarte (2020)	SD-3	0.300	0.208	0.387	6.167	0.000				+		8.55
	Torres-Marín, Navarro-Carrillo & Carretero-Dios (2022) - Study 1	SD-3 - Spanish version	0.270	0.137	0.394	3.896	0.000				+		7.84
	Hollandsworth (2019)	PNI	0.277	0.095	0.441	2.942	0.003				+		6.86
	Podnar (2013)	NPI	-0.010	-0.135	0.115	-0.156	0.876			+			8.09
	Zeigler-Hill & Besser (2011)	PNI	0.235	0.100	0.362	3.361	0.001				+		7.83
Random			0.106	0.011	0.199	2.184	0.029				+		



No change in plot observed with 'trim and fill' method

Narcissism (not inclusive of studies using the PNI) and self-defeating humour

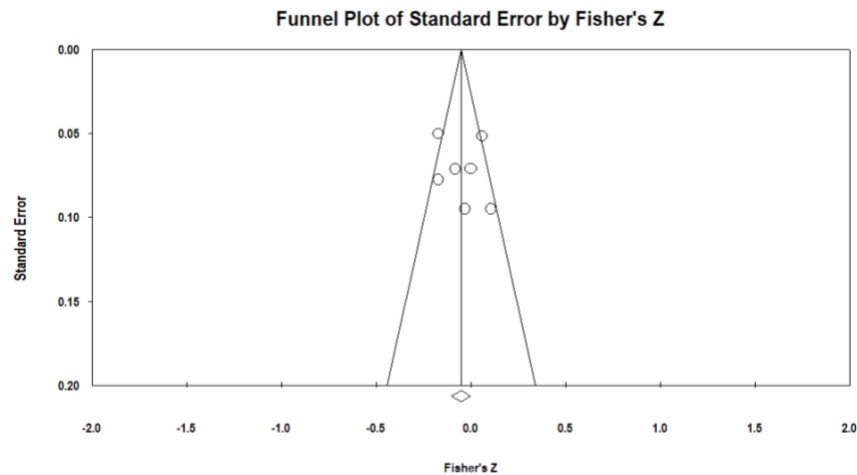
Model	Study name	Outcome	Statistics for each study					Correlation and 95% CI					Weight (Random)
			Correlation	Lower limit	Upper limit	Z-Value	p-Value	-1.00	-0.50	0.00	0.50	1.00	Relative weight
	Averitt (2019)	NPI	-0.150	-0.273	-0.022	-2.302	0.021			+			11.50
	Yee & Lee (2022)	SD-3	-0.100	-0.247	0.052	-1.293	0.196			+			10.97
	Lobbestael & Freund (2021)	NPI - both Dutch and English	0.170	0.023	0.310	2.264	0.024				+		11.05
	Veselka, Schermer, Martin & Vernon (2010) [sample 1]	NPI	0.071	-0.114	0.252	0.749	0.454				+		10.15
	Veselka, Schermer, Martin & Vernon (2010) [sample 2]	NPI	-0.120	-0.297	0.065	-1.270	0.204			+			10.15
	Martin, Lastuk, Schermer, Jeffery, Vernon & Veselka (2012)	NPI	-0.045	-0.183	0.094	-0.632	0.527			+			11.25
	Duarte (2020)	SD-3	0.300	0.208	0.387	6.167	0.000				+		12.11
	Torres-Marín, Navarro-Carrillo & Carretero-Dios (2022) - Study 1	SD-3 - Spanish version	0.270	0.137	0.394	3.896	0.000				+		11.26
	Podnar (2013)	NPI	-0.010	-0.135	0.115	-0.156	0.876			+			11.57
Random			0.048	-0.077	0.171	0.754	0.451			+			



No change in plot observed with 'trim and fill' method

Machiavellianism and affiliative humour

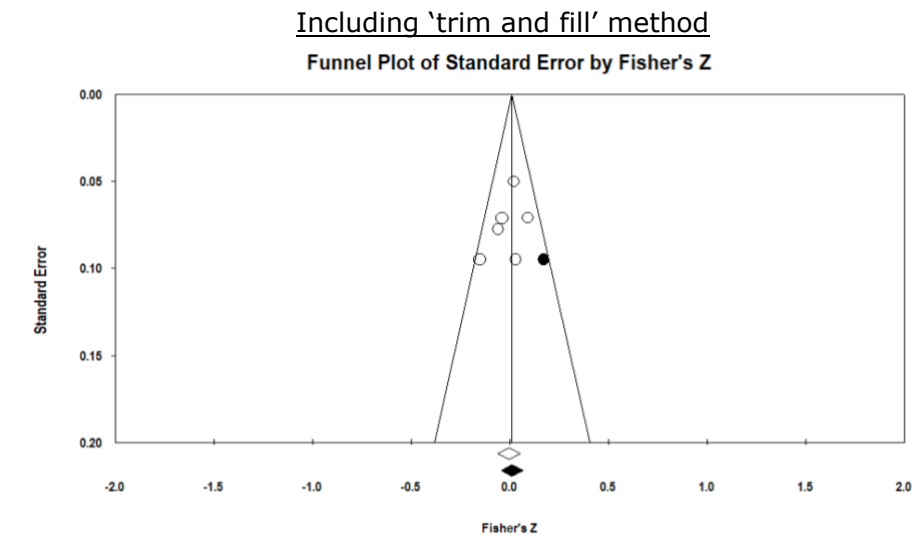
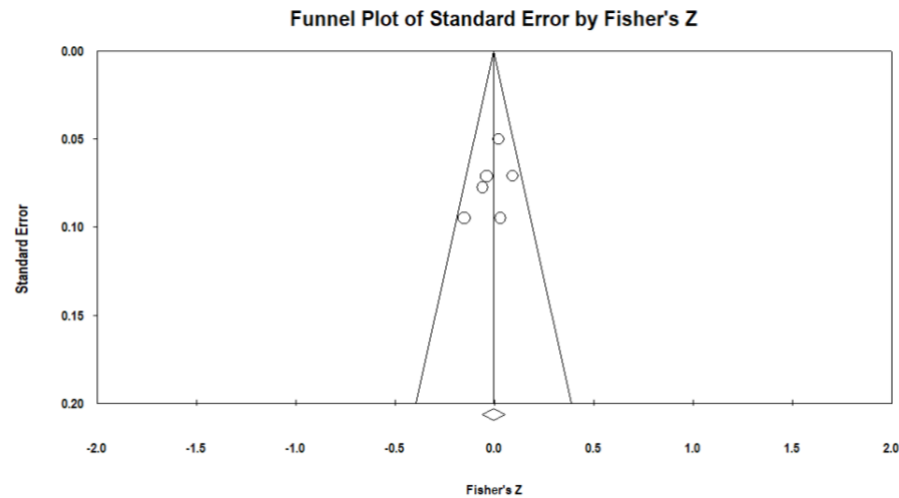
Model	Study name	Outcome	Statistics for each study					Correlation and 95% CI					Weight (Random)
			Correlation	Lower limit	Upper limit	Z-Value	p-Value	-1.00	-0.50	0.00	0.50	1.00	Relative weight
	Choi, Ha & Choi (2022)	DD - Korean version	0.060	-0.041	0.160	1.166	0.243			+			17.67 ■
	Yee & Lee (2022)	SD-3	-0.170	-0.313	-0.020	-2.212	0.027			+			13.43 ■
	Veselka, Schermer, Martin & Vernon (2010) [sample 1]	MACH-IV	-0.030	-0.213	0.155	-0.316	0.752			+			11.08 ■
	Veselka, Schermer, Martin & Vernon (2010) [sample 2]	MACH-IV	0.104	-0.081	0.283	1.100	0.271			+			11.08 ■
	Martin, Lastuk, Schermer, Jeffery, Vernon & Veselka (2012)	MACH-IV	-0.083	-0.219	0.056	-1.168	0.243			+			14.40 ■
	Duarte (2020)	SD-3	-0.170	-0.264	-0.073	-3.420	0.001			+			17.90 ■
	Torres-Marín, Navarro-Carrillo & Carretero-Dios (2022) - Study 1	SD-3 - Spanish version	0.000	-0.138	0.138	0.000	1.000			+			14.43 ■
Random			-0.047	-0.131	0.038	-1.079	0.280			+			



