EFFECT OF CUES OF OBSERVABILITY ON DISHONEST BEHAVIOUR-AN EXPERIMENTAL RESEARCH

BY

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ABSTRACT

Holding private information often gives individuals an incentive to engage in dishonest acts such as cheating or misreporting that information during economic decision making. There has been a large and growing body of experimental research which has analysed dishonest behaviour over the past decade. Though the experimental literature on dishonest behaviour continues to grow but there are pending questions on what trigger and discourage cheating. A review of the literature on dishonest behaviour shows four most widely used experimental paradigms for the dishonesty task: die-roll tasks, coin-flip tasks, sender–receiver games and matrix tasks. The different experimental paradigms especially the die-roll tasks come with different conclusions mostly with monetary incentives. The conclusions drawn from these experimental research as to why individuals engage in dishonest acts when monetary incentives are involved to some extents are unclear and even contradictory. For instance, while some experimental paradigms suggest that monetary incentives lead to more dishonest acts, others suggest otherwise. So far most of these dishonesty tasks take great pains to ensure that the actual outcomes of subjects' task are completely unobserved by the experimenter or any other subject but only the reported outcomes are observed by the experimenter. It is important for the methodology that subjects' actual outcomes are not observed but what about the relevance of observation of the reported outcomes of their task under image of real human watching eyes. One determinant of dishonest behaviour could be whether cues of observability of subjects reported outcomes have the tendency to influence subjects cheating decision making. We therefore investigate the effect of cues of observability on dishonest behaviour using die rolling task. Subjects make cheating decisions either alone or under image of real human watching eyes. We found that subjects who are eye observed were less likely to cheat. Thus, the mere introduction of the image of the Asante King's eyes reduces dishonest behaviour among Ghanaian respondents in Kumasi.

KEYWORDS: dishonest behaviour, cues of observability (image of real human watching eyes), private information, behavioural motivation, social image concerns.

1. INTRODUCTION

Issues concerning human behaviour have led to controversies across disciplines, especially when it comes to dishonest behaviours such as cheating. The magnitude of this problem has raised a lot of public concerns. Most individuals often battle with this issue of dishonesty most especially with decision making associated with monetary incentives.

A central assumption in Economics is that individuals are "rational" and therefore choose the option that is expected to yield them the greatest benefit. This assumption is based on an assessment that individuals are self-interested agents who behave dishonestly for logical reasons. The standard economic model of rationality assumes that people engage in dishonest acts consciously and deliberatively by trading off the expected external benefits and costs of the dishonest act (Allingham and Sandmo, 1972; Becker, 1968). A "rational" individual is therefore one who chooses the option that is expected to yield them the greatest profit (Hobbes and Macpherson, 1968). Their assumption is that people engage in dishonest acts when it is in their material interest to do so. Thus, according to this perspective, people behave honestly or dishonestly only to the extent that the planned trade-off favours the particular action (Hechter, 1990; Lewicki, 1984). In addition to being central to economic theory, this external cost and benefit analysis play a significant role in the dishonest behaviour of individuals. Based on this rationality, individuals reach a decision that maximizes their payoff. The standard economic model of self-interested payoff maximization also lay emphasis that individuals prioritize the outcomes of their actions and often forgo truth telling if it is materially beneficial to act in the dishonest way (Gibson et al, 2013).

Research also suggest that private information is a vital aspect of dishonesty. Individuals holding private information tend to deliberately misreport them to gain advantage from a situation or if monetary incentives are involved. Thus, private information with monetary outcomes is the basis for rational self-interested individuals to engage in dishonest acts such as cheating during economic decision-making corroborating the assumption of the standard economic model discussed earlier. For instance, a taxpayer who must disclose information about his current income level may misreport his/her income by declaring less than the actual income to a tax authority if the likelihood of detection and the probable penalty if detected is low, an employee who has to report the hours he used in working on a project to determine his wage may misreport it, a job candidate who has to reveal his income level to a potential

employer in an online application or during an interview to say determine his future income may misreport it (Conrads, 2014).The income level is the private information of the taxpayer and the job candidate while the actual working hours is the employee's private information. How such private information is reported by individuals is thus of great importance in many areas in Economics. For example, how agents report their performance is important for auditors, how sellers report their sales correctly to tax authorities is relevant to design tax regulation, how easily politicians make promises during campaigns is relevant for voters etc.

There is rich evidence on dishonest behaviour of individuals which indicate that individuals misreport their private information if this is to their material benefit (Gneezy, 2005; Shalvi et al., 2011; Lewis et al., 2012; Abeler et al, 2014; Kajackaite and Gneezy, 2017). It therefore seems the answer to the question "why do people cheat?" is obvious – if they can benefit from it monetarily, they may cheat. Thus, individuals are guided by self-interest and behave fully strategically when reporting their private information (Crawford and Sobel, 1982).

Evidence from recent research however suggests that individuals are not always money maximisers but are more concerned about their image as an honest person when they encounter such situations (Fischbacher and Föllmi-Heusi, 2013; Mazar et al., 2008; Abeler et al., 2016). These different schools of thought have enabled researchers in the cheating literature to categorise individuals into two types: "ethical type" who prefer to maintain a positive image as an honest person and resist such temptation to cheat when monetary incentives are involved (Mazar et al., 2008; Fischbacher and Föllmi-Heusi, 2013; Abeler et al., 2014) or "economic type" who are willing to engage in dishonest acts necessary to maximize their material gains (Koford and Penno, 1992, Gneezy, 2005; Shalvi et al., 2011; Lewis et al., 2012; Gibson, 2013; Kajackaite and Gneezy, 2017).

To improve the earlier research further, this current study aims to examine the behavioural motivation behind the decision to cheat or not by introducing cues of observability (images of real human watching eyes) to investigate whether individuals are rational beings who only care about monetary gains or those who care to maintain an image as an honest person and resist such temptation to cheat when monetary incentives are involve in an economic decision making. Thus, what motivates people to cheat or not while holding private information. More specifically, this study provides an interesting insight into the effect of being observed on dishonest behaviour of individuals by employing cues of observability and using self-reported die roll task. In a setting where there exists no incentive to tell the truth and subjects could

either behave honestly and forgo financial gains or they could cheat to gain financially, it would be interesting to explore whether cues of observability of individuals private information have the hypothesized effect of decreasing the incidence of cheating and complement the role of preferences for being honest in the self-reported die roll game. Our main research questions are

- What impact does subtle cues of observability have on individuals' dishonest behaviour?
- What type of behavioural motivation constrains rather than influences individuals' cheating behaviour: social image concerns or monetary gains? The relationship between cues of observability and dishonesty will allow us to shed light into the behavioural motivation for cheating.

In this experiment, we focus on a setting which involves non-strategic interaction by replicating the die rolling paradigm introduced by Kajackaite and Gneezy (2017). The non-strategic cheating game is used to identify the motive behind the driving aversion to cheat. Employing a strategic interaction such as sender–receiver game would make the setting more complex, for instance if the interest is to study the underlying motives of individuals dishonest behaviour as in this study. A meta study of the existing experimental literature from Abeler et al. (2019) research also reveals that the die rolling task is the most widely used experimental paradigm to measure cheating in the laboratory (Blanco and Cordenas, 2015; Fischbacher and Föllmi-Heusi, 2013; Lewis et al., 2012; Shalvi et al., 2012) and several recent researches have indicated that behaviour in it correlates well with cheating behaviour even outside the artificial environment (Hanna and Wang, 2017; Dai et al., 2018). It is therefore not surprising as most of these conflicting ideas stem from the die roll experiments as already discussed and would be vividly depicted in our literature review. Hence, the die rolling task has been chosen as the right task to answer our research questions although there are other experimental paradigms.

