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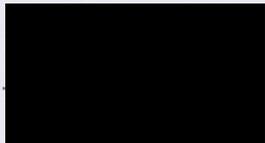
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**Exploring the Effects of Situational Factors on Deception:
From the Forming of Intentions to the Exhibition of
Nonverbal Behaviours**

by

Ke Zhang

A thesis submitted in partial fulfilment of the requirements for the

degree of

Doctor of Philosophy

University of Warwick, Warwick Business School

March 2014

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DECLARATION OF MATERIAL FROM PUBLICATIONS

This thesis is submitted to the University of Warwick in support of my application for the degree of Doctor of Philosophy. It has been composed by myself and has not been submitted in any previous application for any degree. This thesis takes a three-paper format, of which two of the papers (Paper 2 presented in Chapter IV and Paper 3 presented in Chapter V) are the up-to-date revisions based on my two published papers (see the references of Publications 1 & 2 below). Section 1 in Chapter II also contains information from my draft, contributed to a book chapter (submitted for publication), for which I am serving as the second author (see the reference of Submission below).

As agreed by the review committee of my PhD progress, the work presented in the thesis (including literature reviewed, experiment conducted, data generated, data analysis, and writing up for the published and not published contents) was carried out by myself, except in the case below.

Paper 2 presented in Chapter IV is a revised work based on Publication 1 (as listed below), which further includes updates of new thoughts and extended results of Publication 1, as well as an unpublished study (Study 3 in Paper 2, Chapter IV). Publication 1 was revised several times prior publication and the co-authors made inputs regarding the structure and writing up for the early drafts. Although the final version as completed by myself is significantly different from the early drafts, the contribution from the co-authors for this publication, which Paper 2 in Chapter IV is based on, needed to be acknowledged and addressed. The review committee therefore suggested I attach to this thesis a critical review of Paper 2 in Chapter IV so as to reflect my views and suggestions for improving the studies presented in this paper. In line with the above, the critical review and published and submitted work in relation to the thesis are listed in the next page.

MATERIALS IN RELATION TO PUBLICATIONS/SUBMISSIONS

Page 212 -- Critical review of Chapter IV – PAPER 2

(included to address the collaborative work)

References of publications/submissions

Due to the limitation of space for the appendices, the following publications and submitted work are not attached to this thesis and instead are listed below:

Publication 1 (related to Paper 2 in Chapter IV):

Zhang, K., Frumkin, L. A., Stedmon, A., & Lawson, G. (2013). Deception in context: Coding nonverbal cues, situational variables and risk of detection. *Journal of Police and Criminal Psychology*, 28(2), 150-161.

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Zhang, K., Eubanks, D. L., Frumkin, L. A., Saikayasit, R., Stedmon, A. W., & Lawson, G. (2013, April). Telling the difference between deceiving and truth telling: An experiment in a public space. In *Automatic Face and Gesture Recognition (FG), 2013 10th IEEE International Conference and Workshops on* (pp. 1-8).

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Submitted work (related to Section 1 in Chapter II):

Eubanks, D. L., Zhang, K., Frumkin, L. A., Chapter 5: Nonverbal cues to deception and their relationship to terrorism, [Submitted for publication in *Counter-Terrorism and Hostile Intent*, Final title for the chapter/book might be changed.]

ABSTRACT

The present research, conducted with the ultimate goal of preventing, detecting, and controlling harmful deception, aims to understand deceptive behaviour by exploring the potential effects of situational factors on interpersonal deception. Given the deliberateness of the deception targeted in this research, the first part focuses on how situational factors influence the early stage of deception, i.e. the forming of intentions and the second part focuses on how situational factors alter the late stage of deception, i.e. the exhibition of behaviours (in this study I target nonverbal behaviours). By conducting six experimental studies in diverse research contexts, this research contributes to the knowledge of deceptive behaviour in four major areas: (1) It reveals that the situational factor of the probability associated with receiving negative outcomes for deceiving influences deception from the forming of intentions to the exhibition of nonverbal behaviours. (2) It shows that situational factors enhancing the fundamental psychological processes of deception (i.e. emotion, cognitive effort, and attempted behavioural control) can consequently alter deceptive intentions as well as elicit nonverbal indicators associated with these processes. (3) Specifically, the findings suggest that people tend to deceive when they perceive serious negative impact for themselves if not doing so, and such a trend is moderated by the extent of the negative impact in relation to the victims of their deception. (4) The findings also partially support my proposition that explains deception leakages using the failure of self-regulation of behaviour led by ego-depletion, which suggests that self-regulation failure is a key part of the cognitive mechanism behind the behavioural leakages of deception. This research also benefits practitioners with the understanding regarding deceptive behaviour in a range of contexts, as well as providing useful information about the situational factors that can influence deceptive intentions and behaviours.

CHAPTER I

INTRODUCTION

“You can fool all of the people some of the time, some of the people all of the time, but never all of the people all of the time.” Attributed to Abraham Lincoln in one of his speeches made in 1858, this famous quote is considered to originate from Phineas T. Barnum (Lincoln’s speech, 1905, pp. 119; 134), an American performer well known for his entertaining hoaxes¹. If true, Barnum might have learnt this from his rich experience of playing tricks and carrying out humorous deceptions on his audiences. Deception happens everywhere (Vrij, 2008) and many deceivers not only fool people for fun, but also gain advantages through deception that can harm others (De Cremer et al., 2011; Mechner, 2010; Vrij, 2008). Undesirable or harmful deception influences our life to differing extents. A salesperson exaggerating the functions of a camera may result in a misleading purchase that causes monetary loss to the customer; a smuggler concealing and lying about commodities in his/her luggage violates the law, which may also have a negative impact on the market. More serious deception, such as criminals or terrorists undertaking covert activities for destructive attacks could potentially take peoples’ lives and lead to public panic (Jessee, 2006).

Deceptive activities causing negative consequences such as these have been a long-term target for researchers in areas such as cognitive and social psychology concerning human behaviour (ten Brinke & Porter, 2012), law-enforcement practices (Vrij et al., 2006a), and ethics studies in the business context (Shulman, 2007; Stevens, 2013). The ground-breaking work achieved by these scholars, for instance, establishing the psychological foundations (Zuckerman et al., 1981) and identifying behavioural cues² to deception (reviewed by DePaulo et al., 2003; Vrij, 2008), has improved our understanding of deceptive behaviour and protected many people from being harmed by it. Similar to Barnum, these researchers have found that it is the case that

¹ “A humorous or malicious deception” (“Hoax,” 2013)

² In this thesis, “deception”, “lies”, and “interpersonal deception” are used interchangeably and all refer to deception happening between individuals.

deceivers cannot always succeed (Ekman, 1992/2001). But their research outcomes and practices also tell us that deception is one of the most complex human behaviours, about which our knowledge to date is far from sufficient (DePaulo & Bond 2012).

To address the demands of reaching a complete understanding of deception, researchers including myself, who have a background in cognitive and social psychology, usually try to solve the problem of harmful deception by employing scientific methods of investigation (Vrij, 2008). With respect to this, every year hundreds of journal articles concerning deceptive behaviour and lie detection studies are published, with the aim of describing and explaining deception, many of which serve the ultimate goals of preventing, detecting, and controlling harmful deception (Vrij, 2008). Researchers not only observe deceptive behaviour passively, but also explore factors (termed “variables” in some studies) that may alter deceptive behaviour (e.g., Lancaster et al., 2013; Vrij et al., 2008) and could potentially be managed in real life to prevent, detect, and control deception.

In line with these approaches, by using the data generated from, in all, 753 participants in six quantitative studies, I intend to contribute to the research literature and real world practice concerning the understanding of deception and improving lie detection in several aspects. In the following sections, I introduce the rationale for constructing my three-paper thesis (also detailed in Chapter II), as well as providing more details of the objectives that my research presented in these papers aims to achieve, and this is followed by an outline of the structure of this thesis.

1. Investigating Deception: From the Intentions to the Behaviours

1.1. Driven by intentions: The role of self-regulation

As a fundamental part of human communication (ten Brinke et al., 2012), deceptive behaviour, in particular, interpersonal deception, has developed not only as a means of

communication (Buller & Burgoon, 1996), but also as a survival skill for human beings (Brytting et al., 2011). The complexity of deceptive behaviour occurs for several reasons, such as the differences in motivations with which deception is undertaken (DePaulo et al., 1996; Klaver, 2007; Vrij, 2007), the diversity of the forms it takes (DePaulo & Bell, 1996; Ekman, 1997; Vrij, 2008), as well as the combination of psychological processes (i.e. emotions, cognitive effort, and attempted behavioural control) underneath deceptive behaviour (Vrij, 2008; Zuckerman et al., 1981). Regarding these varieties, studies targeting harmful deception usually focus on lies told with the motivation for gaining benefits for oneself (e.g., Burke, 2010; Cook et al., 2012), given the pervasiveness of this in real life (Vrij, 2008). Under this lens, deception is usually considered as a deliberate behaviour. In fact, it appears that the three fundamental psychological processes underneath deception are highly relevant to the three components of self-regulation (Brown, 2006; Hofmann et al., 2011). This overlap supports the view that interpersonal deception is led by self-regulation, which processes human behaviour led by deliberate intentions (Bauer & Baumeister, 2011). Moreover, evidence from cognitive psychology also supports this view, showing that working memory, which assists self-regulation and controls reasoning, planning, and inhibition of behaviour, is involved in deceptive behaviour (Hofmann et al., 2011). Thus, on the basis of theories and the evidence suggesting that deceptive behaviour is highly dependent on self-regulation (reviewed in detail in Chapter II Section 2), I conducted research to investigate deception from its early stage concerning the forming of intentions, to its late stage: the exhibition of behaviours. In the three papers comprising this thesis, I present the first part of the research concerning the early stage of deception, i.e. the forming of deceptive intentions, in Chapter III - Paper 1. This is followed by the latter part of the research concerning the late stage of deception, i.e. the exhibition of specific behaviours, in Chapter IV - Paper 2 and Chapter V -

Paper 3. A more specific literature review regarding the connection between these three papers is presented in Chapter II.

1.2. Effects of situational factors

As stated above, this thesis is aimed at contributing to future research and practices concerning preventing, detecting, and controlling harmful deception. Therefore, I tried to explore factors that could alter deceptive behaviour effectively, as managing such factors may help me and other researchers or practitioners to achieve the ultimate goal. Similar to other human behaviours, deception can be influenced by individual and situational factors (Lewin, 1935/1951), regarding which the latter may be managed intentionally (Brown, 2006; Caso et al., 2005; Vrij et al., 2006a). Hence, the effects of situational factors on deceptive behaviour have attracted much attention from scholars. For example, intentions to deceive may be influenced by the reward of deceiving (Hurkens & Kartik, 2009). In addition, behavioural indicators³ of deception seem to be magnified in situations where the stakes of deceiving (i.e. positive or negative consequences of deceiving) are high (DePaulo et al., 2003; ten Brinke & Porter, 2012). Furthermore, psychologists have reported that interview techniques enhancing cognitive load can elicit detectable deception cues (e.g., Lancaster et al., 2012; Vrij et al., 2008). These findings suggest that situational factors alter deceptive behaviour by enhancing certain psychological processes (i.e. cognitive effort is enhanced by inducing the cognitive load involved in deception (Vrij et al., 2008)). However, there are a great number of situational factors presenting in different contexts where deception occurs (DePaulo & Bond, 2012; Kihlstrom, 2013) and only a few of them have previously been assessed in deception research (DePaulo et al., 2003; DePaulo & Bond 2012; Vrij, 2008). Considering this, I investigated situational factors that have not yet been probed, or have been less frequently assessed in the literature, so as to fill the research gap

³ In this thesis, “indicators”, “cues”, and “leakages” all refer to behaviours revealing deception.

concerning their effects on deception.

Under self-regulation of reasoning and planning of behaviour, individuals are likely to consider factors in relation to their own outcomes that occur as a result of their intentions/decisions (Breakwell, 2007; Emblemsvåg & Kjølstad, 2002; Locke & Latham, 1990). Social psychology theorists (detailed in Chapter III - Paper 1 Section 1) contend that these factors concern both the value of the outcome of each option, and the probability associated with the outcome (Ajzen, 1991b; Fishbein & Ajzen, 1975). Deception researchers have investigated thoroughly the value of the outcome of deception in relation to deceptive behaviour (e.g., stakes of deception (ten Brinke & Porter, 2012)), but comparatively, the probability associated with the outcome needs more investigation. This probability can be managed in real life, through, e.g., introducing monitoring approaches for behaviours and checking or interviewing suspect individuals in public spaces. That is, there are practical implications when find the effect of probability on deceptive behaviours. On the other hand, a high probability associated with the negative consequences of deceiving may arouse fear emotions in deceivers, which may alter individuals' intentions and/or behaviours of deception (Ekman, 1992). Thus, in this research, I focused on the effect of this factor on the early and late stages of deceptive behaviour. Moreover, given the nature of harmful deception targeted in this thesis, the outcome for the deceiver is determined to be the negative consequences of deceiving, as it is likely to happen in harmful cases. In line with this, the potential effect of the probability associated with negative consequences on the deceivers is examined in terms of deceptive intentions (in Paper 1) and specific behaviours (in Papers 2 and 3). In addition to this situational factor investigated in the studies presented throughout the three papers of this thesis, there are other factors that are specifically of interest relating to deceptive intentions and/or behavioural indicators that were

also probed, which are detailed below.