No change in plot observed with 'trim and fill' method

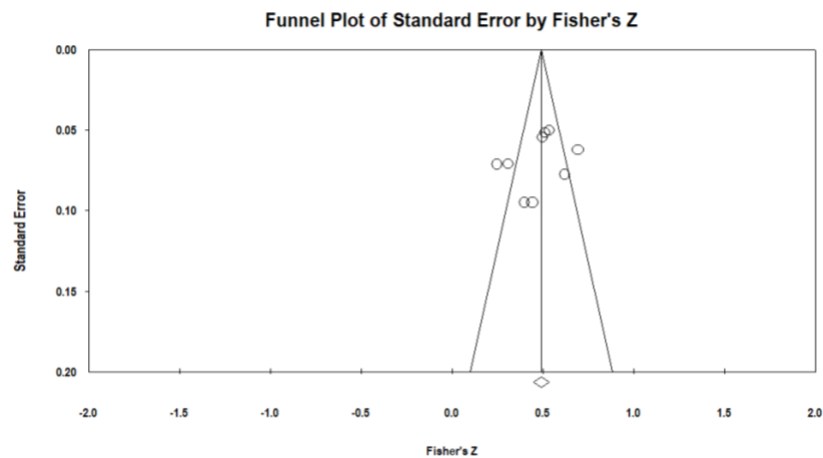
Machiavellianism and self-enhancing humour

Model	Study name	Outcome	Statistics for each study					Correlation and 95% CI					Weight (Random)
			Correlation	Lower limit	Upper limit	Z-Value	p-Value	-1.00	-0.50	0.00	0.50	1.00	Relative weight
	Yee & Lee (2022)	SD-3	-0.060	-0.209	0.092	-0.774	0.439			+			14.36
	Veselka, Schermer, Martin & Vernon (2010) [sample 1]	MACH-IV	-0.150	-0.325	0.035	-1.592	0.111		+				9.75
	Veselka, Schermer, Martin & Vernon (2010) [sample 2]	MACH-IV	0.030	-0.155	0.213	0.316	0.752			+			9.75
	Martin, Lastuk, Schermer, Jeffery, Vernon & Veselka (2012)	MACH-IV	-0.038	-0.176	0.101	-0.534	0.594			+			16.89
	Duarte (2020)	SD-3	0.020	-0.078	0.118	0.399	0.690			+			32.29
	Torres-Marín, Navarro-Carrillo & Carretero-Dios (2022) - Study 1	SD-3 - Spanish version	0.090	-0.049	0.226	1.270	0.204			+			16.97
Random			-0.005	-0.064	0.054	-0.169	0.866			+			



Machiavellianism and aggressive humour

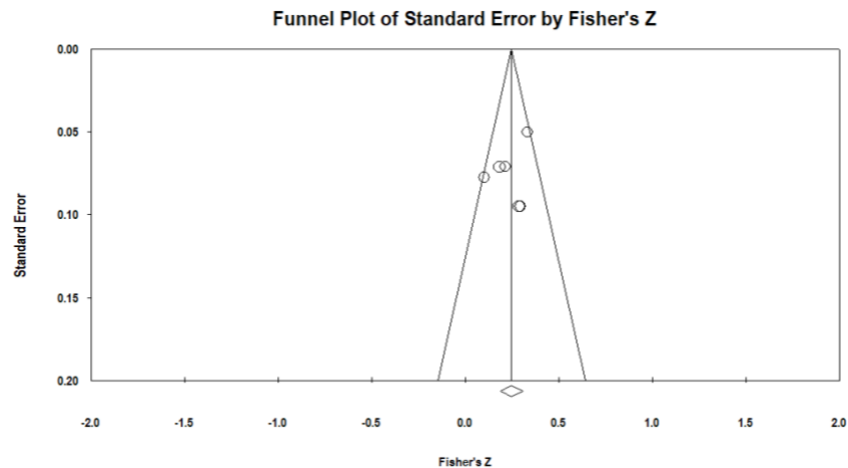
Model	Study name	Outcome	Statistics for each study					Correlation and 95% CI					Weight (Random)
			Correlation	Lower limit	Upper limit	Z-Value	p-Value	-1.00	-0.50	0.00	0.50	1.00	Relative weight
	Choi, Ha & Choi (2022)	DD - Korean version	0.470	0.388	0.545	9.904	0.000				+	+	12.61
	Crysel & Webster (2018) - Study 4	DD	0.600	0.516	0.672	11.134	0.000				+	+	11.73
	Yee & Lee (2022)	SD-3	0.550	0.435	0.647	7.967	0.000				+	+	10.45
	Veselka, Schermer, Martin & Vernon (2010) [sample 1]	MACH-IV	0.416	0.251	0.557	4.666	0.000				+	+	9.08
	Veselka, Schermer, Martin & Vernon (2010) [sample 2]	MACH-IV	0.378	0.209	0.525	4.190	0.000				+	+	9.08
	Martin, Lastuk, Schermer, Jeffery, Vernon & Veselka (2012)	MACH-IV	0.243	0.108	0.369	3.480	0.001				+	+	10.98
	Duarte (2020)	SD-3	0.490	0.412	0.561	10.681	0.000				+	+	12.71
	Torres-Marín, Navarro-Carrillo & Carretero-Dios (2022) - Study 1	SD-3 - Spanish version	0.300	0.169	0.421	4.355	0.000				+	+	10.99
	Mededovic & Bulut (2017)	DD	0.460	0.372	0.540	9.143	0.000				+	+	12.38
Random			0.444	0.370	0.513	10.522	0.000				+	+	