2. LITERATURE REVIEW

Practicing dishonesty is a challenging task, yet it is not impossible. Most research have used various dishonesty priming tasks: die-roll tasks, coin-flip tasks, sender–receiver games and matrix tasks to examine individuals cheating behaviour. The relevance of these tasks is that the reported outcomes obtained serve as a statistical basis for honest or dishonest behaviours of individuals. The most used dishonesty task by experimenters assessing dishonest behaviour is

the standard cheating game - die-under-the-cup task by Fischbacher and Föllmi-Heusi (2013). In the die-under-the-cup task, subjects roll a six–sided die in a cup, observe and report whatever outcome they obtain to the experimenter and earn an amount of money linearly proportional to the die roll number reported. The idea of the die-under-the-cup task and the variations on it have been extensively used in most literature concerning dishonest behaviour of individuals. However, the conclusions drawn from these experimental studies concerning dishonest behaviour of individuals when monetary incentives are involved to some extent are unclear and even contradictory. The Literature review is in three subsections. We would discuss the theoretical review of these different schools of thought in the first subsection, after scan through a review on how observation modify behaviour in general and then discuss the role of traditional authority leaders in promoting behavioural change.

2.1. THEORETICAL REVIEW OF THE DISHONESTY TASK

One such schools of thought follow the standard economic view that individuals are motivated to cheat more when it is in their material benefit (gain higher payoff). For instance, Kajackaite and Gneezy (2017) modified the standard cheating game using the mind game to better understand how monetary incentives affect cheating behaviour. Subjects are asked to think of a number between 1 to 6, roll a die in private and report the number obtained to the experimenter. If the number rolled is the same as the one thought of, report "yes" which will determine subjects' payoff otherwise report "no" and earns nothing. They found that individuals cheated more in the mind game knowing that the experiment can not verify the number thought of in the mind as compared to the standard cheating game.

In their experimental manipulation, Shalvi et al. (2011) studied dishonest behaviour by employing an anonymous die-under-cup task in which subjects roll a die under cup additional times to check whether the die was legitimate but report the outcome of only the first roll which determines their payoff. Their result suggests that when individuals observe desired counterfactuals (roll the die additional or multiple times), they are more likely to make self-justification to cheat to earn higher payoff once they feel they can justify their behaviour. Thus, self-justification influences individuals to act in their self-interest to engage in dishonest act while feeling honest compared to when the same dishonest act occurs without justification as depicted in the single roll scenario where subjects roll the die only once and report the outcome.

Lewis et al. (2012) obtained similar results in their multiple die roll as well as the single die roll scenarios confirming that where there exist counterfactuals cheating increases. In their

single die roll scenario, they found that subjects cheated more when there were financial incentives to do so and that subjects could justify the lie as the money obtained was donated to a cancer charity rather than for personal gains. A feasible explanation for this result is that making contributions to the cancer charity rather than for direct personal gains gave individuals cause to justify their lie and engage in the dishonest act.

Also, the experiment conducted by Gibson et al. (2013) reveal that cheating increases from 18% to 79%, when it became more beneficial to cheat though the experimental design is quite different from the standard die-under-cup task due to the framing used. In their experiment, subjects were placed in a position as a CEO who must announce their firm's earnings per share for the previous quarter to a passive market. Reporting higher earnings would lead to higher payoffs and the experiment was design such that truth telling was economically costly hence many subjects reported their earnings dishonestly and even cheated more when incentives were further raised.

By contrast, a great deal of large-scale research on dishonest behaviours using the die-under-the-cup paradigm and other cheating game methods have also been conducted that violate the standard economic assumption. The evidence from these recent studies suggests that in situations where dishonest behaviour leads to higher payoff and there is no threat of revealing this dishonest act (since task is done in private), individuals do not cheat to the maximum extent possible or are not always money maximisers as posited by the standard economic assumption.

One such experiment was conducted by Fischbacher and Föllmi-Heusi (2013) who brought the clever die roll paradigm for detecting cheating. In the experiment, subjects roll a six–sided die in a cup once, observe and report the outcome they obtain to the experimenter for payoff. The payoff was 1, 2, 3, 4, and 5 CHF for the corresponding outcome of the die roll and one earns nothing if the die roll outcome is 6. The authors observed three behavioural patterns; subjects who are honest, payoff maximisers and partial liars. If subjects were self-interested and rational payoff maximisers as believed none would have reported 6 associated with zero payoff but they would all have reported rolling a '5' to obtain higher payoffs. A percentage of the subjects reporting 6 explains that indeed some individuals are honest. The payoff maximisers comprise of the proportion of subjects reporting 5 which in this case is associated with the highest payoff. There is another observation in their result which is noteworthy to be discussed. A fraction of the subjects does not lie maximally by not reporting the payoff maximising outcome '5' but rather decided to disguise their lie by reporting '4'. Reporting '4'

may let it seem less suspicious that one cheated and one can also gain financially. Thus, this pattern of cheating reveals that self-interested individuals are motivated to cheat more but they also prefer to disguise their lies.

Blanco and Cordenas (2015) also employed the die-under-the-cup task to investigate whether a previous experimenter-subject relationship has effect on the degree of honesty. The subjects were students who had just completed a one-month period labour relationship as research assistants hired to code news from online newspapers and the experimenter-employer was their previous supervisor. The experimental task was for them to roll a six-sided die-under-cup, report the result obtained to the experimenter and earn an amount of money linearly proportional to the die roll number reported. The results show that subjects cheat to earn higher payoffs by reporting high numbers associated with higher incentives '4 and 5' but not maximally by not reporting more of the payoff maximising outcome '6' violating the standard economic assumption of rationality.

Mazar et al. (2008) also described such irrational pattern of cheating by introducing a theory of self-concept maintenance. They conducted series of experiments in which subjects solve mathematical problems and then report to the experimenter how many they managed to solve and received payment based on a piece rate per correctly solved matrix having destroyed their worksheets already making cheating undetectable. If dishonest acts are performed by purely self-interested and calculating individuals, who only care about monetary gains then given such opportunity, the rational thing to do was to have all subjects reporting to have solved all problem but instead few subjects claimed they had all the problem solved. It turned out that subjects cheated more but not maximally. Although their experimental paradigm does not follow the die-under -the-cup task but it is worth discussing.

Shalvi, Handgraaf and De Dreu (2011) conducted an experiment using anonymous die-under-cup paradigm and found similar prediction supporting self-concept maintenance theory. They call this process where individuals make trade-offs between material self-interest and self-concept maintenance "ethical manoeuvring." Their result shows that individuals avoid over-reporting the highest possible outcome to gain financially.

Abeler et al. (2019) provided meta-analysis base on the die-roll paradigm to deepen their understanding of how individuals report their private information. They combine data from 429 treatments across 90 papers involving 44,390 subjects across 47 countries. Subjects roll a die privately such that the outcome of the die roll is unobservable by anyone except the subjects

themselves, report the outcome to the experimenter and then receive a monetary payoff equal to the number they report. The authors found that surprisingly participants continually refrain from cheating maximally. This result also departs from the standard economic assumption of reporting the pay-off-maximizing outcome.