2. Deceptive Intentions: Factors Relating to Deceivers and Victims

Specifically, the first part of this research, presented in Paper 1, addresses the effect of situational factors on deceptive intentions. The reasoning process of unethical decision-making (including harmful deception) not only involves the consideration of the outcome for the decision-makers, but also the outcome for the victims (Adair, 2007; Fishbein & Ajzen, 1975). Taking this into consideration for those harmful deceptions conducted for one's own benefit, it brings one specific question to my mind: "do individuals always sacrifice the victims' benefits when the situation 'forces' them to deceive to protect their own benefits?" The answer might be 'yes' in cases of serious deception such as crimes and terrorism (e.g., Atran, 2003; Victoroff, 2005), but it might not be true for less serious everyday lies as people do consider the negative outcomes for the victims of unethical behaviour (Ekman, 1992). To figure out an answer to this question, I chose the workplace as the research context for the investigation of deceptive intentions and factors. A main reason for so doing is that people sometimes think that deception in the workplace is morally permissible (Carr, 1988; Smith et al., 2009), as discussed in debates of the morality of workplace deception found in the ethics literature. Given this phenomenon, people who have different opinions on the morality of workplace deception may behave differently when they are facing the option of deceiving or not. It becomes interesting to examine how they behave in such a context, particularly when they are involved in highly and less immoral issues. Ethics researchers have put forward that moral intensity, a construct indicating the extent of the harm on the victims of unethical behaviour, describes the degree of harmfulness/morality of unethical issues (Jones, 1991). Such a victim-related situational factor was therefore examined in the initial part of my research, in terms of its effect on deceptive

intentions.

In addition to the victim-related factor of moral intensity, effects of factors relating to the decision-maker are also the focus of this part of the research endeavour. The question I raised above concerns factors that are ‘forcing’ individuals to deceive and such factors are seldom assessed in the extant deception literature, but are worthy of investigation. Money plays an essential role in daily life and is considered to influence deceivers’ evaluation of outcomes effectively (Burke, 2010; Cook et al., 2012). Thus a factor that ‘forces’ individuals to deceive can be manipulated by introducing serious economic pressure to participants (implemented by creating hypothetical scenarios in the study, see details in Chapter III Section 2).

Correspondingly, such a factor in relation to stakes⁴ of not to deceive also relates to perceived behavioural control as suggested by Ajzen (1991b) in his *Theory of Planned Behaviour*. In line with Ajzen (1991b), external factors that become obstacles to being honest (as in the case of this research) can reduce the intention and actions towards the option of not to deceive. As a result, the decision-maker is likely to deceive, when they face a serious economic problem. This factor of the stakes of not to deceive is seldom investigated in deception literature. In addition to the stakes of not to deceive, the probability associated with the negative consequences of deceiving is also investigated in this part of my research, as stated in Section 1.2. The assessment of both the victim-relevant and the decision-maker-relevant factors sheds light on how individuals behave after evaluating their own and the victims’ benefits, which is the first attempt to understand the effect of the combination of such specific situational factors on deceptive intentions.

Research objectives.

⁴ Stakes of not to deceive in this particular research refer to negative consequences of not to deceive. However, stakes may also refer to the positive consequences of deceiving as found in the literature.

Taken as a whole, this part of research concerning the early stage of deceptive behaviour investigates deceptive intentions in the workplace context, as well as the influences from situational factors in relation to the deceiver (including the probability associated with the negative consequences of deceiving and the stakes of not to deceive), as well as the victims of deception (moral intensity). This part of the research aims to describe and explain how the situational factors concerning the deceiver and the victim influence deceptive intentions. This objective serves to answer the question regarding how people evaluate their own benefits and the victims' benefits while forming the intention to deceive or not to deceive. Achieving such an objective will not only contribute to the deception literature, but also to the business ethics literature, with knowledge regarding influential situational factors on deceptive/unethical intentions. This element of the research may further assist practitioners in the workplace to understand how deceptive or unethical behaviour are decided and how the intentions/decisions are altered by these situational factors.

3. Deceptive Behaviours: Leakage of Cues and Situational Factors

In addition to deceptive intentions, specific deceptive behaviours, which are exhibited at the late stage of deception, also need to be understood (DePaulo et al., 2003; Vrij, 2008). The second part of this research which concerns this late stage, is presented in the remaining two papers of this thesis. People, in general, are not good at detecting deception (with only 54% general accuracy (Bond & DePaulo, 2006)). Further, lie detection studies found that people tend to believe that what they are told is true, which leads to a detection bias between truth and lies (61% accuracy in detecting truth and 47% accuracy in detecting lies (Bond & DePaulo, 2006)). This phenomenon is perfectly presented in the movie "i, Robot": the Detective Spooner was chosen by the dead professor, who knows that he will be the only person that is able to detect the

robots' covert plan, given the situation that no one else doubts them. Such a problem not only occurs for the general populace, but also in cases that police officers suspect individuals, where the detection accuracy of deception still varies from 88% to 45% (O'Sullivan et al., 2009).

Psychologists consider that one of the main reasons for this failing is that people rely on incorrect indicators or stereotypes while detecting deception (Vrij, 2008; Vrij et al., 2001). Such an issue suggests that more investigations, drawing on the existing literature, are required in this area.

Previous studies have reported that nonverbal indicators of deception are an essential part of those behavioural indicators that may reveal deception, as they are possibly neglected by deceivers (Ekman, 1985) and in addition, they are the major clues for lie detection when verbal conversations are not involved. Although it is difficult to find stable nonverbal indicators of deception (Vrij & Granhag, 2012), there is still a pressing demand for more understanding of this particular kind of deception cues (DePaulo & Bond 2012). Vrij (2008) pointed out a few reasons why it is difficult to find stable nonverbal cues and two key issues concern the inadequate coding system applied to nonverbal behaviours and restricted research contexts. To address these problems, this part of my research used a coding scheme assessing both body movements and general impressions given by individuals, as well as diverse contexts across the five studies so as to uncover deception cues in these different contexts (detailed in Chapters IV & V). In addition, it is recognised that many studies assessing deception cues have taken place in laboratory settings (ten Brinke & Porter, 2012) and the behavioural cues identified in such purified settings may not be generalised usefully to real life settings that entail diverse confounding factors (Neisser, 1976). Considering this, this part of my research was conducted mostly in the field, which is closer to real contexts than laboratories (Elmes et al., 2003).

As introduced in section 1.2, I tested the effect of the probability associated with the negative outcome for the deceiver on specific nonverbal cues, by introducing high and low probability associated with lie detection. Since being detected when deceiving results in negative consequences for deceivers in the studies conducted in this part of the research, the probability of detection assessed here is considered to indicate the eventual probability associated with the negative consequences of deceiving. By manipulating the probability of detection, I attempted to find out an effective approach to magnify deception cues as this would help in the detection and control of deception in the future.

On the basis of my investigation into the probability and nonverbal cues, I became aware that the cognitive mechanism behind the leaking of deception cues is not adequately explained in the literature. Researchers have reported different behavioural indicators in relation to the three psychological processes of deception (i.e. emotions, cognitive effort and attempted behavioural control) (detailed in Table II-1) and they further propose that deception cues are leaked due to enhanced involvement of one or all of these processes (e.g., enhanced fear emotion leads to negative affect, (Ekman, 1992)). However, the existing literature fails to explain why someone, sometimes, can manipulate their behaviours successfully, whereas, at some other times, leaks cues that reveal deception. This research gap indicates that there is a missing part of the cognitive mechanism behind the leaking of deception cues, which still needs to be uncovered. In this thesis I address this gap by proposing that self-regulation failure led by ego-depletion (Baumeister et al., 1998; Baumeister et al., 2007) causes the leakages of deceptive indicators, as deceivers are likely to be ego-demanded by the psychological processes involved in deception, which may result in depletion and failure in managing behaviours (detailed in Chapter II Section 5 & Chapter V). I consider that ego-depletion, instead of being triggered by attempted behavioural control only

(DePaulo et al., 2003), may also be triggered by the demands of self-regulation resources placed by the other fundamental psychological processes of deception (e.g., emotions and cognitive effort). Therefore, I propose that the failure of self-regulation led by ego-depletion is the key missing part of the cognitive mechanism that underpins deception leakages, as it explains the connection between the psychological processes of deception and the origin of behavioural leakages (see detailed introduction in Chapter II Sections 2 & 5). In line with this, I examined the effect of ego-depletion on nonverbal behaviours by manipulating the situational factor (self-focus) regarding the demanding of resources that are necessary for successful self-regulation.

Research objectives.

In general, the second part of this research assesses the late stage of deceptive behaviour concerning nonverbal indicators of deception and influences from situational factors in relation to the negative outcomes for the deceiver as well as the ego-depletion process causing self-regulation failure. This part of research has two objectives: (1) to test the effect of the situational factor of the probability of detection on altering nonverbal behaviours and (2) to examine my proposition addressing the missing part of the cognitive mechanism behind the leaking of behavioural cues to deception. The studies conducted for this part of research were held in diverse contexts, i.e. in laboratories and the field, so as to make a contribution to the literature by offering data concerning deception cues exhibited in different settings. My proposition regarding the role of self-regulation failure (led by ego-depletion) on deception leakages, if confirmed by this research, would contribute to the deception literature by improving our understanding about how the leakages and the psychological processes of deception are related. On the basis of this, other researchers could seek methods to trigger ego-depletion, so as to elicit deception cues effectively. On the other hand, investigation of the effect of the probability of detection not only

tests the situational factors in relation to the reasoning process of deceptive behaviour, but also probes the effectiveness of the approach of magnifying deception cues by managing the probability of detection. This part of the research may thus also provide lie detection practitioners with knowledge regarding observable nonverbal cues to deceptions happening in specific contexts. The manipulation of situational factors may also inspire practitioners in terms of creating interventions for triggering ego-depletion or managing the probability of detection.

4. Structure of this thesis

Taken as a whole, there are three general objectives addressed in this thesis: (1) To examine the effect of situational factors in relation to outcomes for deceivers and victims on the early stage of deceptive behaviour, i.e. the forming of deceptive intentions. (2) To examine the situational factors in relation to outcomes for the deceiver in the late stage of deceptive behaviour, i.e. nonverbal cues exhibited by deceivers; and, (3) To test my proposition that ego-depletion leading to self-regulation failure is the key to behavioural leakages of deception (i.e. behavioural cues/indicators).

In order to address these objectives in this three-paper thesis, quantitative data from six empirical experimental studies were collected and analysed. The experimental design was employed given its advantages in establishing causal relationships between the manipulation of factors/variables and the findings emerging from these studies (Brown, 2006; Goodwin, 2010). The six studies used approaches such as experimental manipulations confirmed by manipulation checks, random sampling, counterbalancing of task orders, and double blind control between participants and experimenters, etc. so as to ensure that the data collected were comparatively unbiased and representative (Goodwin, 2010). The three papers in this thesis were presented following the early (Paper 1) and late stages (Papers 2 and 3) of deceptive behaviour as

introduced above, instead of in the chronological order of the completion of the studies. This is because the second part of the research (introduced in Section 3) was funded by a research project completed earlier than the first part of research owing to the priority given to the project work. The project work concerned psychological investigations of deception, which composed the majority of my four-year study. Hence, this research mainly investigated deceptive behaviour from a psychological or a combination of psychological and workplace ethics perspectives. In line with the guidance on the three-paper format for a thesis, the outline of each chapter is presented below.

Chapter I – Introduction

This chapter (the present chapter) introduces the background of this research and addresses the general rationale for compiling the three papers together. It outlines the research objectives as well as the structure of this thesis.

Chapter II - General Literature Review and Research Gaps

In this chapter the literature concerning the foundations of this three paper thesis is reviewed. This extends the introduction and focuses on the literature which connects the three papers together. In addition, this chapter reveals the gaps in knowledge regarding deception that are to be addressed in this thesis. As a requirement of the three-paper thesis guidelines, the details of the literatures drawn upon for each paper are avoided in the general review and are specified in the relevant papers.

Chapter III (Paper 1) – Forced to Deceive but Only in Non-Harmful Cases? Stakes of Not to Deceive and Moral Intensity that Influence Deceptive Intentions.

In order to address research objective (1) in the first part of this research, as introduced in Section 2, the first paper presents an online survey-based experimental study assessing deliberate

intentions regarding undertaking workplace deception as well as situational factors which may influence such deceptive intentions. The decision-making process of deception was assessed by measuring intentions to deceive in relation to situations presented in hypothetical scenarios. Situational factors manipulated in the study included: moral intensity regarding the contextual characteristics concerning the impact on the victims of the deceptive action, the probability associated with receiving negative consequences of deceiving, and the stakes (i.e. negative consequences) of not to deceive. This study concerned two scenarios involving different workplace contexts where deception may take place.

Chapter IV (Paper 2) – Deceptive Behaviour and Situational Factors: Nonverbal Cues to Deception and the Effect of Probability of Detection

This paper is the first pertaining to the second part of this research, which mainly serves to address the research objective (2), concerning the role of situational factors in relation to the outcome for the deceivers in altering deceptive behaviours, as introduced in Section 3. This paper presents four behavioural experiments concerning nonverbal behaviours in relation to interpersonal deception, as well as situational factors influencing the incidences of deception cues. Nonverbal behaviours including body movements and impressions which individuals exhibited while deceiving/telling the truth were assessed in the four experiments. The experiments mainly focused on the manipulation of veracity (i.e. concerning deceptive or honest conditions) and the probability of being detected, except that the last study investigated the effect of duplex deception on nonverbal behaviours exhibited in a situation that the probability of detection is enhanced. These four studies also involved four different contexts in which the deception was carried out. The experiments presented in this paper were conducted for a research project, which partially funded my study.

Chapter V (Paper 3) – Telling the Difference between Deceiving and Truth Telling: An Experiment in a Public Space

Similarly, the last paper also belongs to the second part of this research. It was conducted with the aim of understanding the cognitive mechanism behind leakages of deception cues as well as exploring effective approaches to eliciting deception cues (research object (3)). The last behavioural experiment, which is presented in this paper, was designed on the basis of the findings that emerged from the four studies presented in Paper 2. Based on my work for Paper 2, I realised that the literature in relation to the cognitive mechanism behind leakages of deception cues was incomplete. Hence I proposed that the process of self-regulation failure led by ego-depletion (as introduced in Section 3) forms a key part of this cognitive mechanism. I tested this proposition by introducing a situational factor (self-focus) that demands self-regulation resources. On the basis of this, I attempted to explore an effective approach to eliciting leakage cues that can discriminate deceivers from truth-tellers, by investigating the joint effect of the probability of detection and the demand of self-regulation on deceptive behaviour. This study was conducted in the field where participants undertook deception while other people were passing by. This made it possible to investigate deception cues in such real life settings outside of the laboratory. The experiment presented in this paper was also conducted for the research project that partially funded my study.