No change in plot observed with 'trim and fill' method

Machiavellianism and self-defeating humour

Model	Study name	Outcome	Statistics for each study					Correlation and 95% CI					Weight (Random)
			Correlation	Lower limit	Upper limit	Z-Value	p-Value	-1.00	-0.50	0.00	0.50	1.00	Relative weight
	Yee & Lee (2022)	SD-3	0.100	-0.052	0.247	1.293	0.196						15.70 ■
	Veselka, Schermer, Martin & Vernon (2010) [sample 1]	MACH-IV	0.287	0.109	0.447	3.111	0.002						11.82 ■
	Veselka, Schermer, Martin & Vernon (2010) [sample 2]	MACH-IV	0.280	0.101	0.441	3.031	0.002						11.82 ■
	Martin, Lastuk, Schermer, Jeffery, Vernon & Veselka (2012)	MACH-IV	0.182	0.044	0.313	2.583	0.010						17.53 ■
	Duarte (2020)	SD-3	0.320	0.229	0.405	6.608	0.000						25.56 ■
	Torres-Marín, Navarro-Carrillo & Carretero-Dios (2022) - Study 1	SD-3 - Spanish version	0.210	0.074	0.339	3.000	0.003						17.58 ■
Random			0.235	0.164	0.303	6.333	0.000						



No change in plot observed with 'trim and fill' method

Appendix H – Comparing subscale outcomes of studies using the PNI**Narcissism and affiliative humour**

Model	Group by Outcome	Study name	Outcome	Statistics for each study					Correlation and 95% CI					Weight (Pooled tau)
				Correlation	Lower limit	Upper limit	Z-Value	p-Value	-1.00	-0.50	0.00	0.50	1.00	
Random	PNI - grandiose	Besser & Zeigler-Hill (2011) - Study 1	PNI - grandiose	0.150	0.007	0.287	2.050	0.040						25.00
	PNI - grandiose	Besser & Zeigler-Hill (2011) - Study 2	PNI - grandiose	0.120	-0.004	0.240	1.899	0.058						33.70
	PNI - grandiose	Hollandsworth (2019)	PNI - grandiose	0.214	0.028	0.386	2.248	0.025						14.54
	PNI - grandiose	Zeigler-Hill & Besser (2011)	PNI - grandiose	0.160	0.022	0.292	2.265	0.024						26.77
	PNI - grandiose			0.152	0.081	0.222	4.157	0.000						
	PNI - vulnerable	Besser & Zeigler-Hill (2011) - Study 1	PNI - vulnerable	-0.100	-0.240	0.044	-1.361	0.174						25.00
	PNI - vulnerable	Besser & Zeigler-Hill (2011) - Study 2	PNI - vulnerable	-0.130	-0.250	-0.006	-2.059	0.040						33.70
	PNI - vulnerable	Hollandsworth (2019)	PNI - vulnerable	-0.165	-0.342	0.023	-1.723	0.085						14.54
	PNI - vulnerable	Zeigler-Hill & Besser (2011)	PNI - vulnerable	-0.070	-0.207	0.069	-0.984	0.325						26.77
	PNI - vulnerable			-0.112	-0.182	-0.040	-3.042	0.002						
Random	Overall			0.021	-0.235	0.273	0.155	0.877						

Narcissism and self-enhancing humour

Model	Study name	Group by Outcome	Outcome	Statistics for each study					Correlation and 95% CI					Weight (Pooled tau)
				Correlation	Lower limit	Upper limit	Z-Value	p-Value	-1.00	-0.50	0.00	0.50	1.00	
Random	Besser & Zeigler-Hill (2011) - Study 1	PNI - grandiose	PNI - grandiose	0.150	0.007	0.287	2.050	0.040						25.00
	Besser & Zeigler-Hill (2011) - Study 2	PNI - grandiose	PNI - grandiose	0.140	0.016	0.259	2.219	0.026						33.70
	Hollandsworth (2019)	PNI - grandiose	PNI - grandiose	0.119	-0.070	0.300	1.237	0.216						14.54
	Zeigler-Hill & Besser (2011)	PNI - grandiose	PNI - grandiose	0.170	0.032	0.302	2.409	0.016						26.77
	PNI - grandiose			0.148	0.076	0.217	4.031	0.000						
	Besser & Zeigler-Hill (2011) - Study 1	PNI - vulnerable	PNI - vulnerable	-0.070	-0.211	0.074	-0.951	0.342						25.00
	Besser & Zeigler-Hill (2011) - Study 2	PNI - vulnerable	PNI - vulnerable	-0.100	-0.221	0.024	-1.580	0.114						33.70
	Hollandsworth (2019)	PNI - vulnerable	PNI - vulnerable	-0.216	-0.388	-0.030	-2.270	0.023						14.54
	Zeigler-Hill & Besser (2011)	PNI - vulnerable	PNI - vulnerable	-0.100	-0.235	0.039	-1.408	0.159						26.77
	PNI - vulnerable			-0.110	-0.180	-0.038	-2.987	0.003						
Random	Overall			0.019	-0.230	0.266	0.149	0.882						