These researchers therefore do not understand why monetary incentives do not increase cheating even in fully anonymous setting if individuals are self-interested and rational beings who seek to maximize payoff as believed by the standard Economists. It may be the case that when individuals are faced with an opportunity to cheat, they do not make rational choices but rather employ some internal mechanisms that determine how certain actions would affect their image. These researchers therefore formalized and suggested a wide range of explanations for this observed behaviour. Abeler et al. (2019), Gneezy et al. (2016) and Hao and Houser (2011) attribute this to an intrinsic and reputation cost which may influence individuals' dishonest behaviour. They explain that a preference to appear as an honest person is the main driving force for truth-telling. Fischbacher and Follmi-Heusi (2013), original die-throw study authors, Mazar et al. (2008) and Shalvi et al. (2011) suggest that image concern is likely to play a role. They concluded that people engage in dishonesty but only to the extent that it avoids any negative signals that might affect their image. Other influential experiments outside our model also relate individuals' unwillingness to cheat more to a direct lying cost (Ellingsen and Johannesson, 2004; Gneezy, 2005; Kartik, 2009), guilt aversion (Charness and Dufwenberg, 2006; Dufwenberg and Gneezy, 2000) and the influence of social norms (Weibull and Villa, 2005).

These models typically rely on self-reported behaviour but invoke different underlying motives. While some assume that subjects who are rational and self-interested misreport their private information if this is to their material benefit, others depart from this assumption and posit that some people are not always money maximisers hence at least do not lie maximally by refraining from reporting the payoff-maximizing outcome. The possible explanation given for this observation rely on the assumption that people can experience a psychological disutility which holds them back from engaging in dishonest behaviour, at least to some extent. However, when Kajackaite, A. and Gneezy, U. (2017) modify the standard cheating game using the mind game which eliminates the concern of being exposed as liars as well as Shalvi et al. (2011) and Lewis et al. (2012) die-roll game where subjects could self-justify their lies, the evidence suggests that subjects did react to monetary incentives and cheated more. Hence, the above reasons given by these researchers do not explain individuals' behaviour. It could be that

subjects might wonder if their die roll is really private or whether the experimenter had a potential way to figure out if they would cheat therefore these subjects may fear or be more concern about being dishonest. Their results further explain that monetary incentives do not make subjects averse to cheating but knowing that it may be obvious to be detected as liars is perhaps subjects concern and not that individuals have a desire to maintain an honest image and that cheating about a die roll jeopardizes this image.

Following this reasoning, the cheating game for this experiment is the basic mind game employed by Kajackaite, A. and Gneezy, U. (2017). ln this variant of the die-roll game subjects first think of a number between 1 to 6, then roll a six-sided die in private. If the die roll outcome corresponds to the number they thought of, the participant is asked to report "Yes" to obtain payoff, otherwise to report "No" and earns nothing. Kajackaite's version of the die roll game allows us to better investigate the question of how cheating decision-making is affected by eye observability without subjects facing any threat or fear of being exposed as liars since the experimenter has no way of verifying what number individuals thought of in their minds. Thus, the basic mind game eliminates the possibility or fear of being exposed as a liar.

Although there are several experimental literatures which have extensively studied dishonesty using die roll paradigm, but most questions about the motives behind dishonest behaviour remain unanswered. Hence, it would be important and interesting to find out whether these motives and the resulting inclination to cheat are heightened or suppressed when such decisions are made under images of real human watching eyes.

2.2. EFFECTS OF OBSERVATION ON HUMAN BEHAVIOUR

The behavioural effects of being observed have been explored in many contexts across both Economics and Psychology literatures. Our discussion of this observation effect literature would help to examine how observation impacts behaviour. There is a large literature showing that individuals behave differently while being observed and even under images of human watching eyes. These long standing and striking evidence indicate that individuals tend to modify their behaviour when other individuals are present (Markus, 1978; Zajonc et al., 1969; Suri et.al., 2011; Hoffman et al., 2015; Pascual et al., 2015; Kroher and Wolbring, 2015) or behave in a socially desirable way when being observed by others (Leary and Kowalski, 1990; Reuben and Stephenson, 2013; Van Bommel et al., 2014; Zettler et al., 2015). Mol et al. (2020) employed an active virtual observer (an avatar looking like a human), and this tend to affect individual behaviour.

Several studies have employed alternate method by using subtle cues of observability (images of real human watching eyes) to modify individuals' behaviour. Bateson et al. (2006) found that there were substantially higher number of contributions in the honesty box whenever the mere cues of being observed were displayed as against flowers. Oda et al. (2015) concluded that this led to decrease in cheating though it was for a prosocial cause. Other related studies have shown that images of stylized eyes depicting those individuals are being observed cause them to behave more cooperatively in some economic games leading to significant increases in the sharing of money in dictator games (Haley and Fessler, 2005; Rigdon et al., 2009; Oda et al., 2011; Baillon et al., 2013; Nettle et al., 2013) and an increase in donations to a public good (Burnham and Hare, 2007). Displaying images of eyes further prevented people from littering a cafeteria (Ernest-Jones et al., 2011) or leaving rubbish at a bus stop (Francey and Bergmuller, 2012) and stealing a bicycle (Nettle et al., 2012). Evidence from these studies that used human watching eyes to better understand human behaviour shows that people are sensitive to subtle cues of observability. The common interpretation is that images of eyes trigger feelings of being observed or function as an indirect supervision system for individuals which in turn activate social image concerns hence its subsequent behavioural changes. The literature on the mere presence of others and cues of observability give a clue that observability is vital in modifying human behaviour. Acknowledging the fact that individuals are particularly susceptible to subtle cues of observability from the above discussion, it is important to know how this process affects dishonest behaviour since not much has been explored in this angle. To the best of my knowledge, I am not aware of any study which has explored on how cues of observability affect dishonest behaviour hence this study offers a great contribution to the dishonesty literature. This paper also contributes to the growing literature in understanding the behavioural motivation behind individuals' dishonest behaviour.

We decided to recruit Ghanaians in the Ashanti land popularly known as Kumasi for this study. We therefore used the image of eyes of the Ashanti or Asante King to examine whether this can influence the reporting behaviour of individuals' private information. Asante is the largest tribe among Akan ethnic group and in Ghana. The Asantes live in a region centred on the city of Kumasi which is the second most heavily populated place in Ghana. According to the Ghana Statistical Service (GSS) as of 2021 the Akan which includes the Asantes accounts for 47.5% of Ghana's population. The image of eyes of the King is therefore not to conjure any negative connotation on his personality but to represent authority, truth or laws. The rationale for this decision is that traditional authority figures or leaders are considered as custodians of culture,

norms and values and hence can be used to influence their environment. We now turn to specific research on how the role of authority figures or traditional leaders enhanced in promoting behavioural change.

2.3 ROLE OF TRADITIONAL AUTHORIY FIGURES IN BEHAVIOURAL CHANGE

Traditional leaders or Kings have always played a significant role in the lives of majority of African people, especially in rural communities. Traditional leaders serve as local governance and gain power from both local institutions and from the state. They are often closer to the local population than the state officials. For many citizens, a traditional leader is the first authority figure they contact when they have governance issues (Honig, 2019). Their influence over the communities they preside still prevails despite the forces of modernisation, changing government structures, urbanisation and the encroaching influences from the West (Ayittey, 2006). In their role as opinion leaders, traditional leaders can function as levers of change advocating and promoting positive behavioural change. As custodians of culture and traditional values within the African system, Traditional leaders have the influence to alter underlying values and beliefs or harmful customary law practices and motivate subjects to be law abiding. Traditional leaders are therefore believed to wield major influence on their subjects' civic engagement, political involvement and vote choice (Brierley and Ofosu, 2021). The source of their legitimacy (historical socio-cultural customs) and subjects' trust and reverence enable them to have an effective role as change agents. Traditional leaders thus have the influence to promote positive behavioural change and have a pivotal role in maintaining law and order in their communities.