Chapter VI – Summary and General Conclusion

Chapter VI summarises the overall contributions of this thesis. By taking the three papers as a whole, this chapter provides a discussion of the theoretical implications and future research avenues, as well as practical implementations regarding deception detection, prevention, and control of deception in different contexts (e.g., the workplace, security settings). Limitations for

each study are specified in each of the papers to save them from replication in this chapter.

CHAPTER II
GENERAL LITERATURE REVIEW
AND
RESEARCH GAPS

Since the early twentieth century (Trovillo, 1939), when research into deception started, interpersonal deception⁵ has attracted much attention from scholars. Interpersonal deception happens frequently as a part of human communication (DePaulo & Kashy, 1998; DePaulo et al., 1996). It can be harmful to individuals, groups, or the public (Vrij, 2008) and many studies have been conducted aiming to predict or control harmful deception by (1) revealing the decision-making process leading to the forming of deceptive intentions so as to reduce the harmful occurrences (e.g., Chen & Tang, 2006; Lovallo & Sibony, 2006), and (2) improving the understanding of how deceivers behave (reviewed by DePaulo et al., 2003), which may further help to improve lie detection accuracy (reviewed by Bond & DePaulo, 2006). With the same ultimate goal of conducting the present research, I suggest that deceptive intentions and specific deceptive behaviours are both important areas to study. To address this point, I will extend my review of literatures from deception field to a broader field including social and cognitive psychology. By reviewing theories and studies in research concerning human behaviour (detailed in Section 2), I demonstrate the view that deception is a deliberate behaviour, which is led by goal and intentions, followed by the exhibition of specific behaviours, such as telling lies (DePaulo et al., 2003; Ekman, 1992; Vrij, 2008). This belief is the foundation of the structure of the present thesis, which in the first part concerns deceptive intentions (Chapter III - Paper 1) and in the second pertains to specific behavioural indicators exhibited by deceivers (Chapters IV - Papers 2 & V - 3).

Another focus of this work across the three papers is the potential effects of situational factors on deceptive behaviours including intentions and specific behavioural indicators. I review theories and empirical studies suggesting the importance of situational factors on human behaviour including deception (in Section 3). Given the broadness of the situational factors, I

⁵ In this research, this refers to deception happening between individuals.

recognise that more work needs to be done, regarding uninvestigated situational factors, diversity of research contexts, and combinations of forms of deception.

Following the review covering the above main foci of the whole thesis, I discuss each part of this research (deceptive intentions and behavioural indicators of deception) in the last two sections. In Section 4, I review the literature regarding deceptive intentions in the particular context of the workplace and explain why deceptive intentions in this specific context are meaningful to investigate. Further, I identify the research gaps in this field, in relation to the effect of victim-relevant and decision-maker relevant situational factors on the forming of deceptive intentions. In Section 5 I discuss how deceivers behave, subsequent to confirming their intention to deceive. In particular, I focus on nonverbal indicators of deception, given the demand to understand such cues⁶ as indicated by the literature (DePaulo & Bond, 2012). My investigation of deception cues also leads me to a research question regarding how the fundamental psychological processes (i.e. emotion, cognitive effort, and attempted behavioural control (Vrij, 2008)) of deception lead to the behavioural leakages of deception. Such a question is not clearly answered by literatures in deception field and I identify this as a research gap in this area. By reviewing theories and empirical evidence supporting self-regulation and its feature of ego-depletion, I explain why deception leakages occur and raise this proposition for examination in this research (detailed in Chapter V - Paper 3). Finally, I put forward the need for investigating the effects of situational factors on specific deceptive behaviours by drawing upon the relevant literature. Given the three-paper format of this thesis, this review targets the general literatures and research gaps investigated in all three papers. However, this chapter is not a full literature review so as to avoid repetitive content in the papers as they each contain specific

⁶ In this thesis, “cues”, “indicators”, and “leakages” all refer to behaviours revealing deception.

introductions of the works pertaining to their particular research questions (e.g., the specific situational factors investigated in each paper).

1. Interpersonal Deception: Background

1.1. Definitions

As shown in meta-analysis studies (Bond & DePaulo, 2006; DePaulo et al., 2003), interpersonal deception⁷ is a pervasive kind of deception, which has attracted a great amount of interest by researchers. Interpersonal deception has many different characteristics, which are reflected in the most of the definitions that researchers use (Vrij, 2008). Zuckerman et al. (1981, p. 3) defined deception as “an act that is intended to foster in another person a belief or understanding which the deceiver considers to be false”, whereas Burgoon and Buller (1994, pp. 155-156) termed it as “a deliberate act perpetrated by a sender to engender in a receiver beliefs contrary to what the sender believes is true to put the receiver at a disadvantage” and Vrij (2008, p. 15) saw it as “a successful or unsuccessful deliberate attempt, without forewarning, to create in another a belief which the communicator considers to be untrue”. Although emphasizing different aspects of deceptive behaviour, all of the above definitions consistently describe it as a deliberate act directed by goals and intentions. Amongst these definitions, I agree with Aldert Vrij (2008, p.15) that deception exists as long as the deceiver has attempted to deceive, which is not necessarily bound with success in misleading the receiver. In addition, the present research aims to contribute to the great demand for understanding regarding deception causing negative impact on individuals, organisations, or the public (e.g., Jessee, 2006; Koning et al., 2009; Stevens, 2013). I therefore also employ the characteristic of causing disadvantage to the receiver

⁷ In this thesis, “deception” and “lies” are used interchangeably and all refer to interpersonal deception.

of deception (called “victim⁸” in this research), from Burgoon and Buller’s (1994) definition. In all, there are five main characteristics of interpersonal deception employed in the present research: (1) the deliberate attempt to conduct deception; (2) the absence of prior notification; (3) the purpose to mislead; (4) the act that is regardless of the nature of success; and (5) the disadvantage cost to the victim.

1.2. Forms of deception

There are at least three forms of deception (DePaulo & Bell, 1996; Ekman, 1997; Vrij, 2008): outright lies, exaggerations, and subtle lies. *Outright lies* (also referred to as *falsifications*, Ekman, 1997) refer to deceptions conveying completely different or contradictory information, compared with the ‘truth’ that the deceiver believes, whereas *exaggerations* deliver information exceeding the truth, thus transforming it into a lie, and *subtle deception* includes truth, but also has an element that twists it. A special form of subtle deception is concealment with or without statements, where only part of the truth is presented (Ekman, 1997; Vrij, 2008). In practice, two or all of the different forms of deception can exist simultaneously (Caddell, 2004; Portera et al., 2009; Vrij, 2008). Taking a terrorist attack as an example, a bomber may conceal a dangerous item in a bag and lies about the contents when someone asks about it. In such cases, both outright (lying about the contents in the bag) and subtle deception (hiding the item in the bag) is used. Hence, it is worthwhile to investigate deception that takes not only one form of the above, but also a combination of these. This is considered in the present research in that Paper 1 is involved with exaggeration, Paper 2 focuses on outright and subtle deception, and Paper 3 covers all kinds.

1.3. Motivations behind deception

⁸ In this thesis, “victims” is used to refer to people being harmed by deception. Given the scope of this research, it also refers to “receivers” and “targets” of deception.

Vrij (2007) concluded that there are three dimensions of motivation for deception: (1) self-oriented lies which are told for one's own benefit and, in contrast, other-oriented lies; (2) lies told to gain advantages or to avoid costs; and (3) lies told for materialistic reasons or for psychological ones. Self-oriented lies are widely assessed in the deception literature, due to their high frequency of occurrence (DePaulo et al., 1996). Gaining and punishment of deceiving have been introduced in some studies, for instance, assessing deception happening in interactive game and business negotiation (e.g., Panasiti et al., 2011; Murnighan et al., 1999). In most experimental studies, deception was undertaken for monetary rewards (e.g., Klaver, 2007; Langleben et al., 2005), whereas in a study assessing deception between closely related people (DePaulo & Kashy, 1998), deception was found aimed at gaining psychological advantage in social relationships.

Similar to many studies aiming to understand harmful interpersonal deception (e.g., ten Brinke & Porter, 2012; Vrij et al., 2008), the present research mainly focuses on self-oriented deception rather than other-oriented lies. In addition to providing more empirical evidence (e.g., Chen & Tang, 2006; Lovallo & Sibony, 2006) on deception conducted for gaining advantages (in Papers 2 and 3), the study presented in Paper 1 also investigates deception undertaking in order to avoid loss and is mainly monetary-driven due to the finding that monetary rewards can be an effective trigger for deception (Burke, 2010; Cook et al., 2012).

1.4. Psychological processes of deception

In line with Kraut (1980), Zuckerman et al. (1981) proposed a four-factor model for deceptive behaviour containing psychological and physical arousal, emotions, thinking, and attempted behavioural control. Researchers continued to refine the processes of deception by extending the details based on Zuckerman et al.'s model (1981) and Vrij (2008) later combined

these four factors into three psychological processes that deceiving involves: emotions, cognitive effort, and attempted behavioural control. These processes have been recognised as being the three fundamental psychological processes underneath deceptive behaviour, as introduced below.

Emotions.

According to Ekman (1985), there are three types of emotions associated with deception: fear, guilt and duping delight. These three common aspects of emotion could occur simultaneously or separately, which hence increases the complexity of deceptive behaviour. Ekman & Frank (1993) proposed that *detection apprehension* is the key feeling leading to fear emotion and suggested some factors that influence how much detection apprehension would be felt. One of the factors is the deceiver's belief about the receiver's skill as a lie detector. For instance, when facing security officers, deceivers realise that there is a higher probability of their misdeed being found out than when facing laypersons, since they know that the latter are not normally trained to detect deception, whereas the former are. Consequently, when confronted by security officers they might feel more fear. Another important determinant is concerned with the liar's deception skills and preparation. For example, a liar who has greater successful lying experience and good preparation will be confident and will feel less fear of being caught (Ekman, 1992). In addition, the stakes of deception, which concern the perceived consequences for successful and unsuccessful deceptive attempts (Vrij, 2008), are also highly relevant to fear (Ekman & Frank, 1993; Vrij et al., 2006a). Notably, There is a similar negative emotion that may be aroused in truth-tellers, namely "fear of being disbelieved". Such a negative emotion, leading to a similar negative affect in truth-tellers as deceivers, also contributes to the difficulty of lie detection (Ekman, 1992).

Guilt, as another kind of negative emotion that relates to deceiving, is also influenced by

several factors. For instance, deceivers may feel guiltier when they are close to the receiver than deceiving a stranger (DePaulo & Kashy, 1998; Ekman, 1985). In addition, the strength of the guilt relates to the amount of the receiver's cost as well as the difference between deceiver's gain and the receiver's loss (Ekman & Frank, 1993). Further, deceivers may not feel guilt when they consider the deception to be morally acceptable and justifiable (Post, et al., 2003; Hoffman, 2006; Vrij, 2008). Deceivers also may not feel much guilt if they and the victims do not share social values (Ekman, 1992). For example, a terrorist or a spy may not feel guilt as lying is 'authorised' when against their opponent (e.g., Atran, 2003; Victoroff, 2005). In addition, deceivers may feel less guilt while concealing than falsifying, as they may justify their subtle lies as they contain some truthful information (Ekman, 1985; Vrij, 2008).

On another hand, deceivers may feel positive emotions such as excitement when deceiving and they may also feel relief and pride in the achievement afterwards (Ekman, 1985; Ekman & Frank, 1993). Moreover, this feeling of delight could be enhanced when liars feel challenged or when there are audiences (Ekman, 1985; Ekman & Frank, 1993). In general, the strength of emotional feelings depends on the individual factors of the liars and the circumstances under which the deception has been conducted (Vrij, 2008).

Cognitive effort.

Deceiving usually requires extra mental and cognitive effort than being honest (Abe et al., 2006; Christ et al., 2009; Gombos, 2006). That is, deceivers might be preoccupied with formulating lies and remembering their tasks during deceiving (Vrij et al., 2006a; Warmelink et al., 2013) and they may also pay additional attention to their own behaviours as well as monitoring the reaction of the lie receivers, so as to ensure their performance is convincing (Burgoon & Buller, 1994). For example, Lancaster et al. (2013) found that when asking

deceivers unanticipated questions, they gave fewer details than truth-tellers during an interview, due to the cognitive effort required when forming unanticipated lies. In addition, deliberate efforts to “fight with” the conflict between lies and truth can place great mental demands upon liars (e.g., Langleben et al., 2006; Walczyk et al., 2003). Evidence from neuroimaging studies including meta-analysis (Christ et al., 2009; Kozel et al., 2005; Langleben et al., 2002) supports this view as deceiving activates brain areas, such as the prefrontal cortex and the anterior cingulate cortex, which function for processing complex cognitive tasks and inhibiting cognitive conflict.

Attempted Behavioural Control.

According to Buller and Burgoon’s (1996) Interpersonal Deception Theory (IDT), liars adjust their behaviours by monitoring the reactions from their targets. Buller and Burgoon (1996) found that when perceiving suspicion, deceivers present more strategic behaviour than during no suspicion situations, so as to ensure they are convincing. They may try to exhibit behaviours which they believe are credible, such as trying to behave positively and in a friendly manner (reviewed by DePaulo et al., 2003). The deliberate manipulation of behaviour, together with perceiving and monitoring targets of deception, all demand cognitive (Carrión et al., 2010) and physical effort (e.g., Buller & Burgoon, 1996; Burgoon et al., 2001/2008). However, deceivers may not always behave as they want and may fail to control their behaviour successfully, which leads to behavioural leakages that give the lie away (Ekman & Friesen, 1974). Such leakages may serve as deception cues revealing deception and their presence makes lie detection possible.