Narcissism and aggressive humour

Model	Study name	Group by Outcome	Outcome	Statistics for each study					Correlation and 95% CI				Weight (Pooled tau)
				Correlation	Lower limit	Upper limit	Z-Value	p-Value	-1.00	-0.50	0.00	0.50	Relative weight
	Besser & Zeigler-Hill (2011) - Study 1	PNI - grandiose	PNI - grandiose	0.230	0.089	0.362	3.177	0.001					25.43
	Besser & Zeigler-Hill (2011) - Study 2	PNI - grandiose	PNI - grandiose	0.210	0.088	0.325	3.357	0.001					27.27
	Hollandsworth (2019)	PNI - grandiose	PNI - grandiose	-0.070	-0.254	0.119	-0.725	0.468					21.42
	Zeigler-Hill & Besser (2011)	PNI - grandiose	PNI - grandiose	0.190	0.053	0.320	2.700	0.007					25.88
Random		PNI - grandiose		0.151	0.010	0.287	2.093	0.036					
	Besser & Zeigler-Hill (2011) - Study 1	PNI - vulnerable	PNI - vulnerable	0.220	0.079	0.352	3.034	0.002					25.43
	Besser & Zeigler-Hill (2011) - Study 2	PNI - vulnerable	PNI - vulnerable	0.220	0.099	0.335	3.522	0.000					27.27
	Hollandsworth (2019)	PNI - vulnerable	PNI - vulnerable	-0.184	-0.359	0.003	-1.925	0.054					21.42
	Zeigler-Hill & Besser (2011)	PNI - vulnerable	PNI - vulnerable	0.210	0.073	0.339	2.992	0.003					25.88
Random		PNI - vulnerable		0.132	-0.010	0.269	1.828	0.068					
Random		Overall		0.142	0.042	0.239	2.772	0.006					

Narcissism and self-defeating humour

Model	Study name	Group by Outcome	Outcome	Statistics for each study					Correlation and 95% CI					Weight (Pooled tau)
				Correlation	Lower limit	Upper limit	Z-Value	p-Value	-1.00	-0.50	0.00	0.50	1.00	Relative weight
	Besser & Zeigler-Hill (2011) - Study 1	PNI - grandiose	PNI - grandiose	0.140	-0.004	0.278	1.912	0.056						25.00
	Besser & Zeigler-Hill (2011) - Study 2	PNI - grandiose	PNI - grandiose	0.200	0.078	0.316	3.193	0.001						33.70
	Hollandsworth (2019)	PNI - grandiose	PNI - grandiose	0.205	0.018	0.378	2.151	0.031						14.54
	Zeigler-Hill & Besser (2011)	PNI - grandiose	PNI - grandiose	0.210	0.073	0.339	2.992	0.003						26.77
Random		PNI - grandiose		0.189	0.118	0.257	5.177	0.000						
	Besser & Zeigler-Hill (2011) - Study 1	PNI - vulnerable	PNI - vulnerable	0.240	0.100	0.371	3.320	0.001						25.00
	Besser & Zeigler-Hill (2011) - Study 2	PNI - vulnerable	PNI - vulnerable	0.270	0.151	0.381	4.360	0.000						33.70
	Hollandsworth (2019)	PNI - vulnerable	PNI - vulnerable	0.345	0.169	0.500	3.721	0.000						14.54
	Zeigler-Hill & Besser (2011)	PNI - vulnerable	PNI - vulnerable	0.260	0.126	0.385	3.735	0.000						26.77
Random		PNI - vulnerable		0.271	0.203	0.337	7.542	0.000						
Random		Overall		0.230	0.148	0.309	5.378	0.000						

Appendix I - Humor Styles Questionnaire

INSTRUCTIONS: 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.

	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
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 J – HEXACO-60 Scale

HEXACO-PI-R
(SELF REPORT FORM)

© Kibeom Lee, Ph.D., & Michael C. Ashton, Ph.D.

DIRECTIONS

On the following pages you will find a series of statements about you. Please read each statement and decide how much you agree or disagree with that statement. Then write your response in the space next to the statement using the following scale:

- 5 = strongly agree
- 4 = agree
- 3 = neutral (neither agree nor disagree)
- 2 = disagree
- 1 = strongly disagree

Please answer every statement, even if you are not completely sure of your response.

Please provide the following information about yourself.

Sex (circle): Female Male

Age: _____ years

- 1 _____ I would be quite bored by a visit to an art gallery.
- 2 _____ I plan ahead and organize things, to avoid scrambling at the last minute.
- 3 _____ I rarely hold a grudge, even against people who have badly wronged me.
- 4 _____ I feel reasonably satisfied with myself overall.
- 5 _____ I would feel afraid if I had to travel in bad weather conditions.
- 6 _____ I wouldn't use flattery to get a raise or promotion at work, even if I thought it would succeed.
- 7 _____ I'm interested in learning about the history and politics of other countries.
- 8 _____ I often push myself very hard when trying to achieve a goal.
- 9 _____ People sometimes tell me that I am too critical of others.
- 10 _____ I rarely express my opinions in group meetings.
- 11 _____ I sometimes can't help worrying about little things.
- 12 _____ If I knew that I could never get caught, I would be willing to steal a million dollars.
- 13 _____ I would enjoy creating a work of art, such as a novel, a song, or a painting.
- 14 _____ When working on something, I don't pay much attention to small details.
- 15 _____ People sometimes tell me that I'm too stubborn.
- 16 _____ I prefer jobs that involve active social interaction to those that involve working alone.
- 17 _____ When I suffer from a painful experience, I need someone to make me feel comfortable.
- 18 _____ Having a lot of money is not especially important to me.
- 19 _____ I think that paying attention to radical ideas is a waste of time.
- 20 _____ I make decisions based on the feeling of the moment rather than on careful thought.
- 21 _____ People think of me as someone who has a quick temper.
- 22 _____ On most days, I feel cheerful and optimistic.
- 23 _____ I feel like crying when I see other people crying.
- 24 _____ I think that I am entitled to more respect than the average person is.
- 25 _____ If I had the opportunity, I would like to attend a classical music concert.
- 26 _____ When working, I sometimes have difficulties due to being disorganized.
- 27 _____ My attitude toward people who have treated me badly is "forgive and forget".
- 28 _____ I feel that I am an unpopular person.
- 29 _____ When it comes to physical danger, I am very fearful.
- 30 _____ If I want something from someone, I will laugh at that person's worst jokes.

Continued...