Identifying that traditional leaders are the gate keepers and influencers of opinions, Panos Institute Southern Africa (PSAf), for instance, has engaged traditional leaders to lead child protection by ensuring that communities begin to identify all the aspects of their culture which negatively affect children and address them. This is one of the many approaches the organisation is using to strengthen child protection systems in communities. The reason being that Traditional leaders can use their influence to create sanctions/penalties for perpetrators of child abuse. Traditional leaders have a crucial role to play in the changing of attitudes and transforming traditional practices owing to their authority and proximity to the people and their primary mandate to preserve customs and traditions. We therefore argue that the mere introduction of the image of eyes of the Asante King can influence the dishonest behaviour of respondents.

3. BEHAVIOURAL MOTIVATION

We develop behavioural hypothesis based on the different motives presented by earlier researchers in the dishonesty literature to influence individuals' cheating behaviour to assess this claim and to reset the monetary gains versus image concern argument. We consider two behavioural motivations – social image concern and monetary gains motivation. Thus, we want to examine dishonest behaviour and its connection with social image concerns and monetary gains. Monetary gain is considered as a personal motivation while social image concern is a social motivation. An important property of image concern which is lacking in previous research study is its dependency on observability. Image concern is how an individual feels about himself/herself (self-image) or a consequence of what other people think about us (social image). It is assumed that individuals either like to think positively of themselves or prefer being liked and well regarded by other people. A concern for a positive self or social image is central assumption for a large class of signalling models (Falk, 2021).

Social image concern is how the individual perceives other people see or think about him/her. Maintaining a positive social image is a vital feature of human psychology, (Grimalda et al. 2016). Leary (2020) added that people normally try to put up more acceptable behaviours for themselves by caring about what others think about them. Individuals often consider how their behaviour will be viewed by others, and hence may act in a desirable way to avoid any negative signal that may affect their social image. For instance, desirable acts yield positive image such as generous, kindness, caring, fair, honest etc while undesirable acts result in negative image as greedy, selfish, wicked, being unfair (Andreoni and Bernheim 2007; Bénabou and Tirole 2006; Ellingsen and Johannesson 2007). The intuition behind this analysis is that individuals reporting behaviour may depend on which motivation is stronger—monetary gains or social image motivation. Social image motivation therefore is influenced by how the individual thinks others think about them hence the importance of introducing cues of observability. Our eye observability strategy would therefore help us to assess the validity of the proposed explanations given by earlier researchers that image concerns as an honest person is the main driving force for truth-telling in the dishonesty game or individuals are motivated to cheat more if it is financially beneficial to do so.

We proceed by presenting the research methodology of the study in Section 4, Section 5 provides results and discussion, and Section 6 concludes. Experimental instruction for the experiment is presented in the Appendix.

4. RESEARCH METHODOLOGY

We concentrate on cues of observability and measure the effect of this on dishonest behaviour. In this section, we describe the experimental design and measure of cheating, treatment variations and hypotheses.

4.1. EXPERIMENTAL DESIGN AND MEASURE OF CHEATING

The experiment presents an individual making decision alone or under the image of eyes of the Asante King. The cheating game we used is the die-roll version of Kajackaite, A. and Gneezy, U. (2017) experiment described earlier. The experimental task is simply for subjects to first think of a number between 1 to 6 and remember the number without reporting it to anyone. They then roll a six-sided die in private. If the die roll outcome corresponds to the number they thought of, the participant is asked to report "Yes" otherwise to report "No." To determine their individual payoff, if the participant reports "Yes," they receive a considerable amount of money and earns nothing if they report "No." This task is repeated ten times and participants are told at the beginning of the experiment that they will be paid randomly for only one of the ten tasks.

This simple experimental design makes it possible to detect the trends in cheating without subjects facing any threat of being caught or feeling dishonest as in the mind participants know that their lie can never be exposed. Cheating in this experiment means reporting "Yes" to receive payoff rather than reporting "No" even if the actual outcome of the die roll does not correspond to what one thought of. Since cheating is financially more rewarding and because the number thought of in the mind can never be known by the experimenter, subjects face the temptation to obtain payoffs by misreporting their outcome. Due to the nature of the experimental task, the experimenter does not know whether any individual subject cheated or not. However, the distribution of the reported number of "Yes" aggregated across the ten tasks would infer information about trend in individual dishonesty.

4.2. TREATMENT

With our design we aim to investigate individuals' dishonest behaviour under cues of observability. It is therefore natural to have one treatment (eye observed treatment) and a no eye treatment, under otherwise equal conditions. We argue that the mere introduction of the image of eyes of the Asante King can influence the reporting behaviour of individuals' private information and therefore decide to have a treatment in which Otumfuo Nana Osei Tutu II (the

(paramount Chief of the Asantes) eyes are observing participants directly as they roll the die in private (see figure 2 in Appendix B for screenshot).

In the eye observed treatment, the image of eyes of the King were positioned such that they were looking directly at the participants as they roll the die alone. This was meant to trigger feelings of being observed or somehow create a sense of observability in the minds of subjects. This put subjects in the treatment group in a dilemma especially the Asantes and therefore they must do a cost and benefit analysis on the psychological cost of being dishonest (if they care about their social image and may suffer psychological cost when they behave dishonestly before the King) versus the monetary benefit of being dishonest. This involves trade-off between the social image of being honest before the Asante King and the monetary benefit of being dishonest. The control or no eye treatment presented normal computer background (see figure 1 in Appendix B for screenshot) to provide a base assessment point.

4.3. EXPERIMENTAL PROCEDURE

The purpose of this current study is to examine experimentally how cues of observability affect dishonesty. The experiment was programmed in Qualtrics and conducted online in July 2022. Participants were recruited by sending a test message via various WhatsApp platforms and Facebook prior the online experimental survey. A total of 80 people participated fully in the pilot study within 20 minutes. 40 participants each for the eye observed and no eye treatment. Participants were randomly sort into treatment and no subject participated in more than one treatment.

A link to the experiment was sent to participants 15 minutes before the experimental survey. One interesting feature about this online experimental survey was that participants could assess the experiment on their smartphones. Subjects were informed at the beginning of the experiment that they could earn a considerable amount of money depending on the decisions they make in the experiment. A welcome address and brief introduction to the experiment were given to explain the task to be performed in detail (full instructions are reported in Appendix A). Before the experiment, participants provided demographic information and completed some questionnaires. The experiment began with a brief practice session to help familiarize subjects with the rules and check if the die was rolling effectively. The practice session was followed by the paid session where participants were randomly sort into the eye observed and no eye treatment. Subjects were made fully aware that

(a) the task requires them to first think of a number between 1 to 6 and remember it.

(b) roll a die by touching the "Throw die" on the screen, observe the outcome and report "YES" if the die roll outcome corresponds to the number thought of and "NO" otherwise.

(c) reporting "YES" yields a payoff of ¢15 and ¢0 otherwise.

(d) the task would be repeated ten (10) times and they would perform same task as before.

(e) at the end of the experiment only one of the ten tasks will be randomly selected for payment.