2. Deliberate Deception: From Intentions to Behaviours

After introducing the background of interpersonal deception, in this section I review the literature that indicates the deliberateness of deception. This view is the foundation of the

structure of this research, which aims to investigate deception from intentions to specific behaviours. Firstly, I introduce the origin of psychology literature that considers the role of cognitive processes and intentions that determine human behaviour, including deception. Secondly, I address the close relationship between deception processes and self-regulation, which is required by intention-led behaviour. Finally, I highlight the relationship between the central executive and deception, thus concurring with the view that the deceptive behaviour as targeted in the present research involves executive control, such as working memory. These all relate to the processes of forming deceptive intentions and exhibition of deceptive behaviours. In line with what is detailed below, I consider it is necessary to investigate deception from the forming of deceptive intentions (in Paper 1), to the exhibition of specific behaviours (in Papers 2 and 3).

2.1. Purposive deception

As pointed out in Section 1.1, interpersonal deception is widely believed to be a goal-directed, deliberate act. However, before Edward Tolman (1926), psychologists studying behaviour mostly believed that human behaviour is a direct reaction to stimuli where intention is not necessarily involved (Watson, 1913). By proposing an intervening factor between stimuli and reaction, namely cognitive processes, Tolman (1926/1932/1948) argued that behaviour is directed by goals or purposes. Such a proposition is the foundation of later cognitively oriented theories, such as the *Expectancy-Value Model* proposed by Ajzen (1991b), which suggest that intentions/decisions are made on the basis of decision-makers' cognitive processes assessing the subjective expectancy (in relation to probability) of receiving an outcome and their evaluation of the positive value of the outcome. The *Expectancy-Value model* further inspired the *Theory of Reasoned Action* (Fishbein & Ajzen, 1975) and *Theory of Planned Behaviour* (Ajzen,

1985/1991a/b), which assert that attitudes predict behaviour via intentions. In short, Tolman's (1926/1932/1948) perspective was the catalyst for theories concerning goal-directed behaviour, which includes deception, as investigated in the present research. This stance also inspires the view that deliberate behaviour like deception is directed by intentions formed in advance of the observable specific behaviours (Zuckerman et al., 1981), thus implying that both intentions and behaviours are essential facts that need to be understood in deception research.

2.2. Self-regulation and the psychological processes of deception

In considering deception as a kind of goal-directed behaviour, I need to discuss self-regulation (or so called *self-control*), which is a key process influencing such behaviour, defined as “the capacity to override natural and automatic tendencies, desires, or behaviours; to pursue long-term goals, even at the expense of short-term attractions; and to follow socially prescribed norms and rules.” (Bauer & Baumeister, 2011, p. 65). The natural and automatic responses that self-regulation controls concern not only actions and behavioural performance, but also thoughts, feelings, and desires, etc. (Baumeister et al., 1994). Self-regulation is involved in higher order cognition, such as reasoning, planning, inhibiting, and controlling behaviour, etc. and many empirical studies have addressed the importance of such a cognitive process for human beings (e.g., Finkel & Campbell, 2001; Masicampo & Baumeister, 2008; Schmeichel et al., 2003; Tangney et al., 2004).

Interestingly, the psychological processes underlying deception (introduced in Section 1) appear to have a close relationship with the three key components of self-regulation: emotional regulation, mental control, and behavioural control (Brown, 2006; Hofmann et al., 2011). Emotional regulation, refers to the matter that people may try to suppress their emotions when they feel they need to, such as pretending to be emotionless (Gross & Levenson, 1993).

Deceivers who do not want to express emotions contrary to that of giving an “honest impression” may also try to override such emotions via emotional regulation (DePaulo et al., 2003). In addition to emotions, people also try to resist inappropriate thoughts in their minds (mental control), by inhibiting them via self-regulation (Kavanagh et al., 2005). Similar effort has been introduced above as being that deceivers need to overcome the conflict between true and false information in their minds (Abe et al., 2006; Kozel et al., 2004). The last self-regulation component that is similarly involved in deception is behavioural control, whereby people resist inappropriate temptations with self-regulation (Baumeister et al., 1998) in the form of manipulating their behaviours (Buller & Burgoon, 1996). The overlaps between the components of self-regulation and processes of deception are not coincidental, which suggests that deceptive behaviour is highly dependent on self-regulation and that such goal-directed behaviour is led by deliberate intention.

2.3. Central executive and deception

In addition to self-regulation, the neural correlates of deception also suggest its relationship with working memory (Abe et al., 2006; Christ et al., 2009; Gombos, 2006), which contributes to goal-directed reasoning (including forming of intention) and behaviour, and also assists self-regulation (Hofmann et al., 2011). Specifically, the central executive, as indicated in the updated model of working memory (Baddeley, 2000/2007), is proposed as executing several functions, including: allocating attention to goal- or task-relevant information, updating and manipulating context-relevant working memory and inhibiting irrelevant information/behaviour (Baddeley, 2007). Such functions are required when deceiving (Ekman, 1992; Vrij, 2008), for example, liars need to pay attention to information in relation to their goal of lying while preparing to do so (Warmelink et al., 2013), to monitor the context in which they perform deceptive behaviour

(Burgoon et al., 2001), as well as to inhibit the default truth and honest information or behaviour that could reveal their lies (Ekman & Friesen, 1969). Researchers in the neuroimaging area also found that brain regions relating to working memory and executive control that deal with complex tasks, are activated during deception (e.g., Christ et al., 2009; Ganis et al., 2003; Jiang et al., 2013; Proverbio et al., 2013; Vartanian et al., 2012).

2.4. From intentions to behaviours

Taken as a whole, the relationship between deception, self-regulation, and central executive implies that deception is a goal-directed behaviour involving cognitive processes, such as reasoning and planning, followed by specific behaviours exhibited by deceivers. On the basis of this understanding and the purpose to draw a clear picture of interpersonal deception, the present research thus investigates deception targeting two major aspects: the forming of intentions and the specific behaviours exhibited by deceivers. My ultimate goal for understanding interpersonal deception is to predict and control harmful deception happening between individuals. Therefore, the present research also focuses on situational factors that can be manipulated to alter deception, from the forming of intentions, to the specific behaviours exhibited. The next section supports the focus on situational factors by reviewing their importance in human behaviour, including deception.

3. Situational Factors and Deception: General Review and Research Gaps

3.1. Effects of situational factors on human behaviour

One of the fundamental assumptions of social psychology is the existence of the effects of situational factors (or called “situational variables”) on human behaviour (Brown, 2006). The term situational variable refers to “any factor that provides the context for an event or experience” (Brown, 2006, p. 3). Taking deceiving as an example, the situational factors that

may influence deceiving are not restricted to the location and the timing the deception takes place. In fact, the negative consequences that the deceiver might receive, the behaviour presented by the target of the deception, and social norms regarding the morality of conducting deception, are also situational factors.

The effect of situational factors on human behaviour was introduced by Lewin (1935, 1951), who proposed a *Field Theory* addressing the relationship between individual factors, situational factors, and behaviour as $B = f(P, E)$. The theory holds that behaviour (B) is determined by the environment (E) as perceived by the person (P), and his/her perception about the environment is determined by the world and his/her own factors, such as personality traits, and goals, etc. (Lewin, 1951). The field theory not only contends that behaviour is influenced by environmental stimuli, but also supports Gestalt psychology (Koffka, 1935) in that perceptions are dependent on the person him/herself as well as their situation and environment. These views suggesting situational effects on human behaviour is supported by empirical evidence from different areas of psychology, such as the findings showing the effects of situational factors on deceptive behaviour (e.g., Logsdon & Patterson, 2009; Stawiski et al., 2009; Vrij et al., 2008), self-regulation (e.g., Muraven et al., 1999; Shmueli & Prochaska, 2009; Vohs & Faber, 2007), and the central executive of attention and behaviour (e.g., Baddeley et al., 1998; Lavie et al., 2004; Schmeichel et al., 2003).

3.2. The need to investigate situational factors

Like other human behaviour, deception is also influenced by situational factors. For example, people may tell lies when the incentives for deceiving is high, whereas they may avoid doing so when this is low (Gneezy, 2005; Hurkens & Kartik, 2009). Moreover, the extent of deception cues (i.e. the behavioural indicators exhibited by deceivers) may be magnified when

the stakes (i.e. consequences of deceiving) of deceiving are high (DePaulo et al., 2003; Vrij, 2008). Although many situational factors have been investigated in deception studies, such as the punishment for deceiving (Feeley & deTurck, 1998), rewards of deceiving (Gneezy, 2005), power of deceiving (Koning et al., 2011), group dynamics (Marett & George, 2013), and cultural differences (Wang & Leung, 2010) etc., the broad range of potential influential situational factors suggests that other factors remain uninvestigated (Brown, 2006; Kihlstrom, 2013). In addition, researchers have found that some situational factors, such as the cognitive load of deceiving, can be managed to influence deceivers' behaviour (e.g., Vrij et al., 2006a; Vrij et al., 2009; Walczyk et al., 2003). For example, researchers using an interview technique that enhances the cognitive load of the deceiver, such as asking them to describe their day in reverse order, have found that this magnifies difference in the behaviour presented between deceivers and truth-tellers (Vrij et al., 2008). Therefore, the exploration of situational factors influencing deceptive behaviour is not only for a better understanding of the factors that may influence deception, but also involves exploring effective factors or interventions that can be managed to elicit deception cues. Such factors or interventions may further be used in helping lie detection. In line with this, I endeavour to conduct the present research so as to contribute to the knowledge of situational factors that can influence deceptive intentions and specific behaviours (see details Sections 4 – 5 & in the three papers).

In accordance with the goal to prevent, detect, and control harmful deception, the situational factors I investigate in the present research are assessable and/or manageable. By understanding their effects on deceptive behaviour, this research will thus also contribute to practices by advancing suggestions regarding the appropriate approaches, policies, or interventions that may be employed to deter, detect, or to prevent deception in the real world.

Furthermore, given the potential effects of situational factors on deception discussed here, the present research aims to investigate deception taking place in different situations and contexts. This is in line with the call to extend the research contexts of deception (DePaulo & Bond, 2012), as the limited ones studied to date, such as traditional laboratory settings, may have influenced behavioural indicators and thus may not have informed real life lie detection effectively (ten Brinke & Porter, 2012). Another benefit of assessing different contexts is that the finding about behavioural indicators of deception can be compared across these settings, so as to explore potential consistent behavioural patterns indicating deception. To this end, the present research considers contexts including the workplace (see details in Paper 1), daily life outside of the workplace (see details in Paper 2), and security-related contexts (see details in Papers 2 and 3).

3.3. Individual factors

Individual factors, such as gender, cultural, and personality, etc., are not the focus of the present research. However, there are studies showing their indirect effect on deception, including their effect on risk-taking decisions (Byrnes et al., 1999) and nonverbal behaviour (e.g., Vrij & Winkel, 1991). It is found that individual moral judgments is relating to deception conduct (Carson, 2010). In addition, individual differences also influence perceptions of nonverbal behaviours (DePaulo et al., 1993), ability to deliver information in communication (Kring & Gordon, 1998), and strength of self-regulation (Baumeister et al., 1994). As suggested by Vrij (2008), studies assessing deceptive behaviour should not neglect the effect of individual differences. The current research therefore takes this into account by measuring individual factors (detailed in Chapters III to V) and testing them as covariates in the data analyses. Such an approach ensures that the effects individual factors might have on the results are prevented

(Field, 2005). The next two sections each focus on one of the two aspects of the present research, namely, the intention to deceive in the workplace context (Section 4) and the specific behaviours exhibited by deceivers in other daily life and security settings (Section 5).

4. Deceptive Intentions and Effects of Situational Factors

In line with Section 2, the forming of deceptive intentions is an essential step in the execution of deceptive behaviour. Consequently, exploring the factors influencing deceptive intentions will help researchers and practitioners to understand deception and thus be more likely to be able to prevent it before it happens, as well as to control it from spreading to a bigger issue (Fleming & Zyglidopoulos, 2008). In the previous section, I introduced the notion that situational factors not only influence behaviours directly, but also influence perception, self-regulation, and the central executive of working memory. Since these cognitive processes contribute to the logical reasoning, planning, and execution of deceptive behaviours (discussed in Section 2, Bauer & Baumeister, 2011; Hofmann et al., 2011), it can be inferred here that situational factors may influence the forming of deceptive intentions, or the so-called decision-making of deception through these cognitive processes. The first part (presented in Paper 1) of the present research therefore probes deceptive intentions by targeting situational factors suggested by the different theories in relation to the decision-making of human behaviour. The following section explains the rationale for conducting this part of the research in the specific context of the workplace, as well as the gap in the literature regarding deceptive intentions in this context.

4.1. Deception in the workplace context: Morally acceptable?

The workplace is a crucial part of everyday life and is one of the most common places where deception happens (Shulman, 2007). The topic of deception research within a business context in the literature covers many aspects, such as forms of deception (Lindsey et al., 2011),

attitudes toward deception (e.g., Smith, 2002), intentions and decisions to engage in deception (e.g., Chen & Tang, 2006; Lovallo & Sibony, 2006), the impact of deception on individuals (e.g., Zhong, 2011) and organisations (e.g., Fleming & Zyglidopoulos, 2008), and the circumstances where deception takes place, such as during bargaining (e.g., Koning, 2011; Xu et al., 2012) and negotiation (e.g., Olekalns & Smith, 2009; Schweitzer et al., 2002). Similar to lies told to friends, deception in the workplace sometimes serves a function. For example, deception can be used as a tactic in negotiation (Carr, 1968/1988), and deception used by service staff sometimes leads to better feedback from customers (Jehn & Scott, 2008). Researchers have also found that some deception, such as impression management in a job interview or during daily work life, does not necessarily produce a serious negative impact (Robinson et al., 1998). These kinds of workplace deception, especially those used as tactics in negotiation, are argued as being morally permissible owing to the benefits and functions they can serve (Carr, 1988; Smith et al., 2009).