- 31 _____ I've never really enjoyed looking through an encyclopedia.
- 32 _____ I do only the minimum amount of work needed to get by.
- 33 _____ I tend to be lenient in judging other people.
- 34 _____ In social situations, I'm usually the one who makes the first move.
- 35 _____ I worry a lot less than most people do.
- 36 _____ I would never accept a bribe, even if it were very large.
- 37 _____ People have often told me that I have a good imagination.
- 38 _____ I always try to be accurate in my work, even at the expense of time.
- 39 _____ I am usually quite flexible in my opinions when people disagree with me.
- 40 _____ The first thing that I always do in a new place is to make friends.
- 41 _____ I can handle difficult situations without needing emotional support from anyone else.
- 42 _____ I would get a lot of pleasure from owning expensive luxury goods.
- 43 _____ I like people who have unconventional views.
- 44 _____ I make a lot of mistakes because I don't think before I act.
- 45 _____ Most people tend to get angry more quickly than I do.
- 46 _____ Most people are more upbeat and dynamic than I generally am.
- 47 _____ I feel strong emotions when someone close to me is going away for a long time.
- 48 _____ I want people to know that I am an important person of high status.
- 49 _____ I don't think of myself as the artistic or creative type.
- 50 _____ People often call me a perfectionist.
- 51 _____ Even when people make a lot of mistakes, I rarely say anything negative.
- 52 _____ I sometimes feel that I am a worthless person.
- 53 _____ Even in an emergency I wouldn't feel like panicking.
- 54 _____ I wouldn't pretend to like someone just to get that person to do favors for me.
- 55 _____ I find it boring to discuss philosophy.
- 56 _____ I prefer to do whatever comes to mind, rather than stick to a plan.
- 57 _____ When people tell me that I'm wrong, my first reaction is to argue with them.
- 58 _____ When I'm in a group of people, I'm often the one who speaks on behalf of the group.
- 59 _____ I remain unemotional even in situations where most people get very sentimental.
- 60 _____ I'd be tempted to use counterfeit money, if I were sure I could get away with it.

APPENDIX K – Short Dark Triad Scale (Jones & Paulhus, 2014)

Instructions: *Please indicate how much you agree with each of the following statements*

Disagree strongly	Disagree	Neither agree nor disagree	Agree	Agree strongly
1	2	3	4	5

Machiavellianism

1. It's not wise to tell your secrets.
2. I like to use clever manipulation to get my way.
3. Whatever it takes, you must get the important people on your side.
4. Avoid direct conflict with others because they may be useful in the future.
5. It's wise to keep track of information that you can use against people later.
6. You should wait for the right time to get back at people.
7. There are things you should hide from other people to preserve your reputation.
8. Make sure your plans benefit yourself, not others.
9. Most people can be manipulated.

Narcissism

1. People see me as a natural leader.
2. I hate being the center of attention. (R)
3. Many group activities tend to be dull without me.
4. I know that I am special because everyone keeps telling me so.
5. I like to get acquainted with important people.
6. I feel embarrassed if someone compliments me. (R)
7. I have been compared to famous people.
8. I am an average person. (R)
9. I insist on getting the respect I deserve.

Psychopathy

1. I like to get revenge on authorities.
2. I avoid dangerous situations. (R)
3. Payback needs to be quick and nasty.
4. People often say I'm out of control.
5. It's true that I can be mean to others.
6. People who mess with me always regret it.
7. I have never gotten into trouble with the law. (R)
8. I enjoy having sex with people I hardly know
9. I'll say anything to get what I want.

Appendix L - The Short Sadistic Impulse Scale (O'Meara, Davies, & Hammond, 2011)

Please indicate whether you believe each of the following statements to be 'like' you or 'unlike' you.

1. I enjoy seeing people hurt.
2. I would enjoy hurting someone physically, sexually, or emotionally.
3. Hurting people would be exciting.
4. I have hurt people for my own enjoyment.
5. People would enjoy hurting others if they gave it a go.
6. I have fantasies which involve hurting people.
7. I have hurt people because I could.
8. I wouldn't intentionally hurt anyone.
9. I have humiliated others to keep them in line.
10. Sometimes I get so angry I want to hurt people.

APPENDIX M – A preliminary study aimed at identifying humour content for research studies 1 and 2

Both empirical research studies include humour stimuli. In study 1 (see chapter 4) participants rate non-dark and dark humour, whereas in study 2 (see chapter 5) participants are exposed to non-dark, dark and dark sexual humour. This preliminary study sought to identify suitable humour content for inclusion in both studies, across all three genres (non-dark, dark and dark sexual). Three online questionnaires, one for each genre, aimed to find humour stimuli considered 'funny' and representative of each genre in the general population using opportunity sampling. This was considered necessary to minimise bias from the researcher's own humour preference when identifying humour content for the main research studies 1 and 2.

Humour content inclusion

Humour in the form of both videos and internet memes were included. The research aimed to include content relevant to modern society and memes have become an increasingly popular method in which to share humour online. The criteria for inclusion included the following: one joke could be extracted without requiring further context, available video material appeared to be from an authentic source and content was perceived to be sufficiently representative of the defined genre characteristics. Dark humour was defined as 'humour that makes amusement of serious, sad or sinister topics' and non-dark humour as 'humour that *does not* make amusement of serious, sad or sinister topics'. The former definition is an integration of the definition of 'black humour' from the

Cambridge Dictionary (Cambridge University Press, 2021) and Baldick (2001, p.36). Dark sexual humour for the purpose of the current study was defined as 'humour suggestive of sexual harassment or sexual assault'. The "disturbing or sinister" subject of sexual harassment and sexual assault was considered to represent the 'dark' aspect in accordance with Baldick's (2001, p.36) definition. Both dark humour and dark sexual humour were found searching related terms on Google Search and YouTube. Searches for dark humour included terms such as 'dark humour', 'black comedy' and 'gallows humour', whereas searches for dark sexual humour included terms such as 'rape humour', 'dark sexual humour' and 'sexual harassment humour'. Broader terms were used to search for non-dark humour, e.g. 'stand-up videos' or 'funny memes', ensuring that content did not include aspects that may be considered dark or sinister. Videos included stand-up comedy, TV shows and movie clips to account for modality preference and were retrieved from YouTube and internet memes were retrieved through Google Search, with all acknowledgements listed on the questionnaire debrief page. It was evident during searches for humour content that dark humour has a wide-ranging spectrum, from mildly disturbing to extremely distressing. Further abusive or sexually graphic material is likely available within the 'dark web', but as the current study aims to explore the effects of watching humour frequently experienced in the media, only content readily available online was used. With regards to dark sexual humour, it was also decided that the final study would only include those jokes referencing harassment or assaultive behaviour referencing a male perpetrator. It was acknowledged that the media does portray jokes regarding female perpetrators, but due to the prior being more prevalent and for the means of more focused stimuli, the content was limited to referencing male perpetration.