(f) payment would include participation fee of ¢5 which would be paid via Sendwave into their MTN mobile money account.

The task is same in both treatments. The only difference between the two is that the no eye treatment presents screens displaying a normal background while in the eye observed treatment, the screen displayed the image of eyes of the Asante King.

4.4. RESEARCH HYPOTHESES

In this framework, an individual chooses whether to engage in dishonest behaviour or not. In such a cheating game where individuals hold private information and their actual outcomes are unverifiable as they think of a number in the mind but only made known by reporting either "Yes" or "No" if the number thought of corresponds to a die roll outcome or not, it becomes important as to how respondents would behave when under images of eyes of the Asante King. The evidence in the dishonesty literature have indicated that subjects do cheat when monetary incentives are involved though not maximally by others. This explains that to get higher payoffs, subjects would cheat when an opportunity is presented however being observed by others most especially a King is an important determinant as to how we want others to view us, which in turn, can influence our own behaviour. It is on this note that we introduce the eyes of the King to better understand how individuals reporting behaviour would change in this present study. We tend to put up our best behaviour or often consciously behave in a socially desirable way when we know that others are observing us (Leary and Kowalski, 1990; Van Bommel et al., 2014) and even with images of real human watching eyes (Bateson et al., 2006; Oda et al., 2015). This is enough to motivate hypothesis 1:

H_1: Cheating is significantly less in the eye observed treatment than in the no eye treatment.

This follows from the expectation that people who are under the image of eyes of the Asante King would be less likely to cheat.

An individual motivated solely by monetary gains would report "YES" regardless of the actual number rolled to earn money for themselves irrespective of treatment as cheating is financially beneficial. However, those motivated to maintain a positive social image would behave honestly or observe some level of truth-telling if they want to appear honest before the Asante King. Rolling a die under the image of eyes of the Asante King influence dishonest behaviour in that it leads to a situation where there are two opposing forces: motivation to behave dishonestly to obtain payoff and motivation to maintain a positive social image as honest before the Asante King. Individuals should be willing to cheat more "when the materialistic gain exceeds the psychological cost caused by lying" (Shalvi et al., 2011, p. S23). This implies that, all things being equal, dishonesty should increase once the benefit gain from cheating is high. However, the question arises whether and to what extent individuals would cheat more once cheating yields substantial personal gain at the expense of their social image not before any other person but a King who stands as a symbol of authority, truth or law? Given that individuals should be motivated to maintain a positive social image as they may encounter a threat to their social image (psychological cost) when they engage in dishonest behaviour, they should refrain from cheating though the number thought of in the mind is unverifiable. The outcome of this evaluation depends on which behavioural motivation is stronger- monetary gains or social image motivation. We predict that social image concerns would outweigh monetary gains. This leads to hypothesis 2.

H_2: Individuals are more concerned about their social image as an honest person than monetary gains.

Introducing image of eyes of the Asante King in our study affect dishonest behaviour in that it increases the desire to act honestly. For this reason, if the effect is a decrease in cheating such that the eye observed treatment records less cheating than the no eye treatment ($\mathbf{H_1}$) then this effect clearly indicates that social image concern as a consequence of observability is the motivation behind subjects being honest in the dishonesty task ($\mathbf{H_2}$).

5. RESULT AND DISCUSSION

5.1 DESCRIPTIVE ANALYSIS

Table 1 shows the descriptive statistics of our sample. Indeed, our descriptive evidence shows that majority of our respondents were between the ages of 25-29 (49% for which 24% were in the untreated group and 25% in the treated group) and single 54% for which 30% were in the untreated group and 24% in the treated group, 61% were females accounting for 26% in the untreated group and 35% in the treated group, 16% of the respondents in the untreated group were employed and 20% were employed in the treated group with a total of 36% being employed. More than half of the respondents were Asantes (58%) as this is not surprising since Kumasi is the habitat of the Asantes**.** With the 58% Asantes, 30% were in the untreated group and 28% in the treated group.

Table 1: Descriptive Statistics of Respondents

	Mean		
Variable	Untreated	Treated	Total
Gender			
Female	0.263	0.350	0.613
Male	0.238	0.150	0.388
Age			
18-24	0.088	0.038	0.126
25-29	0.238	0.250	0.488
30-34	0.113	0.125	0.238
35-39	0.025	0 .050	0.075
40-44	0.013	0.000	0.013
45-49	0.000	0.013	0.013
Above 50	0.025	0.025	0.050
Ethnicity			
Asante	0.300	0.275	0.575
Ewe	0.050	0.038	0.088
Fante	0.113	0.163	0.275
Ga	0.013	0.013	0.026
Northerner	0.025	0.013	0.038
Marital status			
Married	0.063	0.163	0.225
Widowed	0.013	0.013	0.026
Divorced/separated	0.013	0.025	0.038
Engaged/Dating	0.113	0.063	0.176
Single	0.300	0.238	0.538
Employment			
Employed	0.163	0.200	0.363
Self -employed	0.050	0.088	0.138
Student	0.150	0.100	0.250
Unemployed	0.138	0.113	0.251

Table 2: Descriptive Statistics of Asantes and the other ethnic group

	Asantes			Other Ethnic Group		
Variable	Untreated	Treated	Total	Untreated	Treated	Total
Gender						
Female	0.138	0.188	0.326	0.125	0.163	0.288
Male	0.163	0.088	0.251	0.075	0.063	0.138
Age						
18-24	0.050	0.013	0.063	0.038	0.025	0.063
25-29	0.125	0.125	0.250	0.113	0.125	0.238
30-34	0.088	0.075	0.163	0.025	0.050	0.075
35-39	0.013	0.038	0.050	0.013	0.013	0.025
40-44	0.013	0.000	0.013	0.000	0.000	0.000
45-49	0.000	0.000	0.000	0.000	0.013	0.013
Above 50	0.013	0.025	0.038	0.013	0.000	0.013
Marital status						
Married	0.025	0.138	0.163	0.038	0.025	0.063
Widowed	0.000	0.013	0.013	0.013	0.000	0.013
Divorced	0.000	0.000	0.000	.0125	0.025	0.038
Engaged	0.075	0.038	0.113	0.038	0.025	0.063
Single	0.200	0.088	0.288	0.100	0.150	0.250
Employment						
Employed	0.113	0.163	0.275	0.038	0.050	0.088
Self-emp	0.025	0.025	0.050	0.025	0.063	0.088
Student	0.088	0.025	0.113	0.063	0.075	0.138
Unemployed	0.075	0.063	0.138	0.063	0.050	0.113

The Asantes account for 58% of our respondents while the other ethnic groups (Fantes, Ewes, Guans and Northerners) comprise of 42%. Since we used the image of eyes of the Asante King in our study, in table 2 we selected respondents who are Asantes from respondents from the other ethnic groups and did a descriptive analysis of both. The descriptive evidence shows that majority of the Asantes were females (33%) while 29% females were from other ethnic groups. 25% of the Asantes were between 25-29, 28% were employed and 28% were single.

5.2 MAIN RESULTS

We conducted an experiment to evaluate how eye observability impact dishonest behaviour of individuals. To address our research questions posed earlier, our analysis was based on Mann-Whitney U test. We used the Mann-Whitney U test to compare cheating in the eye observed treatment and no eye treatment to find out whether the distribution of the reported number of 'Yes' aggregated across the ten tasks of individual subjects is different or not. This would help us to examine whether eye observed cheating decision is different from individual cheating decision making (without eyes). The total reported number of 'Yes' across individual subjects

was therefore our dependent variable and eye observability was the independent variable. Put simply, we wanted to find out whether being under the Asante King's watching eyes (independent variable) has any effect on the ability to report higher number of Yes- dishonesty (dependent variable).