There appears to be a debate on the morality of workplace deception, generally originating from Carr's (1988) view, which argues that deception happening in the business context can sometimes be immune from unethical judgments. However, researchers have challenged such a perspective by providing evidence showing the long-term harmful impact of workplace deception. For example, researchers have found that engaging in deception can lead to the forgetting of moral rules (Shu & Gino, 2012) and thus may further lead to unethical behaviour in future. Schweitzer et al. (2006) also found that trust destroyed by deception hardly ever fully recovers, which may affect relationships between individuals in the business context. From the perspective of an organisation, scholars have found that when there is a conflict of interest between the organisation and the employee, the latter is likely to sacrifice the interests of the former by conducting deceptive or unethical behaviour (De Cremer et al., 2011). Deception is

also proposed to have an escalation effect as it can snowball from an initial single lie to an organisation-wide phenomenon, together with increasing degrees of severity and pervasiveness (Fleming & Zyglidopoulos, 2008).

4.2 Effects of situational factors

The debate regarding the morality of workplace deception attracts my interest to assess this specific context, as unlike everyday life outside of the workplace, many people may consider some workplace deception as more morally acceptable than other forms (Sims, 2002). Regarding this, research has found that those of similar opinion on unethical behaviours may perform those behaviours which they consider to be morally acceptable (Mudrack & Mason, 2013). On the other hand, in line with the psychological processes of deception such as emotion, serious impacts on the receiver/victim of deception may raise a strong guilt affect in the deceiver (Ekman, 1992; Vrij, 2008). Therefore, people may try to avoid such morally unacceptable deception so as to prevent the negative emotion of guilt (Ekman, 1992; Haidt, 2007), which suggests that deceivers could be influenced by factors reflecting morality, especially the impact on the victims of the deception.

In addition to the factors influencing the negative outcomes for the victims, the situational factors influencing the negative outcome for the deceiver may also raise negative emotions of deceiving. For example, a high probability of receiving negative consequences may result in increased negative affects, such as fear and also lead to the intention of avoiding deception (Ekman, 1992). In addition, expectancy-value models (Ajzen, 1991b; Locke & Latham, 1990), the theory of planned behaviour (Ajzen, 1991a), and decision theories (Breakwell, 2007; Emblemståg & Kjølstad, 2002) all propose that factors indicating the values of outcomes and the probability associated with each outcome may influence individuals' intention to undertake

actions. In line with the above, factors indicating the negative outcomes for both of the victim and the decision-maker of deception might play essential roles in altering intentions to deceive. Furthermore, there might be an interactive effect between the situational factors covering these two objects, in relation to how people balance their interests and those of the victims while forming deceptive intentions. Therefore, I contend that the factors concerning both the deceiver and the victims need to be examined in more detail in deception research in terms of assessing the forming of deceptive intentions.

The extant literature has highlighted many factors that may influence workplace deception from different aspects. For instance, researchers have found that conflict of professional roles is positively linked to telling lies (Grover, 1993; Marett & George, 2004). Researchers have also found that the negative consequences for the victims of deception may lead to avoidance of deceiving (Shalvi et al., 2011). In addition, leader deception (de Vries et al., 2012; Grover, 1993) may influence the leader-member exchange and the latter's organisational commitment (Griffith et al., 2011). Furthermore, perceived power difference influences deceptive behaviour in the workplace, which is likely to be due to the stakes differences associated with the different levels of power (Dunbar et al., 2012). Moreover, the ethical climate in an organisation may have an indirect influence over deception as it can impact on a potential perpetrator's strategy for lying (Aquino & Becker, 2005). Although many factors have been assessed in the context of workplace deception, few studies have investigated both the victim-related and decision-maker related factors together. In addition, there are other deceiver-relevant factors that need to be examined, together with the effect of victim-relevant ones. This calls for empirical examination, which forms the basis for the first part of this research (presented in Chapter III – Paper 1).

In addition, the existing empirical studies assessing decision-making and the influential

factors of deception have mostly been conducted in very specific contexts, such as bargaining and negotiation (e.g., Munier & Zaharia, 2002; Olekalns & Smith, 2009; Shalvi et al., 2011; Zhou et al., 2013). Deception can take different forms in the workplace (Olekalns & Smith, 2007), and the intention to deceive may be influenced by situational factors in settings other than bargaining and negotiation. On the basis of the existing literature, I consider that there is a demand for more empirical studies assessing deceptive intentions in diverse contexts, such as when undertaken by service providers targeting customers. This is taken into account when determining the context of workplace deception for the first part of the research (please refer to the details in Chapter III - Paper 1).

In conclusion, the first part of the present research, as presented in Paper 1, targeting intentions of deception happening between service providers and their customers, focuses on the effects of situational factors in relation to (1) the negative outcome for the victim of deception; (2) the negative outcome for the decision-maker of the proposed deceptive action; and (3) the interactive effect between these two kinds of factors. The specific situational factors being investigated as well as the research hypotheses are presented in Paper 1 and not covered here, so as to avoid repetition. The next section introduces the second part of the present research, targeting specific behaviours exhibited by deceivers and influential situational factors.

5. Behavioural Indicators of Deception and Situational Factors

After forming an intention to deceive, deceivers execute the deceptive intention by exhibiting specific behaviours, such as verbal statements and/or nonverbal body movements (Vrij, 2008). Interpersonal deception like this is a pervasive phenomenon and the relevant skills have been developed alongside human evolution (Ekman, 2003; Porter & ten Brinke, 2008). Prior research has informed that people tell about two lies a day (DePaulo et al., 1996), whereas

the chance that people can detect deception is not much better than flipping a coin (54%, Bond & DePaulo, 2006). There might be reason for this, such that many deceivers are too good at delivering and manipulating their behaviours while lying (Kring & Gordon, 1998) or some receivers are not good at reading and perceiving information delivered during interpersonal communication (DePaulo et al., 1993). However, lie detection research has found that the low detection accuracy might also be due to people being generally too trusting (Bond & DePaulo, 2006), or that they may rely on inaccurate “behavioural indicators” when judging deception (Hartwig & Bond, 2011; Vrij, 2008). Compared to changing people’s belief in relation to the first issue, it is easier to explore accurate behavioural indicators of deception by conducting more empirical studies based on the existing literature. The second part of the present research thus aims to contribute to the understanding of behavioural indicators of deception via (1) exploring deceptive behaviours in different contexts, (2) testing the cognitive mechanism behind the leakage of deception cues, and (3) examining the situational factors that may magnify the deception indicators, which all may help in improving the detection of deception.

5.1. Investigating the nonverbal indicators of deception

Laver and Hutcheson (1972) adopted two types of behavioural distinctions of face-to-face interactions: vocal versus nonvocal and verbal versus nonverbal. In interpersonal deception, researchers normally use the second distinction by dividing deception-related behaviour into verbal and nonverbal indicators (Vrij, 2008; DePaulo et al., 2003). In more detail, investigation on deception indicators covers vocal (e.g., pitch of sound), verbal (e.g., statement), and visual channels (e.g., body movements, see review in DePaulo et al., 2003). In recent years, vocal and verbal indicators of deception have attracted much attention, and different interview techniques, such as Statement Validity Assessment were developed (Kohnken, 2004). There are also other

techniques have been proposed more recently. For example, Leins et al. (2011) found that a spatial drawing task together with an interview can help to spot deceivers from truth-tellers. In addition, Sooniste et al. (2013) found that individuals who plan to engage in deceiving were less specific while talking about their past events than truth-tellers.

Issues of nonverbal cues.

Comparing vocal and verbal cues, nonverbal cues were found to be less stable in terms of detectability, and it was also pointed out that few reliable techniques are available to detect such cues (Bond & DePaulo, 2006). It is interesting to note that scholars have pointed out many different nonverbal indicators which are associated with deception (e.g., facial pleasantness, foot movements, etc, reviewed by DePaulo et al., 2003), however, the inconsistency that has emerged in the literature regarding nonverbal cues is problematic. There are four main reasons given for this variety. The first relates to the fact that deception assessed in the literature has complex and diverse characteristics, such as the different forms of and motivations for deceiving as covered in Section 1. The second reason concerns that the three psychological processes of deception (i.e. emotion, cognitive effort, and attempted behavioural control) playing their role in shaping deceptive behaviour in different manners based on the situations assessed in the different studies (e.g., higher task complexity leads to greater cognitive effort) (Lancaster et al., 2013; Vrij, 2008). For instance, deceivers who perceive a high probability of getting caught experience fear emotions and may exhibit negative affects in one study, whereas others may not present similar emotions in other studies when facing little chance of negative consequences. Thirdly, the three processes of deception can sometimes lead to similar nonverbal cues, which enhances the difficulty in finding consistent deception cues across studies (Vrij, 2008). For example, review studies (DePaulo et al., 2003; Memon et al., 2003) indicate that the deceiver's behaviour might

look rigid and tense due to attempted behavioural control. Similarly, the concentration aroused by cognitive overload can also lead to neglect of body language (Vrij, 2008) and hence result in a decrease in body movements and the onset of rigidity (DePaulo et al., 2003). Fourthly, deceivers' behaviour is not completely different from that of truth-tellers given their strategic manipulation of their behaviours to appear convincing (Buller & Burgoon, 1996), and such similarity causes a huge problem for lie detection (DePaulo, 1992).

A demand for understanding nonverbal cues.

It is believed that no robust cue (neither verbal nor nonverbal) can predict deception every time (Vrij, 2008). By having a clear grasp of the issues of nonverbal cues as presented above, I agree with other scholars that the current level of understanding of nonverbal cues is not enough (DePaulo et al. 2003, Sporer & Schwandt, 2007). Furthermore, the great demand for understanding nonverbal indicators of deception is not only because such physical behaviours are an essential part of deceptive communications, but also because in many contexts verbal or vocal cues are not assessable by lie detectors (e.g., O'Brien, 2008). For example, subtle deception, such as the concealment of behaviour or intention, may only arouse visible nonverbal cues, since no statement is involved in the communication. Ekman (1985) also argued that nonverbal cues cannot be completely managed by liars, owing to the inevitable impact of psychological processes of deception, such as emotions and/or cognitive load, as well as situational factors in specific contexts. Recently, Reinhard et al. (2012) found that when people are not familiar with the deceiver, they tend to rely on nonverbal cues instead of verbal ones while making judgments about deception. Furthermore, in some contexts when people need to make judgments on deception in a brief period (e.g., during a quick security check), detailed verbal or vocal analysis might not be applicable. In stead, nonverbal cues are the only indicators that those people can

rely on.

Therefore, I consider the investigation of nonverbal cues to deception should not be hindered by the difficulties of achieving stable findings, and hence the second part of the present research aims to address this. Specifically, this part of the research (presented in Chapter IV - Paper 2 & Chapter V - Paper 3) focuses on the subset⁹ of those nonverbal cues which are easily observed during short conversations (e.g., hand movements). This aims to resolve the difficulty of lie detection in situations where lie detectors do not have time to perform detailed vocal, or micro facial expression analyses within a short conversation. In addition, I also assess the impressions given by deceivers (e.g., appearing to be pleased) based on the three fundamental psychological processes of deception introduced in Section 1. Although some of the tense impressions have been investigated in the literature (DePaulo et al., 2003), not many studies have performed a detailed assessment of impressions in relation to all three psychological processes. The understanding of deception-related impressions may also inspire future research exploring how some individuals can detect deception effectively using intuition instead of specific body movements (Hartwig & Bond, 2011). In sum, I believe the investigation of the target nonverbal cues in this research will not only enrich the literature about this specific kind of deception cues, but also further help to improve the detection of deception by providing information about accurate nonverbal indicators of deception.

5.2. Exploring the origin of behavioural leakages: The role of ego-depletion.

On the basis of the widely accepted framework of the three psychological processes of deception (as introduced in Section 1), researchers have found specific deception cues associated with each process (Table II-1, resource from Vrij, 2008). However, the association of behaviours

⁹ Starting from this sentence, ‘nonverbal cues’, ‘body movements’, ‘visible cues’ or ‘behavioural cues’ in this thesis refer to the subset of nonverbal cues, which are visible body movements (coarse gestures).

with the three psychological processes of deception does not explain why deception cues appear. Perhaps the closest discussions regarding this question are by Ekman and Friesen (1969, 1974), who proposed that deception could be revealed by behaviours (including nonverbal cues) that are difficult to manipulate, so called behavioural leakages. Zuckerman et al. (1981) also contended that enhancing the psychological processes could lead to deception cues. Nonetheless, it is still not clear why different deception leakages occur and why someone is good at manipulating their behaviours, whereas someone else leaks deception cues. While more and more findings about deception cues are being generated in deception literature today, this question is still not perfectly answered. This issue has raised my consideration of there being a possible missing part of the cognitive mechanism behind the leaking of behaviours that reveal deception.

Table II-1

Nonverbal cues indicating psychological processes of deception

Psychological processes	Nonverbal behavioural cues to deception	
Emotions	Increased physiological arousal; Increased eye blinks; Self-adaptors (touching own clothes, hair, face, etc.); Speech hesitations (mm's and er's); Speech errors (stutters, repetition of words, omission of words); Fundamental frequency of pitch (higher pitched voice).	
	Guilt	Gaze aversion
	Delight	Increase in movements; Smiling and signs of joy.
	Overall	Less eye contact; Less body orientation; Decrease in illustrators.
	Cognitive effort	Less blink; Gaze aversion; Fewer hand and arm movements; More speech hesitation and errors; Speak slower, pause more; Wait longer before giving an answer
Attempted behavioural control	Deliberate control Avoid subjectively believed cues; Avoid gaze aversion; Move deliberately; Planned and rehearsed; Lack in spontaneity; Unusually smooth speech pattern.	
	Lack of control	Facial expressions of emotions; High pitch of voice; Performance looks flat.