Acknowledging that bias may occur due to the researcher's subjective opinion, this preliminary study aimed to minimise this bias with the final inclusion of content determined by ratings from a community sample.

Method

Three online questionnaires were developed, one rating dark humour content, one rating non-dark humour and another rating dark sexual humour. Attempts were made to focus the vast subjectivity of humour preference by asking participants to indicate their humour preference from the three genre options and then routing them to the questionnaire corresponding with their indicated preference. Prior to viewing humour content, participants were provided with a definition of their chosen humour genre, to ensure consistent understanding of what each humour genre aims to represent. Each questionnaire had eight short videos and eight internet memes representing the specified genre. Participants viewed content either in the original order or reverse to counterbalance responses.

Participants were asked to rate how 'funny' and 'offensive' they found each joke and whether it matched the intended genre. Responses were measured on a 5-point Likert-type scale (1 = Strongly Disagree to 5 = Strongly Agree). 26 participants completed the dark humour questionnaire (13 female, 13 male), 15 the non-dark humour (12 female, 3 male) and 14 the dark sexual humour (8 female, 6 male).

Results

Stimuli were then ranked by highest-lowest 'funny' ratings and by highest-lowest 'genre representation'. The three videos and three memes in each genre with the highest collective rank figure were included in the main questionnaire (see Tables 29-31). The inclusion of 'offensive' ratings aimed to further explore the nature of each genre, with dark humour 'offensive' ratings (minimum=1.62, maximum=2.5) and dark sexual humour 'offensive' ratings (minimum= 1.57 to maximum= 2.5) visibly higher than non-dark humour 'offensive' ratings (minimum= 1, maximum= 1.4). One video in the dark humour questionnaire was found to be unavailable in certain countries and was therefore removed from the main study. See Table 32 for 'funny' and 'genre representation' means of content used in the main studies.

Table 29. *Raw scores and ranking of non-dark humour content (n=15)*

	Humour stimuli	Funny ratings	Funny ranking	Genre representation ratings	Genre representation ranking	Combined ranking
Video Clips	16	3.87	3	4.4	5	8
	6	3.6	7.5	4.47	3.5	11
	10	4.33	1	4.07	13	14
	8	3.6	7.5	4.07	13	20.5
	4	3.73	5	3.93	16	21
	2	3.6	7.5	4	15	22.5
	14	3.33	12	4.13	10.5	22.5
	12	3.2	13.5	4.13	10.5	24
Internet Memes	7	4	2	4.53	2	4
	3	3.47	10	4.67	1	11
	11	3.6	7.5	4.2	8	15.5
	1	3.8	4	4.07	13	17
	5	3.4	11	4.2	8	19
	15	3.2	13.5	4.33	6	19.5
	9	2.93	16	4.47	3.5	19.5
	13	3.07	15	4.2	8	23

Table 30. *Raw scores and ranking of dark sexual humour content (n=14)*

	Humour stimuli	Funny ratings	Funny ranking	Genre representation ratings	Genre representation ranking	Combined ranking
Video Clips	13	3.79	1	3.5	5	6
	1	3.07	8.5	3.93	2.5	11
	9	3.29	5	3.21	8.5	13.5
	15	2.86	13	4	1	14
	5	2.93	12	3.43	6.5	18.5
	3	3.36	4	2.57	15	19
	11	3.14	7	2.79	13	20
	7	3.21	6	2.36	16	22
Internet Memes	10	3.64	2	3.43	6.5	8.5
	2	3	10.5	3.79	4	14.5
	4	3.5	3	2.64	14	17
	6	3.07	8.5	3.21	8.5	17
	14	2.57	16.00	3.93	2.50	18.50
	8	3	10.5	3	12	22.5
	12	2.71	14	3.07	10.5	24.5
	16	2.64	15	3.07	10.5	25.5

Table 31. *Raw scores and ranking of dark humour content (n=26)*

	Humour stimuli	Funny ratings	Funny ranking	Genre representation ratings	Genre representation ranking	Combined ranking
Video Clips ¹	5	4.04	4.5	4.35	2.5	7
	7	4.19	2	3.81	11	13
	13	3.96	6	3.65	14	20
	11	3.38	15.5	4	6.5	22
	3	3.5	13	3.85	10	23
	15	3.5	13	3.77	12	25
	1	3.38	15.5	2.88	16	31.5
Internet Memes	2	3.92	7	4.38	1	8
	8	4.04	4.5	4.08	5	9.5
	4	4.15	3	3.88	9	12
	6	3.69	8.5	3.92	8	16.5
	10	3.58	10	4	6.5	16.5
	14	3.5	13	4.15	4	17
	16	3.69	8.5	3.5	15	23.5
	12	3.54	11	3.73	13	24

¹ One video was removed due to inaccessibility in some countries.

Table 32. *Mean funny and genre representation scores for humour content used in study 1 and 2*

Humour Genre	Stimuli Type	Funny Ratings (mean)	Genre Representation Ratings (mean)
Non-dark humour	Video Clips	3.93	4.31
	Internet Memes	3.69	4.47
Dark sexual humour	Video Clips	3.38	3.55
	Internet Memes	3.38	3.29
Dark humour	Video Clips	4.06	3.94
	Internet Memes	4.04	4.11

Discussion/conclusion

Three memes and three video clips were identified to represent each humour genre based on ratings in a community sample. The range of ratings were found to differ between genres, which was unsurprising considering the vast subjectivity of humour taste. All content chosen for inclusion in the main studies showed 'funny' ratings between 'neutral' and 'strongly agree'. It is anticipated that use of these stimuli will minimise researcher bias and present participants with content that fulfils the definition of humour and represents the intended genre.

APPENDIX N – Humour Content

Description of non-dark and dark humour content included in empirical research projects 1 and 2

Non-dark humour internet memes

- A picture of Leonardo DiCaprio with his eyes closed, with the caption 'when you're about to leave work and the boss says "before you go...."'.
- A picture of an alpaca with a hat on, with the caption "an adventure? Alpaca my bags".
- A dog in a pool looking fearful with wide eyes, with the caption "when you're swimming and something touches your foot".