We then form these hypotheses for the Mann-Whitney U test:

Ho: The distributions (shape) of the total reported number of "Yes" across the ten tasks in both treatments are equal.

Ha: The distributions (shapes) are not equal.

We run the experiment with 80 participants: 40 participants in the eye observed treatment and 40 without. We input these data by creating a dataset with 80 observations. YES, records the total reported number of "Yes" in the ten tasks of individuals and Treat records untreated if participant was in the no eye treatment and treated if participant was in the eye observed treatment.

The null hypothesis above for the Mann-Whitney U test is that the two treatments have the same reported number of Yes (thus, they both have the same shape and/or medians). The Mann-Whitney test works by converting the total reported number of Yes into ranks and then compare the rank sum of each group. Based on the difference between the expected and actual rank sum, a z value and corresponding p value are calculated. If the difference between the rank sum is big enough to be significant, then we reject the null hypothesis that the two treatments have the same total reported number of Yes. Table 3 presents the summary statistics of the Wilcoxon rank-sum test.

Table 3: Two-sample Wilcoxon rank-sum (Mann–Whitney) test – Summary Statistics

Treat	**Observation**	**Rank sum**	**Expected**	**Median**
Treated	40	1211.5	1620	4.00
Untreated	40	2028.5	1620	7.00
Total	80	3240	3240	6.00

As we can see from table 3, there is what looks like a sizeable difference between the rank sum of the treated and untreated groups - a difference of 817. The Mann-Whitney test statistic will

tell us whether this difference is big enough to reach significance. The Mann-Whitney test produced these test statistics: z value of -3.958 and an exact *p*-value of 0.000(see Stata output in Appendix C). The results indicating an exact p value of 0.000 which is less than 0.05(the standard alpha level) or even less than 0.01 means it is highly significant to reject the null hypothesis that the two treatments have the same total reported number of Yes. This significance supports the alternative hypothesis that the reported number of "Yes" aggregated across individuals' ten tasks in the eye observed treatment significantly differ from those in the no eye treatment. This difference is detected in the differences in shape and spread of the total reported number of Yes as clearly depicted in figure 1.

A comparison of the median values of the distribution was conducted to examine which treatment recorded less dishonesty. The median values presented in table 3 and figure 2 also imply that there exist significant differences in the total reported number of Yes between the treatments. The median value of the treated group is 4.00 as compared to the untreated group which recorded a median value of 7.00. This explains that respondents in the treated group cheated less than those in the untreated group. Hence, the total reported number of Yes in the treated group was significantly less than in the untreated group.

Figures 1 and 2 below present the graphical representation of the results. Figure 1 shows the distribution of the total reported number of Yes by Treat. The distribution/shapes of both graphs differ. It can be observed that respondents in the treated group have total reported number of Yes mostly 5 and below with some even having zero total reported number of Yes. The total reported number of Yes in the untreated group on the other hand is mostly above 5 with about 13 respondents reporting Yes for all the ten tasks. The total reported number of Yes in the untreated group above 5 is an indication of a degree of dishonesty. This implies that most respondents cheated more in the untreated group as compared to the treated by reporting more Yes to obtain payoff.

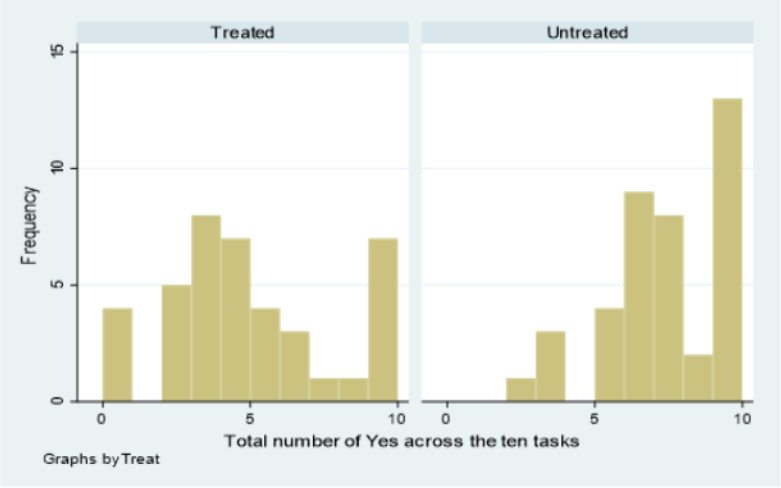


Figure 1: Distribution of the total reported number of Yes

Figure 2 shows the box plots of samples of size 40 each drawn from the distributions in figure 1. Vertical lines indicate the medians and boxes the interquartile range. The median value was 4units in the treated group and 7units in the untreated group indicating that dishonesty was less in the treated group than the untreated. Not only do the medians differ by 3units, but the distributions are also different as seen in figure 1.

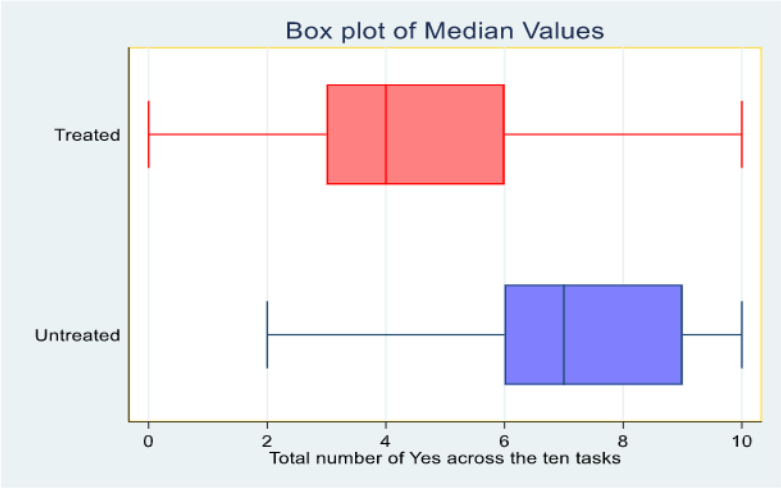


Figure 2: Box plots of the medians and interquartile range.

The Mann-Whitney U test was applied to test if there were differences in the total reported number of Yes between the eye observed and no eye observed treatment. Since the shapes or distribution of the total reported number of Yes for the two groups differ, we could conclude that the total reported number of Yes for eye observed group (rank sum =1211.5) and no eye group (rank sum = 2028.5) were statistically significantly different. Thus, the results indicate that respondents under the Asante King's watching eyes engage in less dishonesty than those

without, a difference that is statistically significant. We can therefore conclude that cues of observability impact behaviour hence it can prevent dishonest behaviour by harnessing individuals' desire to maintain a view of themselves as honest even before images of real human watching eyes and indeed social image concern is the motivation behind subjects being honest or is the driving force for truth telling in the dishonesty tasks.