Source: reviewed by Vrij (2008).

Dual-process functioning of human behaviour.

Before discussing how behavioural cues to deception are leaked, first it is necessary to understand how human behaviour is regulated. In the late 20th century, researchers began to consider that human behaviour is regulated by dual-process self-regulating systems. Epstein (1985, 1994) raised the view that two systems, namely, the *rational system* and *experiential system*, operate human behaviour together. The rational system works for deliberate and logical control of behaviours, whereas the experiential system is activated by responding to stimuli from the environment and via shortcuts (Epstein, 1994). In Epstein's view, both of the systems work in regulating behaviour, and what exhibited by individuals depends on which system is presently dominant. A later extension of Epstein's model is Strack and Deutsch's (2004) *reflective-impulsive model*. They propose a two-mode model for social behaviour, consisting of a *reflective system* and an *impulsive system*. The reflective system deals with higher order cognition similar to the rational system, such as reasoning, evaluation, and forming intentions and decisions, whereas the impulsive system acts without a decision process and responds to perceptual input directly, similar to the experiential system (Strack & Deutsch, 2004). Similar to Epstein (1994), Hofmann et al (2009) further proposes that the reflective and impulsive systems are also influenced by situational and dispositional factors that may determine which system prevails.

In line with the dual-process models and evidence showing that deception is regulated by higher order cognition, such as reasoning, planning, and the forming of deliberate intentions (as in Section 2, Kireev et al., 2012; Vrij, 2008; Walczyk et al., 2003), it is understood here that deceptive behaviours, such as deceptive statements (e.g., lies) and some deliberate nonverbal behaviours (e.g., fake smiles), are likely to be regulated following the rational or reflective system. On the other hand, according to Ekman and Friesen (1969), the behavioural leakages are

not expressed intentionally. They are likely to be automatic responses activated directly by the perception of the stimuli (e.g., negative affect due to fear), as regulated by the experiential or impulsive system. When behaving intentionally, the reflective system is considered to be supported by deliberate self-regulation (Vohs, 2006), which not only performs reasoning tasks, but also performs inhibition tasks with the assistance of the central executive of working memory (Hofmann et al., 2011). As a result, the inappropriate impulses (e.g., nonverbal behavioural leakages) could be inhibited by successful self-regulation, resulting in behaviours reflecting the goal or intention (Baumeister et al., 1994; Vohs, 2006). For example, a person who decides to deceive will try not to mention anything indicating the truthful information. When one can successfully implement self-regulation, this person can keep such a reflective system present and regulate behaviours properly as planned (Hofmann et al., 2009). However, there are cases when one fails to implement reflective control, where the impulsive system becomes dominant and thus resulting in leaking behaviours outside of the plan (Hofmann et al., 2009; Strack & Deutsch, 2004). Based on the dual-process functioning of human behaviour, it is not difficult to infer from this that behavioural leakages of deception appear due to the failure of proper self-regulation in relation to reflective system.

Depletion of resources and failure of regulation: leaking deception cues.

Baumeister et al. (1994) explained the failure of proper self-regulation by proposing a strength model of self-regulation resources, which could be depleted by self-regulation demanded tasks (e.g., in Muraven *et al.*, 1998). They proposed that the capacity of self-regulation is like muscles having a limitation of strength to carry on their duty. For example, the tasks requiring self-regulation can be effortful (Baumeister et al., 1998; Muraven et al., 1999) and thus place high demands on psychological resources (or called ego resources) required for

proper self-regulation (Baumeister et al., 1994). Working memory, as considered to be the cognitive process supporting self-regulation (Hofmann et al., 2011), is also found to require great effort and thus demanding resources (Baddeley, 2007; Baddeley et al., 1998). When the demand for ego resources exceeds the strength of self-regulation, the failure of control occurs (Baumeister et al., 1998). Such a state was later called *ego-depletion*, referring to diminished psychological resources due to exertive self-regulation (or so called self-control) (Baumeister et al., 2007).

Baumeister et al., (1994) put forward three main reasons for self-regulation failure: there may be a chronic lack of strength such that some people are normally performing self-regulation worse than others; there might also be temporal low strength of self-regulation due to exhaustion or stress; and finally, ego-depletion may also happen when the impulse or behaviour is too strong to override. In line with these, I consider that deception that requires effort for self-regulation and executive control (as discussed in Section 2) is not immune from the possibility of ego-depletion. Following the reasons for self-regulation failure caused by ego-depletion, a deceiver may leak behavioural cues simply because s/he is not good at managing behaviour. Another deceiver who is generally good at managing behaviour may still fail to inhibit behavioural leakages since s/he has completed a lot of tasks, leading to cognitive and physical exhaustion. It is also possible that a deceiver, neither bad at regulating behaviour nor being exhausted, still leaks behavioural cues due to such behaviours being too difficult to override (e.g., micro-expression, Ekman, 2003). In addition, the three psychological processes of deception are considered to place demands of ego resources required for self-regulation when they are enhanced (e.g., cognitive effort (Langleben et al., 2002)), given that the similar components of self-regulation do require effort and resources for self-regulation (Brown, 2006; Hofmann et al.,

2011).

By connecting the strength model of self-regulation and deceptive behaviour, I propose that behavioural leakages of deception are likely to appear due to the failure of self-regulation (owing to the depletion of psychological resources). The reasons for the failure of self-regulation introduced above give a good explanation of why someone at sometimes is good at hiding deception cues, whereas in some cases people leak deception cues. DePaulo et al. (2003) has proposed that the process of attempted behavioural control may require extra self-regulation resources and lead to overcontrolled behaviour. However, since all three psychological processes of deception may place high demands on self-regulation resources (as stated above), I propose that self-regulation failure led by ego-depletion not only occurs owing to attempted behavioural control, but can also happen due to any of the factors/processes that place overloading demands on self-regulation resources. As a result of these, deceivers may leak cues that reveal their deception based on the self-regulation failure, triggered by any of the psychological processes of deception that deplete the resources.

Specifically, as suggested by the strength model of self-regulation (Bauer & Baumeister, 2011; Vohs et al., 2005), when the psychological processes, such as negative emotions, are enhanced, the demand on the ego resources may exceed the deceiver's strength of self-regulation. Ego-depletion then happens and further leads to self-regulation failure. This deceiver may hence fail to manage his/her behaviour as s/he intended to be. His/her behaviour in this case may leak cues in relation to the fundamental psychological processes of deception, such as negative affect revealing negative emotion, and hesitating responses indicating cognitive effort. Such kinds of cues are the leakages suggested by Ekman and Friesen (1969). Taken as a whole, I contend that ego-depletion leading to self-regulation failure, as the missing part of the cognitive

mechanism behind behavioural leakage, bridges the psychological processes of deception and the leakage of cues to deception. Indeed, deception cues not only include leakages but also strategic moves (e.g., fake smiles) (Buller & Burgoon, 1996; DePaulo et al., 2003; ten Brinke et al., 2012). However, deception researchers consider that behavioural leakages could be cues effectively revealing deception (e.g., Bond & DePaulo, 2006; Ekman, 1992; Vrij, 2008). Hence, by explaining such kind of deception cues, this proposition contributes to the knowledge regarding a better understanding of deceptive behaviour as well as approaches that may be introduced to reveal deception. In line with Section 4.2, this part of the research (detailed in Chapter V - Paper 3) examines this proposition from the aspect of nonverbal indicators of deception, as there is a call for investigation of diverse deception cues as stated in Section 4.2.

5.3 Effects of situational factors

With the aim to understand behavioural indicators of deception, researchers not only passively observe deceivers' behaviour, but also manipulate situational factors that may magnify the difference between deceivers and truth-tellers. For example, Vrij et al. (2009) asked unanticipated questions in interviews so as to enhance cognitive load and thereby magnify cues in relation to the cognitive overload of deceiving. Cook et al. (2012) manipulated the incentives of passing deception tasks so as to enhance the positive outcome of successfully deceiving. It has also been found that the involvement of the three psychological processes of deception can be influenced by factors determining the outcomes for the deceiver (Frank & Ekman, 1997). For example, under higher stakes (i.e. higher extent of the positive or negative consequences of lying), deceivers demonstrate more behavioural reductions and more signs of high levels of cognitive activity, which indicates an enhanced extent of cognitive effort (Vrij & Mann, 2001). In addition, researchers have elicited that deception detection can be improved under higher-

stakes conditions given the magnification effect of these on deception cues (e.g., Bond & DePaulo, 2006; Hartwig et al., 2006; Vrij & Mann, 2001). These findings suggest that the situational factors in relation to the outcome of deceiving not only influence the forming of deceptive intentions, as introduced in Section 3, but also have an impact on the behavioural indicators of deception. Some of the situational factors can be preplanned so as to elicit deception cues and subsequently used as interventions to magnify the differences between deceivers and truth-tellers in the real world.

In Section 3 it was put forward that the three psychological processes of deception, self-regulation, and the central executive in working memory may all be influenced by situational factors. Since these cognitive processes are highly relevant to deceptive behaviour (as introduced in Section 2), I consider the situational factors are likely to influence deceptive behaviour via their effects on these processes. Specifically, situational factors in relation to the negative outcome for the deceiver influence the extent of the psychological processes involved in deceiving (i.e. emotion, cognitive effort, and attempted behavioural control). For example, deceivers being evaluated on their truthfulness may experience a greater fear of being caught compared to those not being evaluated (Ekman, 2001), due to the enhanced probability of getting caught associated with this evaluation (Brown dyke et al., 2008; Ekman & Frank, 1993). Therefore, in order to prevent getting caught, deceivers may experience an enhanced cognitive load since they need to think more carefully about deceptive tasks as well as the truthful information they need to inhibit (Langleben et al., 2002). They may further try harder to manipulate their behaviour so as to present a credible impression (Burgoon et al., 1996). On the other hand, the impact of the situational factors on the psychological processes of deception enhances the demand on the psychological resources for self-regulation and central executive

involved in working memory (as introduced in Section 2), which further influences the effectiveness of behavioural control (Hofmann et al., 2011). Given such an explanation based on the empirical evidence cited above, it is useful to investigate the effect of different situational factors on the exhibition of behavioural indicators of deception. The second part of the present research, thus, particularly focuses on their effect on the nonverbal indicators of deception (detailed in Paper 2 & Paper 3).

The situational factors, such as probability of detection or the demand for self-regulation, are also determined by contexts (Vrij, 2008). For example, the demand for self-regulation might be enhanced by the demands of the cognitive load (Carver & Scheier, 1998), so that a more complicated deception task is more likely to result in the ego-depletion leading to self-regulation failure. Diverse cues to deception found in different contexts (DePaulo et al., 2003) have also supported the view that nonverbal cues are highly dependent on these (Vrij, 2008). By admitting that there is no universal nonverbal cue to deception, researchers need to investigate deception cues in different contexts, since the cues found in specific settings may inform future studies/lie detection practices about how deceivers behave in similar settings. With this in mind, the second part of this research assesses different contexts in which deception takes place. For example, while many studies have probed deception cues during a seated interview, the studies presented here (Papers 2 and 3) assess deception cues while individuals are standing, sitting, moving around, and with or without direct social interaction. The contexts of their deception tasks also vary from lies told to a stranger in a private room, to the lies told to a security officer in a public space. This will contribute to the literature regarding empirical data about the nonverbal cues to deception exhibited in diverse settings.

In conclusion, the second part of the present research targets two main questions in terms

of nonverbal indicators of deception, across diverse contexts: (1) whether self-regulation failure caused by ego-depletion elicits behavioural leakages of deception? And (2) how situational factors in relation to the negative outcome for deceivers influence deception cues directly? The first question is tested by introducing situational factors in relation to self-regulation, and the second is examined by manipulating specific factors in relation to the negative outcome for deceivers. The introduction of specific factors and research hypotheses are presented in Papers 2 and 3 (Chapters IV & V), in line with the requirements of the collective thesis. Notably, I began to consider the potential effect of ego-depletion and self-regulation failure (question 1) later than when conducting the studies assessing the situational factors in question 2. Hence, research question 2 is addressed first in Paper 2, and then both of the two research questions are addressed in Paper 3.

6. Conclusion

In conclusion, the literature in the social psychology, cognitive psychology, and deception fields all suggests that interpersonal deception is considered to be goal-directed. That is, the specific behaviours exhibited by deceivers are led by deceptive intentions in mind. In line with this, the present research targets deception from two aspects: deceptive intentions and behavioural indicators of deception. In addition, the effect of situational factors on human behaviour including deception is found in the literature. Specifically, situational factors in relation to victims and the deceiver may both place effects on deceptive intentions. Situational factors may also alter deceptive behaviour via influencing self-regulation and the central executive, as well as the three psychological processes of deception (i.e. emotions, cognitive effort, and attempted behavioural control). With the aim being to prevent, detect, and control harmful interpersonal deception, I consider that situational factors that are manageable can be

used to alter deceptive behaviour. The effect of situational factors on deceptive intentions (detailed in Chapter III - Paper 1) and nonverbal behaviours (detailed in Chapters IV - V: Papers 2 - 3) is therefore a focus of this research. Furthermore, I employ the literatures regarding self-regulation and the dual-process models of human behavioural control to suggest that self-regulation failure caused by ego-depletion is likely to be the missing part of the cognitive mechanism behind behavioural leakages of deception. This proposition (examined in Paper 3) may fill the gap in explaining the cognitive mechanism behind behavioural leakages of deception, which is not sufficiently addressed in the existing literature. In sum, there are three general predictions raised in this thesis: (1) Situational factors in relation to negative outcomes for deceivers and victims both influence the early stage of deceptive behaviour, i.e. the forming of deceptive intentions. (2) Situational factors in relation to negative outcomes for the deceiver can also shape the late stage of deceptive behaviour, i.e. nonverbal cues exhibited by deceivers; and (3) Ego-depletion leading to self-regulation failure is the key to behavioural leakages that reveal deception. The next three chapters present the three papers of this thesis and examine these general predictions in detail.