Non-dark humour video clip description

- Jack Whitehall stand-up about trying to explain that the toilet will not flush in a foreign language.
- Video clip from Friends sitcom attempting to get a couch up the stairs.
- Michael McIntyre stand-up about the actions people make when trying on clothes.

Dark humour internet memes

- A picture of a man drawing a hand where a women's hand has been amputated, with the caption "me trying to solve other people's problems knowing I am totally unqualified".
- A picture of a man smiling, with the caption "what's the difference between Hitler and Usain Bolt? Usain Bolt can actually finish a race".
- A picture of a priest with his eyes wide in shock, with the caption "when the ceremony's been over for hours and you remember you didn't take the baby out of the water after the baptism".

Dark humour video clip description

- Bill Burr stand-up on how eliminating certain people could solve the population crisis.
- Video clip from the movie Three Lions in which a terrorist used poor disguises when buying a large amount of hydrogen peroxide.
- Ricky Gervais stand-up on Hitler's ideology.

Description of dark sexual humour content included in empirical research project 2

Dark sexual humour internet memes

- A picture of Jim Henson with a Kermit the frog puppet, with the caption "Kermit the Frog drops bombshell sexual assault allegations against Jim Henson" and "he would put his hand inside me before every show".
- A picture of Zach Galifianakis looking thoughtful, with the caption "No means no, unless she's dyslexic, then it's on".
- A picture of Bear Grylls pointing, with the caption "if you accidentally emailed a porn link to a co-worker, just email other co-workers the link as well and call it a virus" and "Improvise. Adapt. Overcome".

Dark sexual humour video clip description

- Drew Michael stand-up about giving roofies to his female partner to stop her drunkenly arguing with him.
- Clip from The Mash Report TV programme showing how *not* to sexually harass someone in an ironic way.
- Jimmy Carr stand-up about the advantages of having a girlfriend who is a deep sleeper and that she will be thrilled to know she is pregnant.

Acknowledgements

Video clips

BBC (2007). Jimmy Carr on Women - Live at the Apollo - BBC One [online]. Available at <https://www.youtube.com/watch?v=5JHnMyiWNk4>

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Drew Michael (2019). Can Roofies Be Used For Good? [online]. Available at https://www.youtube.com/watch?v=RsUpIy_RmO4

Netflix is a joke (2020). Bill Burr Tackles The Population Problem | Netflix Is A Joke [online]. Available at <https://www.youtube.com/watch?v=a9WowBxdhTQ>

Studio Canal UK (2010). FOUR LIONS 'Can I Have 12 Bottles of Bleach Please' Clip - Directed by Christopher Morris [online]. Available at https://www.youtube.com/watch?v=ZAGO_I_YTbk

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Universal Comedy (2019). Michael McIntyre On Towel Drying | BEST OF Hello Wembley! | Universal Comedy [online]. Available at <https://www.youtube.com/watch?v=ElwsV6N3j7w>

Universal Comedy (2020). Ricky Gervais On Hitler's Ideology | POLITICS |

Universal Comedy [online]. Available at <https://www.youtube.com/watch?v=9CINep9Gqhk>

Internet memes

An adventure? Alpaca my bags [digital image] (found in 2019). Retrieved from <https://me.me/i/an-adventure-alpaca-my-bags-where-do-you-want-to-fda4eb3ab51c4f928936e62f73d888a4>

If you accidentally email a porn link to a co-worker, just email other co-workers the link as well and call it a virus [digital image] (2018). Retrieved from <https://imgur.com/gallery/uCXnVG1>

Kermit the Frog drops bombshell sexual assault allegations against Jim Henson. "He would put his hand inside me before every show" [digital image] (found in 2017). Retrieved from <https://me.me/i/kermit-the-frog-drops-bombshell-sexual-assault-allegations-against-jim-19474655>

Me trying to solve other people's problems knowing I am completely unqualified @ Al Pundy meme [digital image] (found in 2017). Retrieved from <https://me.me/i/me-trying-to-solve-other-peoples-problems-knowing-am-totally-15617198>

No means no unless she's dyslexic then it's on meme [digital image] (found in 2018). Retrieved from <https://me.me/i/no-means-no-unless-shes-dyslexic-then-itson-none-20242996>

What's the difference between Hitler and Usain Bolt Usain Bolt can actually finish a race meme [digital image] (found in 2017). Retrieved from <https://me.me/i/whats-the-difference-between-hitler-and-usain-bolt-usain-bolt-can-15405875>

When the ceremony's been over for hours and you remember you didn't take the baby out of the water after the baptism is meme [digital image] (found in 2017). Retrieved from <https://me.me/i/when-the-ceremonys-been-over-for-hours-and-you-remember-19416611>

When you're about to leave work and the boss says before you go meme [digital image] (found in 2018). Retrieved from <https://me.me/i/when-youre-about-to-leave-work-and-the-boss-says-20152983>

When you're swimming and something touches your foot [digital image] (found in 2019). Retrieved from <https://me.me/i/when-youre-swimming-and-something-touches-your-foot-funny-animal-7a17d03c08824c618d25b93f2a732871>

APPENDIX O - Ethical approval from the University of Nottingham



**University of
Nottingham**
UK | CHINA | MALAYSIA

Faculty of Medicine & Health Sciences Research Ethics Committee

Faculty Hub
Room E41, E Floor, Medical School
Queen's Medical Centre Campus
Nottingham University Hospitals
Nottingham, NG7 2UH
Email: FMHS-ResearchEthics@nottingham.ac.uk

29 May 2020

Emma Layzell

DForenPsy Top-up Programme Student
c/o Dr Vincent Egan, Associate Professor
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Psychiatry and Applied Psychology, School of Medicine
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Dear Ms Layzell

Ethics Reference No: 09-0420 – please always quote	
Study Title: Dark Laughter: exploring the dark tetrad, dark humour preference and influence of humour content on proclivity for related behaviours.	
Chief Investigator/Supervisor: Dr Vincent Egan, Associate Professor, Dr Simon Duff, Director of Stage II Training and Placement Manager, Centre for Forensic and Family Psychology, Psychiatry and Applied Psychology, School of Medicine.	
Lead Investigators/student: Emma Layzell, DForenPsy Top-up Programme Student, School of Medicine	
Proposed Start Date: 01/04/2020	Proposed End Date: 31/10/2021

Thank you for submitting the above application which was considered by the Committee at its meeting on 24 April 2020 and the following documents were received:

- FMHS REC Application form and supporting documents version 1.0: 26/03/2020

These have been reviewed and are satisfactory and the project has been given a favourable opinion.