5.3 REGRESSION ANALYSIS

In our experiment, we have primarily been interested in cues of observability and its influence on dishonesty. However, since the experiment was conducted using participants in the Ashanti Kingdom, we decided to analyse the effects of the image of eyes of the Asante King on the Asantes (how the Asante King has impact on the Asantes dishonest behaviour). We run a linear regression to first find further support for dishonesty being lesser in eye observed treatment than in the no eye treatment. In the regression, the dependent variable is YES which is the total reported number of Yes aggregated across individual ten task and is a continuous variable which contains values from 0 to 10. We created a dummy for the binary categorical Treat variable where treat=1 for treated and 0 otherwise. A dummy was also created for Ethnicity where tribe1=Asantes and 0 otherwise. The dummies were created to assign numerical variables to the levels of categorical variables to avoid error in our analysis and to get meaningful data points. Table 3 reports the regression results.

Column (1) shows the raw treatment effect. We found similar results in the linear regression as in the non-parametric test (Mann Whitney U test). The significant coefficient of the treat dummy shows that on average there is 2.5points difference between the treated and untreated total reported number of Yes. Thus, respondents in the treated group reported total number of Yes that is 2.5points lower than those in the untreated group. Hence, respondents in the treated group were less likely to cheat compared to the untreated. In column (2), we included ethnicity dummy (tribe1) and interact it with the treat dummy to find out if the images of Otumfuo's eyes influence the dishonest behaviour of the Asantes. The significant coefficient of tribe1 explains that on average the Asante people have a predicted total reported number of Yes 1.3 points lower than those from the other ethnic groups. Also, an Asante in the treated group on average is predicted to have total reported number of Yes that is 3.3points lower than the others, and this difference is statistically significant. The results explain that Asantes in the treated group were less likely to engage in dishonest behaviour. We can therefore conclude that the Asante King's eyes have an impact on the Asantes reporting behaviour. We included

employment status in Column (3). Column (4) additionally controls for the remaining socio-demographic variables: marital status, age and gender.

Table 4: Coefficients from Linear Regressions on Full Sample

Dependent Variable: YES - The total reported number of Yes				
	1	2	3	4
Treat	-2.500***	-3.201***	-3.122***	-3.175***
	(0.584)	(0.809)	(0.820)	(0.838)
Tribe1(Asante=1)		-1.271**	-1.343**	-1.338**
		(0.658)	(0.637)	(0.691)
Treat#Tribe1		-3.313***	-3.443***	-3.502***
		(0.796)	(0.779)	(0.760)
Employment			-.2660	-.2877
			(0.251)	(0.256)
Marital status				0.510*
				(0.288)
Age				0.072
				(0.250)
Gender				-0.4551
				(0.539)
Constant	7.050***	7.8125***	8.428***	7.245***
	(0.351)	(0.446)	(0.698)	(1.571)
N	80	80	80	80

Robust standard errors in parentheses.

*p < 0.1, **p < 0.05, ***p < 0.01

We then run a linear probability model by converting our outcome variable into a binary variable. We selected a cut-off value by taking the median predicted value of the total reported number of Yes. We defined the cut-off as "the threshold above which participants engage in dishonest behaviour and below which there is some degree of truth telling. Hence, our outcome variable is yes=1 if YES >=6 and 0 otherwise where YES is the total number of yes aggregated across individual ten task. We interacted the treat and tribe1 dummies to predict the estimated probability of a respondent to engage in dishonest behaviour, given that he/she is an Asante or from the other ethnic group. In Table 5, we report the predictive margins and marginal effects after running the regressions using the yes dummy as the endogenous variable and the interaction between treat and tribe1 dummies as the exogenous variable with the help of the margins command.

Table 5: Predicted Probability of engaging in Dishonest Behaviour by Ethnicity

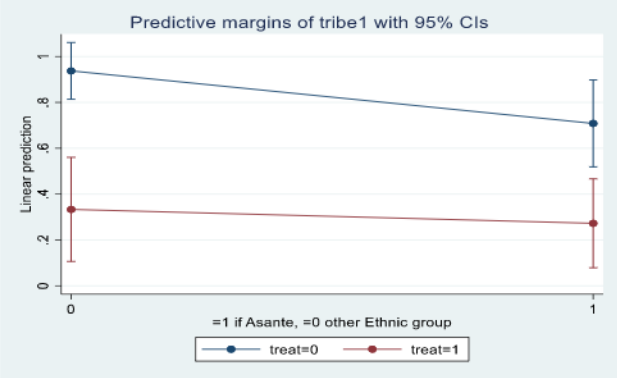
Dependent Variable: Dishonest Behaviour - yes=1 if yes >=6			
Predictive Margins			
	Untreated	Treated	Marginal effects
Asantes	0.708***	0.273***	-0.436***
	(0.095)	(0.097)	(0.136)
Other ethnic groups	0.938***	0.333***	-0.604***
	(0.062)	(0.114)	(0.130)

Robust standard errors in parentheses.

*p < 0.1, **p < 0.05, ***p < 0.01

The estimated predicted margins from the Linear probability model show the predicted probability to engage in dishonest behaviour. It can be seen from table 5 that the predicted probability for an Asante to engage in dishonest behaviour in the treated and untreated groups are 0.273(around 27%) and 0.708(71%) respectively**.** The estimated marginal effects which measure the differences in the treated and untreated predicted values indicate that Asantes under the eyes of Otumfuo are less likely to cheat compared to those without the eyes showing a difference of 44% point which is statistically significant at 1% significant level. Thus, the Asantes in the treated group are 44% less likely to cheat than those in the untreated group. This is vividly shown in figure 3. We can therefore conclude that the images of eyes of Otumfuo inculcated a degree of honesty in the Asantes by making them refrain from cheating. Similar comparison was made with the other ethnic groups excluding Asantes and we found that the predicted probability for one to engage in dishonest behaviour is 94% point in the untreated and 33% point in the treated group showing a difference of 61% (see table 5 and figure 3). The results explain that the Asante King's eyes not only influence the dishonest behaviour of the Asantes but also respondents from the other ethnic group as well. The predictive margins and the marginal effects are graphically shown in figure 3**.**

a. Estimated predictive margin



b. Marginal effects

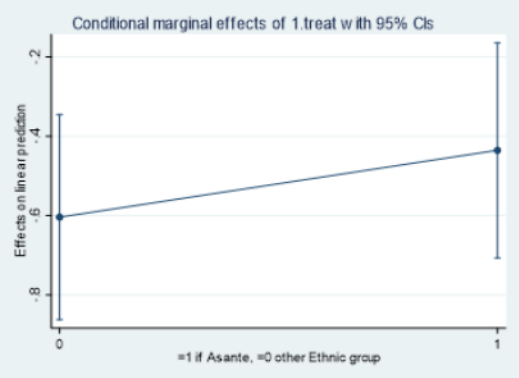


Figure 3: Graphical representation of predictive margins and marginal effects.

6. CONCLUSION

Individuals encounter economic decision-making problems whether big or small every day. Several factors come into display during such decision-making process. Identifying and understanding the factors that influence such decisions is relevant to understand what decisions could be made which is of great importance to researchers and policymakers alike. Thus, the factors that influence this process may influence the outcomes as well. In this paper, we propose that cue of observability may be an important influence during such decision making. In a world where there is frequent encounter with dishonest acts, it is important to know whether the mere introduction of image of eyes of the Asante King can help increase or decrease an individual's dishonesty. This present study contributes to earlier literature by seeking to examine how individuals make dishonest decisions under cues of observability and bring to light the behavioural motivation behind subjects' dishonest behaviour. The self-reported die roll task presented an opportunistic act for this analysis to be made since the results obtained by earlier research using the die roll paradigm present contradictory ideas.