CHAPTER III

PAPER 1

Forced to Deceive but Only in Non-Harmful Cases?

Stakes of Not to Deceive and Moral Intensity that Influence Deceptive Intentions

Abstract

The present study investigates intention to deceive in the workplace context and situational factors that may influence such deceptive intention. Two types of situational factors are assessed in the study: (1) there are two factors in relation to the impact on the decision-maker of deception, including the probability of receiving negative consequences from deceiving as well as the stake (i.e. negative consequence) of not deceiving; and (2) the factor of moral intensity, which is a construct comprising six elements regarding unethical practice in relation to the impact on the victim of the deception. Mixed-subject design is employed to manipulate these three factors by varying information described in the scenarios given in an online survey. Individual factors, such as personality, moral judgments, and ethical ideology, etc. are measured and tested as covariates. The results indicate the probability of receiving negative consequences from deceiving and the stakes of not deceiving both have significant influence on deceptive intentions. Perhaps more importantly, the stake of not to deceive and moral intensity influence deceptive intentions interactively in that people may be “forced to deceive” when the former is high and such “forced deception” happens more in low moral intensity conditions than in high ones. Implications and future study recommendations based on the present findings are also discussed.

Key words: deception; probability; stakes of not to deceive; moral intensity; theory of planned behaviour; ethical decision-making

Forced to Deceive but Only in Non-Harmful Cases?

Stakes of Not to Deceive and Moral Intensity that Influence Deceptive Intentions

1. Introduction

Deception happens everyday in different contexts. By telling one or two lies on average per day (DePaulo et al., 1996), people use deception not only for monetary interests (e.g., Langleben et al., 2005; Mackinger & Jonas, 2012), but also for psychological rewards (e.g., DePaulo et al., 2003; DePaulo et al., 1996) and other purposes, such as gaining advantages in business (e.g., Carr, 1968/1988; Lewicki et al., 1994; Olekalns & Smith, 2009). As introduced in Chapter II, it is widely believed that deception is usually conducted for a purpose (e.g., Buller & Burgoon, 1996; Ekman, 1992; Van Yperen et al., 2011). Taking workplace deception as an example, it is used when people want to gain advantages amongst conflicts of interest in business transactions (Zhong, 2011), as part of the strategy of a salesperson's work commitment (e.g., Smith, 2002; Smith et al., 2009), or when people want to gain benefits from customers by charging a high price for inferior products/services (Heidhues et al., 2012). Such kinds of workplace deception are believed to be unethical (e.g., Graafland et al., 2006; Robertson & Rymon, 2001; Smith, 2002; Zhong, 2011) and may seriously affect an organisation (e.g., Shulman, 2007; Stevens, 2013), as well as destroy the trust and loyalty of customers (Limbu et al., 2011). In order to prevent the negative impact of workplace deception, understanding how the intent to deceive is formed and what factors influence such an intention becomes an important step (Brandts & Charness, 2003; Hogue et al., 2012; Zyglidopoulos & Fleming, 2008).

I have pointed out in Chapter II Section 4 that the workplace has become an interesting context for deception behaviour as people may consider deceiving is morally permissible in this

setting (e.g., Carson, 1993; Lewicki, 1983; Power et al., 2013). Studies targeting intentions to deceive in the workplace context focus on the effects of various different aspects, such as the ethical climate and media of communication (e.g., Aquino, 1998; Whitty et al., 2012), the group dynamics in relation to deceptive decision-making (e.g., Marett & George, 2013; Stawiski et al., 2009; Zhou et al., 2013), and the effect of rewards/sanctions for deceiving (e.g., Aquino & Becker, 2005; Mackinger & Jonas, 2012). However, factors in relation to the situation that “forces” individuals to deceive (i.e. stakes of not to deceive) appear to have seldom tested in the literature. In addition, such factors relating to the impact on decision makers may interact with those influencing the negative outcomes for the victims of deception. Consequently, it is contended that this gap in the literature needs to be filled through empirical investigation.

On the basis of theories in social psychology and ethics research, the present study aims to fill the research gap introduced above and tests the effect of multiple factors and their potential interactive effect on deceptive intentions in the workplace context. Although there used to be a debate as to whether some deception in the workplace is immune from ethical consideration (in Lewicki et al., 2006; Piker, 2002), it is generally accepted that such deception, in many situations, is unethical and can lead to negative consequences for the individuals concerned as well as the organisation (e.g., Carlson et al., 2011; Graafland et al., 2006; Grover, 1993). This study places greater emphases on the effect of situational factors (e.g., moral intensity of the given issue, Jones, 1991) since they could be manipulated, when practitioners need to prevent and control deception. Unlike most research assessing unethical issues and related matters using non-experimental surveys (e.g., Barnett & Valentine, 2004; Chen et al., 2009; Leitsch, 2006), this study employs experimental manipulation in an online scenario-based survey. This methodology permits me to understand any causal relationship between the manipulated factors

and the intention to deceive (Elmes et al., 2003; Goodwin, 2010). The following sections explain in more details about the factors that were investigated in this study and theories they are based on, starting with those in relation to the negative outcome for the decision-maker of deception, followed by those in relation to the negative outcome for the victim of deception.

1.1. Factors in relation to the negative outcome for the decision-maker of deception

1.11 Theory of planned behaviour and deceptive intentions

The intention of undertaking deception in relation to deliberate human behaviour can be predicted based on the determinants suggested by the *theory of planned behaviour* (TPB) (Ajzen, 1985/1991a). As an extension to *theory of reasoned action* (Fishbein & Ajzen, 1975), which addresses the role of attitude and subjective norms in predicting behavioural intentions and actions, Ajzen added a variable, namely, *perceived behavioural control* into the model so as to predict behaviours that are not completely volitional (Ajzen, 1985). As argued by Ajzen, the empirical evidence supports that TPB has better predictability on behavioural intentions than theory of reasoned action (e.g., Chang, 1998; Madden et al., 1992) and has therefore been widely used in studies assessing a wide range of human behaviours, such as tourism activity (Quintal et al., 2010), the use of public transportation (Heath & Gifford, 2002), pro-environmental behaviour (Fielding et al., 2008) and ethical intentions (Randall & Gibson, 1991).

As discussed in Chapter II Section 2, deception is also a form of human behaviour based on deliberate intentions (Vrij, 2008; Zuckerman et al., 1981), which may be explained by TPB. That is, factors influencing the determinants of intention in the TPB framework may therefore contribute to the forming of deceptive intentions. Attitudes toward behaviour, as one of the determinants of intention in the TPB framework, are estimated based on the *expectancy-value model* (Fishman & Ajzen, 1975), which explains attitudes using the subjective probability that

performing the behaviour will lead to a particular outcome (or more than one outcome), as well as the evaluation (benefits vs. harm) of that outcome. Subjective norms, another major determinant of intention, concern the person's beliefs about how likely it is that most people who are important to them would approve or disapprove of performing the given behaviour (Ajzen, 1991a). The last determinant, perceived behavioural control, refers to the perceived ease or difficulty of performing the given behaviour and is positively related to intentions (Ajzen, 1991a/2002). This determinant takes into account the realistic constraints caused by individual (e.g., self-efficacy, Ajzen, 2002) or situational factors (e.g., lack of opportunity, Ajzen, 1991b) that may become obstacles to performing a given behaviour (Ajzen, 1991b).

In conclusion, the theory of planned behaviour suggests that factors, such as (1) the subjective probability of receiving the outcome of a given behaviour, (2) the values of the outcomes, (3) the opinions of important people, and (4) individual and situational factors that affect the volition of a given behaviour, each may influence behavioural intention. I consider that these factors may also play essential roles in determining intentions to deceive.

1.12 Decision theories and deceptive intentions

In addition to the theory of planned behaviour, decision-making from a psychological perspective focuses on the deliberate and controlled cognitive process of making a decision, including generating deliberate intentions (Hastie & Dawes, 2009). Given the deliberate feature of deception introduced earlier as well as in the definition proposed by Vrij (2008, p15), the factors that influence the deliberate decision-making process may also influence the decision to deceive. This consists of three fundamental parts (Hastie & Dawes, 2009): (1) there is more than one option to choose in any possible action (e.g., choosing to deceive or not to deceive); (2) the decision maker can form expectations of the outcomes of each option and the degrees of belief

(e.g., probabilities) that the outcomes will occur (e.g., choosing to deceive can definitely bring monetary gains); and (3) the consequences associated with the outcomes can be assessed and evaluated, depending on one's current goals and personal values. Such characteristics of decision-making indicate that decisions to deceive are made on the basis of personal goals and values by evaluating the outcomes of the available options (to deceive or not) and the probability associated with such outcomes (Breakwell, 2007; Emblemståg & Kjølstad, 2002; Koller, 2005; Sip et al., 2010).

1.13 Assessing situational factors in relation to the decision-makers of deception

Preventing and controlling harmful deception can be improved by understanding individual and situational factors and the roles of these factors are equally important in shaping human behaviour (Lewin, 1935/1951). Unlike individual factors, situational factors in some cases can be manipulated intentionally in context (e.g., Vrij et al., 2006a; Vrij et al., 2008). For example, a company can use a strict ethics monitoring system to ensure that the probability of receiving the negative consequence of an unethical act is higher than if there were no such system. By contrast, people all have their preferences when facing options to choose (Pitesa & Thau, 2013), which are difficult to define and manipulate. With the ultimate goal of predicting and controlling harmful deceptive behaviour as for this research, I thus choose to focus on situational factors and their effects on intent to deceive in this study.

Probability of receiving negative consequences of deceiving.

In line with above, both the *theory of planned behaviour* and decision theories introduced above suggest that the probability of receiving consequences of deceiving is a key situational determinant of deceptive intentions. Empirical studies also found that when individuals were aware of the negative consequences of deception, the high probability of being detected has a

significant effect on the fundamental psychological processes, such as increased negative emotion and cognitive effort (Zhang et al., 2013a/2013b, published based on the studies presented in Chapters IV and V). However, in real life settings such as the workplace, the detection of deception does not necessarily lead to negative consequences for the deceiver (Fleming & Zyglidopoulos, 2008). That is, someone can avoid negative consequences even though a deceptive action has been detected (Shulman, 2007). Therefore, the present study aims to assess the probability factor precisely, by manipulating high vs. low levels of probability associated with the negative consequence of deceiving instead of the probability of being detected deceiving.

In line with the above, I propose that higher degrees of probability associated with the negative consequences of deceiving predict a lower degree of intention to deceive. For further details of the manipulation of the probability, please refer to Section 2 and the scenarios in Appendix 1. The first hypothesis is proposed as:

Hypothesis 1: There will be a stronger intention of undertaking deception being expressed by individuals when the probability of receiving negative consequences is lower, compared with higher probability conditions.

Stakes of not to deceive.

Decision theories suggest that individuals not only evaluate the probability of positive outcomes of options, but also that of negative outcomes (i.e. this refers to “stakes” in this study) regarding both options (Adair, 2007; Schwenk, 1984): undertaking (e.g., deceiving) or not undertaking the action (e.g., abstaining from deceiving). For example, one may evaluate the value of the monetary gain from deceiving and the positive emotion of being honest, together

with the probability associated with each outcome. One may also consider the stake¹⁰ (i.e. refers to negative consequence in this study) of losing reputation as a result of deceiving and the unaffordable economic pressure for giving up the chance to cheat for money. Therefore, it is not difficult to infer that good people sometimes can make a “bad” decision to deceive (De Cremer et al., 2011; Shulman, 2007; Valentine & Bateman, 2011), when they think a specific situation forces them to do so. Ekman (1985/1992) also suggests another situation, whereby people may choose to deceive in order to avoid punishment for revealing an existing deception. Such tendency is supported by *regulatory focus theory*, which proposes that the self-regulatory process involves the states of approaching desired end (e.g., approaching accomplishment) and avoiding an undesired end (e.g., avoiding nonfulfillment) (Scholer & Higgins, 2011). That is, these two states indicate that people can not only tell lies to gain benefits, but they can also tell lies to avoid harm. Hence, factors such as the negative consequence (i.e. stakes) of not to deceive should be considered in research assessing deceptive intentions.

The stakes of not to deceive are also reflected in the *theory of planned behaviour*. Regarding this, when one is facing the options to deceive or not to deceive, the serious negative consequence of the latter may become an obstacle to being honest. In line with Ajzen (1991a/b), the perceived behavioural control of performing honestly may thus be negatively impacted upon, thereby leading to a decrease in the intention to fulfill this intention. That is, serious stakes of abstaining from deception may result in the intention to deceive.

Regrettably, while the stakes (i.e. negative consequence) of deceiving have been assessed in deception research in the psychology (e.g., Hartwig *et al.*, 2006; ten Brinke & Porter, 2012) and business fields (Wanasika & Adler, 2011), the stake of not to deceive has been seldom

¹⁰ Stakes of deception can refer to both the positive and negative consequences of deceiving. However in some studies, as with this one, the stakes of deception refer to the negative consequence of deceiving.

investigated. The present study thus assesses this factor so as to fill the lacuna in the literature. The degree (high vs. low levels) of the stakes (i.e. negative consequence) of not to deceive is manipulated by introducing a serious economic problem to the decision maker as described in the scenarios, which is in accordance with the finding indicating that money is a strong motivator for crime and corruption in organisations (Burke, 2010; Van Swol et al., 2012).

In line with the above, I propose that higher stakes of abstaining from deceiving lead to a stronger intention to deceive. For further details of the manipulation, please refer to Section 2 and the scenarios in Appendix 1 and hence, the second hypothesis is put forward:

Hypothesis 2: There will be a stronger intention of undertaking deception expressed by individuals when the negative consequence (i.e. stakes) of not to deceive is higher, compared with lower stake conditions.