A favourable opinion has been given on the understanding that:

1. The protocol agreed is followed and the Committee is informed of any changes using a notice of amendment form (please request a form).
2. The Chair is informed of any serious or unexpected event.
3. An End of Project Progress Report is completed and returned when the study has finished (Please request a form).

Yours sincerely

Dr Bethan E Phillips, Associate Professor

Clinical, Metabolic & Molecular Physiology, Medical Sciences & Graduate Entry Medicine
Acting Chair, Faculty of Medicine & Health Sciences Research Ethics Committee

APPENDIX P – Participant information sheet, informed consent and debrief

Participant Information

University of Nottingham
Jubilee Campus
Wollaton Road
Nottingham
NG8 1BB

Research Ethics Ref: 09-0420

Thank you for your interest in taking part in this questionnaire. Please read through the following information:

This study is being conducted by Emma Layzell, Dr Vincent Egan and Dr Simon Duff at the University of Nottingham. This is a two-part study investigating the relationship between personality traits and humour preference and the effect of humour content on behaviour.

You will be provided with questions to answer, before observing jokes in the form of video clips and internet memes. It should take approximately 30 minutes to complete. This study does contain content of an **adult nature** which some may find distressing. A debrief following the study will provide information for support if required.

Your answers will be anonymous. However as with any online related activity the risk of breach is possible, but this risk is being minimised by using a platform that sits on an encrypted webpage. For further information about the online survey tool security please see <https://www.onlinesurveys.ac.uk/security/>. The only personal data we will receive is your e-mail if you contact us to ask further questions. This will be received and handled separately from your completed questionnaire. Your e-mail address will only be kept as long as needed to resolve your query and deleted. For further information about how the university processes personal data please see: <https://www.nottingham.ac.uk/utilities/privacy.aspx/>

Your participation in this study is entirely voluntary. You can withdraw at any point during the questionnaire by closing the browser. The data will only be uploaded on completion of the questionnaire by clicking the FINISH button.

Data Management

Your data will be transferred and stored in a password-protected file sitting on a restricted access IT system managed by the University. Data will be kept for a minimum of 7 years. The results will be written up as a doctoral thesis and may be used in academic publications and presentations. The overall anonymised data from this study may be shared for use in future research and teaching (with research ethics approval). The University of Nottingham is the data controller (legally responsible for data security) and the Supervisor of this study (named above) is the data custodian (manages access to the data) and as such will determine how your data is used in the study. Your questionnaire data will be used for the purposes of the research only. Research is a task that we perform in the public interest.

Please input a 7-digit number below and keep note of this number. This number can be provided if you choose to remove your data from the study. * *Required*

Informed Consent

This study has been reviewed and given a favourable opinion by the University of Nottingham, Faculty of Medicine & Health Sciences Research Ethics Committee (Ref: 09-0420).

If you have any questions about this project, you may contact the Lead Researcher Emma Layzell (emma.layzell@nottingham.ac.uk) or if you have any concerns about any aspect of this study please contact the Research Supervisor Dr Simon Duff (simon.duff@nottingham.ac.uk). If you remain unhappy and wish to complain formally, you should then contact the FMHS Research Ethics Committee Administrator, c/o The University of Nottingham, Faculty PVC Office, E41, Medical School, Queen's Medical Centre Campus, Nottingham University Hospitals, Nottingham, NG7 2UH. Email: FMHS-ResearchEthics@nottingham.ac.uk

WARNING: THIS STUDY MAY INCLUDE HUMOUR ON SUBJECTS SUCH AS SEXUAL ASSAULT, DEATH, DISABILITY, TERRORISM, SCHOOL SHOOTINGS OR THE HOLOCAUST. THIS STUDY MAY ALSO CONTAIN EXPLICIT LANGUAGE AND VIOLENT SCENES. PLEASE DO NOT CONTINUE IF YOU MAY BE DISTRESSED BY SUCH CONTENT.

I have read and understood the above information and I confirm that:

I am **aged 18 years or older**.

I have read and understood the information on the previous page.

I understand that my participation is voluntary and I can end the study at any time and withdraw my data by closing the browser.

I understand that my answers will be anonymous. I understand the overall anonymized data from this study may be used in the future for research (with research ethics approval) and teaching purposes.

Please indicate whether you are willing to voluntarily take part in the study below.

☐ I do not consent to take part ☐ I consent to take part

Debrief

Thank you for participating in my study!

Further explanation of the study aims are provided below:

Study 1

Aims to explore the relationship between 'dark tetrad' personality traits (narcissism, psychopathy, Machiavellianism and sadism) and a preference for dark humour.

Study 2

Aims to explore the effect of observing sexual dark humour on an individual's predisposition to engage in sexual harassment behaviour.

All responses are anonymous and are stored online, password protected.

However, if you want to withdraw from the study at this point, please send your 7-digit identification number to emma.layzell@nottingham.ac.uk.

Should this study have caused you any distress, please see UK wide support services below:

Rape Crisis UK: 0808 802 9999

Mind UK - a mental health charity: 0300 123 3393

APPENDIX Q – Sexual Harassment Proclivity Scale (Bartling & Eisenman, 1993).
See adapted item in **bold**.

Respondents asked to indicate their extent of agreement (disagreement) to these 10 statements on a scale from 1 ("strongly disagree") to 5 ("strongly agree").

1. Women are flattered by sexual advances from men even when they fail to respond positively to these advances.
2. It is natural for men to be more aggressive when it comes to sexual relations with women.
3. Women are often inconsistent in terms of their non-verbal communications with men.
4. Women often mean "maybe" or even "yes" when they say "no" to sexual advances by men.
5. It is important for men to control the initial development of their relationship with women.
6. Women frequently use men to obtain status, security, or other things that they want.
7. Women who dress in a sexy manner at work are deliberately sending a sexual message to men.
8. Highly attractive individuals (opposite in gender to me) "drive me crazy" and I sometimes do or say things around them that I can't help.

Adapted item no. 8: Highly attractive individuals (the gender of my sexual preference) "drive me crazy" and I sometimes do or say things around them that I can't help.

9. Pregnant women use their conditions to justify doing less work on many jobs in comparison to their coworkers.
10. Women often are flattered by sexual advances by their male coworkers.