We conducted an experiment in which participants make decisions either under the image of eyes of the Asante King or without eyes. Results from our experimental research shows that mere introduction of the image eyes of the Asante King reduces dishonest behaviour implying that social image concern is the motivation behind subjects being honest in the dishonesty task. The most interesting part is that the Asantes who were under the image of their King's eyes cheated less as compared to those without the eyes. This finding has several implications. Most importantly, it lends empirical support to the assumption of social image concerns as the

driving force for truth telling and that individual not only care about monetary gains, but also about a positive social image as an honest person before others, especially a King. On a practical basis, our findings suggest new mechanisms and instruments for policy makers who design policies to promote socially acceptable behaviours. Government, firms, organizations or institutions seeking to promote socially responsible behaviours may want to create environments that draw individuals' attention to authority figures when taking decisions. For instance, forms and contracts could be designed to include pictures of authority figures, images of watching eyes of authority figures can be pasted on walls and at vantage points of public places such as market areas, churches and mosques, playground etc to deter people from engaging in bad behaviours.

There are some limitations in this study that could be addressed in future research. The foremost of which is the insufficient sample size. Since the research was a pilot study, we did not have a sufficiently large sample size to draw valid conclusions. This can be problematic as it can lead to biased conclusions. Basing the study on larger sample size could have generated more accurate results. Second, we did not find out if participants were still in the Ashanti region (Kumasi) or not at the time of the study. Hence, this create a picture of participants not being a true representative of the people of Kumasi. Also, there was limited literature on the role of traditional authority figures in behavioural change. As a pilot study intended to lay the groundwork for a more complete research study in the future, we hope to inculcate these findings.

A major challenge of this research was finding and recruiting participants from the target population. This challenge was compounded by an online survey with its difficulties of setting up the experiment on smartphones. As a result of the online format, we limited the potential pool of respondents to participants from various WhatsApp platforms and Facebook and to those having smartphones. While the online survey had the potential to increase ease of response within the target population, some respondents of the target population may have not participated because of their discomfort with online interaction. Also, there was a problem with funding. We needed to find our own funding and a cost saving way of paying participants by using an agent to minimise transaction cost.

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APPENDIX

A.EXPERIMENTAL INSTRUCTION

Welcome and thanks for agreeing to participate in our short online experimental survey today. This experiment is part of a study we are conducting, and your help is highly appreciated. During the experiment we require your complete, undistracted attention so we ask that you follow these instructions carefully. You are about to participate in an economic decision-making experiment and receive payoffs afterwards. You are free to earn a considerable sum of money depending on the decisions you make in the experiment.

It is important that you remain attentive throughout the experiment. Your total earnings will include participation fee of ¢5 which will be paid via Sendwave to your MTN mobile money account. You will be asked to provide demographic information and complete some questionnaires after the instructions before we begin the experiment. During the instruction period, you will be given a complete description of the experiment and this experiment will begin with a brief practice session to help familiarize you with the rules. The practice session will be followed by a paid session.

On your decision screen will be a six-sided die. The experimental task is simply for you to first think of a number between 1 to 6 and remember it. Then roll the die by touching the "throw die" on the screen. If the number you obtained is the number you thought of, please indicate "Yes" on the record screen and your payment will be ¢15. If the number you rolled is not the number you thought of, please indicate "No" on the record screen, and your payment will be ¢0. This task will be repeated ten times and you will perform same task as before. At the end of the experiment only one of the ten tasks will be randomly selected for payment.

After you have completed the task, please click on the submit button at the extreme left corner of the screen.

We thank you for your time spent taking this survey.

Your response has been recorded.

B. DECISION SCREEN



Figure 1: Decision Screen for the No Eye Treatment and how it appeared on respondent's smartphone.

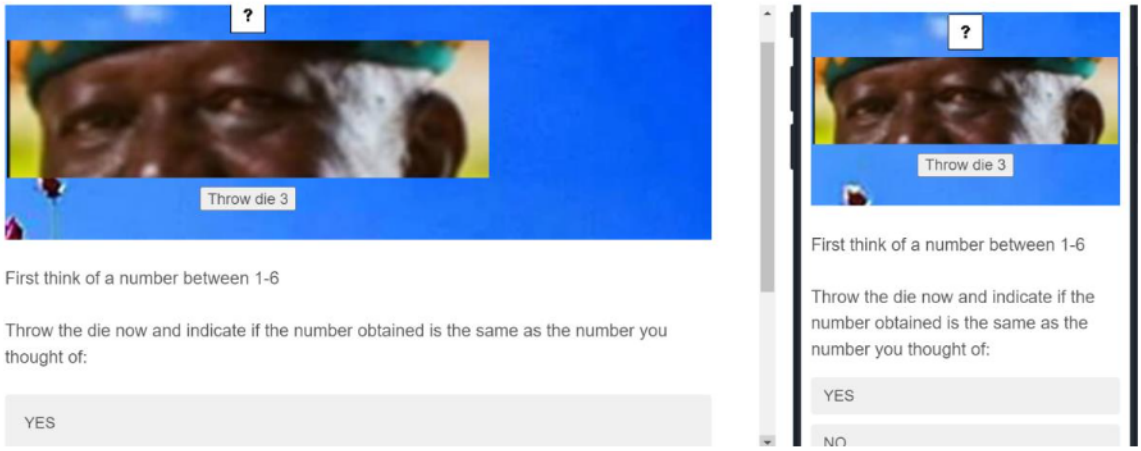


Figure 2: Decision Screen for the Eye Observed Treatment and how it appeared on respondent's smartphone.

C. STATA OUTPUT

```
. ranksum YES, by(Treat)

Two-sample Wilcoxon rank-sum (Mann-Whitney) test
```

Treat	Obs	Rank sum	Expected
Treated	40	1211.5	1620
Untreated	40	2028.5	1620
Combined	80	3240	3240

```
Unadjusted variance    10800.00
Adjustment for ties     -150.00
Adjusted variance      10650.00

H0: YES(Treat==Treated) = YES(Treat==Untreated)
          z = -3.958
Prob > |z| = 0.0001
Exact prob = 0.0000

.
.  tabstat YES, statistics (mean median) by (Treat)

Summary for variables: YES
Group variable: Treat
```

Treat	Mean	p50
Treated	4.55	4
Untreated	7.05	7
Total	5.8	6

```
. margins treat, at(tribe1=1 tribe=0)

Adjusted predictions                                  Number of obs = 80
Model VCE: Robust

Expression: Linear prediction, predict()
1._at: tribe1 = 1
2._at: tribe1 = 0
```

	Margin	Delta-method std. err.	t	P>|t|	[95% conf.	interval]
_at#treat						
1 0	.7083333	.0951908	7.44	0.000	.5187445	.8979222
1 1	.2727273	.0974181	2.80	0.006	.0787022	.4667523
2 0	.9375	.0620875	15.10	0.000	.8138421	1.061158
2 1	.3333333	.1139976	2.92	0.005	.1062874	.5603792

```
. margins tribe1 , dydx( treat )

Conditional marginal effects                          Number of obs = 80
Model VCE: Robust

Expression: Linear prediction, predict()
dy/dx wrt:  1.treat
```

	dy/dx	Delta-method std. err.	t	P>|t|	[95% conf.	interval]
0.treat	(base outcome)					
1.treat						
tribe1						
0	-.6041667	.1298087	-4.65	0.000	-.8627031	-.3456302
1	-.4356061	.1362042	-3.20	0.002	-.7068802	-.164332