Factors being controlled.

The extent of the negative consequence of deceiving is not the target variable manipulated in this study. This control variable was kept consistent across the experimental conditions using a description of moderate level so as to reduce its impact on the intention to deceive. However, participants' perception of the level of such a control variable was assessed in the manipulation check, being tested as covariates, so as to prevent its effect on the results. Another control variable is the probability of receiving negative consequence for opting not to deceive, which was controlled for across the experimental conditions using a high level description (100%, i.e. the decision maker in the scenarios is certainly under serious economic pressure). Such experimental control ensures the negative consequence (i.e. stakes) of not to deceive, as introduced in some of the experimental conditions, is sufficiently serious so as to be a major obstacle against being honest.

1.2. Factors in relation to the negative outcome for the victim of deception

1.21 The four-component model and deceptive intentions

Studies focusing on the ethical/unethical intentions and decisions have been widely influenced by Rest's (1986) four-component model of ethical decision-making (or unethical decision-making) (Craft, 2013; O'Fallon & Butterfield, 2005). This model, consisting of the components of moral recognition, moral judgments, moral intention, and moral behaviour, is considered to be a reliable proposition regarding the decision-making in relation to unethical conduct as tested by empirical studies in various contexts (e.g., Leitsch, 2006; McMahon & Harvey, 2006). The model suggests that moral recognition and moral judgments are key factors for determining unethical intentions. The former (or moral awareness) concern the ability to identify moral issues, whereas the latter (also called moral evaluation) relate to one's evaluation of the morality of a given issue. Both of these elements have been shown to influence ethical intentions and behaviour (see reviews in Craft, 2013; Loe et al., 2000; O'Fallon & Butterfield, 2005).

1.22 The issue-contingent model and deceptive intentions

Based on Rest's four-component model, Jones (1991) proposed the *issue-contingent model* by adding situational factors to the aforementioned components of ethical decision-making. The key construct, namely *moral intensity (MI)*, consists of six elements of the characteristics of an ethical/unethical issue and by proposing the moderating effect of moral intensity, Jones claimed that individuals respond differently to moral issues in line with these six elements, which refer to the characteristics of given situations. According to Jones (1991), the six elements of moral intensity include: (1) the magnitude of consequences of an action (i.e. the degree to which a consequence can harm the victim of the unethical action); (2) social consensus (i.e. the level of

social agreement on the action); (3) the probability of the effect of an action (i.e. the probability that the consequence for the victim is likely to happen); (4) temporal immediacy (i.e. time difference between the act and the onset of the consequence); (5) proximity (i.e. the cultural, psychological, physical or social closeness of the decision maker and the victim), and (6) the concentration of the effect (i.e. the impact of the given magnitude of a consequence relating to the number of individuals impacted upon, e.g., 10 people in all losing \$100 has a lower concentration of effect than two people in losing \$100).

The six elements of moral intensity taken together form the construct that is believed to comprehensively cover the essential elements/characteristics involved in an unethical issue (see review in Craft, 2013; Loe et al., 2000; May & Pauli, 2002; McMahon & Harvey, 2007).

According to Jones (1991), a higher degree of moral intensity indicates a greater moral imperative in a situation, which also indicates a greater negative impact on the victim of the given behaviour. As a construct mainly reflecting the negative outcome in relation to the victim, moral intensity has been proven to have a significant negative relationship with unethical decisions: the higher the degree of moral intensity predicts lower unethical intentions (as reviewed by Craft, 2013). In line with the evidence regarding other ethical issues, the effect of moral intensity has also been found in studies assessing deception behaviour (e.g., Gneezy, 2005).

1.23 Assessing situational factors in relation to the victim of deception

Moral intensity.

Guided by the evidence showing the predictability of moral intensity on moral intentions and actions (Hunt & Vitell, 1986; Mayo & Marks, 1990; Pan & Sparks, 2012), I intended to assess how moral intensity influences individuals' intention to deceive. Scenarios (detailed in

Section 2 and Appendix 1) that incorporate all six elements of moral intensity were used in this study so as to present a full picture of deception issues. I employed experimental manipulation in these scenarios, by varying the descriptions so as to bring them into line with high vs. low level situations for each element of moral intensity. Since individuals could have perceived the degree of moral intensity differently than that intended in the descriptions (Morris & McDonald, 1995), their perception of moral intensity construct was therefore measured in order to confirm the validity of this experimental manipulation. Their perceptions were analysed prior to/at the formal study so as to confirm the manipulation of this variable functioned properly (also detailed in Section 2). In addition, the manipulation of the moral intensity elements resulted in high and low values of victims' monetary loss in the corresponding high and low moral intensity conditions. Such values were equal to the deceivers' monetary gaining and thus may have potentially influence their intention to deceive. Participants' perception of monetary gaining of deceiving was therefore assessed and tested as a covariate, so as to prevent its impact on the results (see details in Section 2).

1.3. Interactive effects between situational factors in relation to the decision-maker and the victim of deception

Taking the three factors being manipulated in this study as a whole (i.e. probability of receiving negative consequence of lying, the stakes of not to deceive, and moral intensity), the first two situational factors suggested by social psychologists are relevant to the negative outcome for the decision maker, whereas moral intensity is more related to the negative outcome for the victim of a given deceptive action. Considering that decision makers involved in an ethical dilemma evaluate not only the outcomes for themselves, but also the outcomes for others being influenced by the decisions (Adair, 2007), it is worthwhile exploring any interactive

effects on the intention to deceive, between these three situational factors. I thus paired each of the factors in relation to the decision maker's negative outcome (i.e. probability and stakes¹¹) and the factor regarding the victim's negative outcome (i.e. moral intensity) so as to assess the interactive effect of each pair of factors on intentions. These interactive effects have seldom been investigated in deception studies and hence, the present study help address this gap in the literature.

Based on the strong effect of moral intensity on unethical intentions found in previous studies (e.g., Jones, 1991; Kish-Gephart et al., 2010), I propose that moral intensity will have a strong effect on intentions to deceive. More specifically, when the degree of moral intensity is high, decision makers may choose not to deceive, regardless of the level of the probability or stakes. This is because where a serious unethical issue occurs (i.e. a high degree of moral intensity), the option of undertaking the deceptive action strongly violates the general personal values regarding immoral conduct (Haidt, 2007), which results in avoidance of undertaking deception (Shalvi et al., 2011). However, when the degree of moral intensity is low, the decision makers' intention of avoiding deceiving is less strong than for high intensity situations. In addition to the situational factors, deceptive intentions may also be influenced by the individual factors that are normally considered in the decision-making process (e.g., probability and stakes, as suggested by the theories of planned behaviour and decision-making) (Ajzen, 1991a; Emblemsvåg & Kjølstad, 2002). By proposing the existence of such interactive effects, I understand that individual factors, such as personal value orientations may influence the results significantly. They are, therefore, measured and considered as covariates of the present study, as detailed in Section 1.4 and Section 2.

¹¹ In the rest of this paper, I use "probability" and "stakes" as the shortened form of factors of "probability of receiving negative consequence of deceiving" and "stakes of abstaining from deceiving".

In line with the predictions above, the present study also tests the following hypotheses concerning the main effect of moral intensity and the interactive effect between moral intensity and probability/stakes:

Hypothesis 3: Moral intensity, in general, is negatively related to the intention of undertaking deception.

Hypothesis 4: When the degree of moral intensity is low, the difference in the deceptive intention between conditions of higher and lower probability (i.e. the probability of receiving a negative consequence of deceiving) would be greater than a situation in which the moral intensity is high.

Hypothesis 5: When the degree of moral intensity is low, the difference in the deceptive intention between conditions of higher and lower degree of stakes (i.e. the negative consequence of abstaining from deceiving) would be greater than a situation in which the moral intensity is high.

1.4 Individual factors that may influence the intent to deceive

Moral judgments.

The three factors discussed above emphasise the impact of situations and contexts on deceptive intentions. However, the effects of individual factors should not be neglected. For example, as a key component in Rest's ethical decision-making model, moral judgments have been found to be highly relevant to deception conduct (Carson, 2010; Harada et al., 2009). In addition, scales assessing such judgments (e.g., the "moral equity" dimension of Reidenbach & Robin's (1990) ethics scale) not only assess individual's own opinion on a given unethical issue, but also those of other people who are important to the decision-maker (e.g., family members). Referring back to the theory of planned behaviour, such construct of moral judgments may also

cover the nature of subjective norms as proposed in the TPB framework (Ajzen, 1991a/b). Hence, I consider this as an essential individual factor influencing deceptive intention.

According to the effect of moral judgments on unethical decision-making suggested by ethics research (e.g., Celuch & Dill, 2011; Hunt & Vitell, 1986; Rest, 1986), they are positively related to the intentions and decisions regarding unethical conduct (i.e. a more “ethical” judgment on a proposed deceptive option indicates a stronger intention to deceive). I thus consider that the intention to deceive should be influenced by the degree of moral judgments in a similar way.

Ethical ideology.

Ethical ideology (i.e. idealism & relativism) relates to personal value orientations of unethical behaviours (Douglas, 2001) and is another individual factor that influences unethical behaviour while making decisions (e.g., Hastie & Dawes, 2009; Davis et al., 2001; Vitell et al., 1993). Compared with idealistic individuals, relative people tend to have less ethical intentions (e.g., Valentine & Bateman, 2011). While proposing the interactive effect between probability, stakes, and moral intensity, I also consider that the factor of personal values on unethical behaviour is influencing such interactive effects. That is, the scores of ethical ideology on idealism and relativism may moderate the interactive effect between the probability/stakes and moral intensity.

In conclusion, the effects of individual factors including moral judgments and ethical ideology on deceptive intentions should not be neglected even in studies focusing on situational factors. In the present study, these two factors were measured and tested as covariates for the data analyses as they are not under the research lens. This approach will prevent the effect of

such individual factors on the results and ensure the validity of findings concerning situational factors (Field, 2009).

1.5. Other covariates concerning personal details

Other individual factors, such as social desirability (Valentine & Hollingworth, 2012), education level and type and years of employment (Krambia-Kapardis & Zopiatis, 2008; McCullough & Faught, 2005), as well as demographic characteristics, such as age and gender (Smith et al., 2013; Valentine & Rittenburg, 2007) have been found to influence moral judgments. Culture differences have also been discovered in relation to ethical values (Wang & Leung, 2010) as well as individuals' attitudes toward the use of deception (Smith, 2002). Moreover, personality (Miller et al., 2004) could influence risk-taking behaviour, such as deceiving. Although these factors are not the focus of this study, they were measured and tested as covariates so as to control their potential effects on the results.

2. Methods

2.1. Participants

Participants were recruited online via Amazon Mechanical Turk (AMT)¹² for a study entitled “Workplace Behaviour”, which is an online interface available for work recruitment and payment. It is used by a growing body of researchers to conduct online data collection due to advantages, such as its low cost and short recruitment cycle (Mason & Suri, 2012). Reports show that AMT has similar reliability and validity to traditional experiments/surveys conducted in person or in the laboratory (Buhrmester et al., 2011; Paolacci et al., 2010). One of its key advantages is that it enables researchers to recruit participants from diverse backgrounds, including a wider range of age (Buhrmester et al., 2011) and work experience rather than is often the case their being restricted to university students (according to reviews from Craft, 2013; Loe

¹² Amazon Mechanical Turk: <https://www.mturk.com>

et al., 2000; and meta-analysis studies in DePaulo et al., 2003; Hartwig & Bond, 2011).

Moreover, while recruiting participants via AMT, researchers are able to use a response review system to filter out invalid responses (e.g., responses made by participants who have not fully understood their tasks) using designated criteria, which prevents the threat of invalid data for studies conducted online (Best & Krueger, 2004). In this research, participants' responses were reviewed on the basis of the manipulation and validation check questions (see details in Section 2.4 and Appendix 2). Only valid responses and their associated respondents were included in the participant pool for the data analysis.

417 participants passed the first round of the filtering process (see details in Section 3) and were included for further analysis. In the second round of the filtering process, nine more were excluded due to their failing to follow instructions of being required to provide consistent responses across the decision items. Consequently, valid data from 408 participants (189 males, 219 females) were finally included in the analyses ($M_{age} = 36.42$ years; $SD = 13.01$).

2.2. Study design and procedures

The present study took the form of an online experimental survey containing two hypothetical scenarios and a number of self-administered questions. Each scenario presented an unethical issue involving participants in their hypothetical workplace and proposed a possible act of deception as the reaction to the issue (see details in Section 2.3-2.4). The whole study involved experimental manipulation of three independent variables using a $2 \times 2 \times 2$ mixed design, as well as measurements of covariates (e.g., personality). The two between-subjects variables were (1) stakes of not to deceive: the degree of negative consequence as a result of abstaining from deceptive actions (high vs. low degree); and (2) the probability of receiving negative consequence of deceiving (high vs. low value). The within-subjects variable was the

degree of moral intensity (high vs. low degree) describing unethical issues that involve proposed deceptive actions. The two between-subjects variables generated the four conditions of the survey presenting the different contents of the scenarios followed by identical questions. The participants were randomly assigned to four groups and each person completed one survey. The manipulation of the within-subjects variable was also reflected in the contents of the scenarios (see next section and Appendix 1), where each of the two scenarios in the survey created a high or low degree of moral intensity, hence giving the four above mentioned versions. The orders of the two scenarios within each survey were counterbalanced and tested as covariates so as to prevent the carryover effects of the experimental conditions (Kantowitz, et al., 2009). The order for the scenarios has also been tested as a covariate so as to prevent its impact on the results.

Participants who gave their consent to take part in this study were directed to an online survey on Qualtrics (an online survey interface¹³) taking about 30 minutes. In the first section, they were required to picture themselves in the scenarios described and answer the questions following each. They were presented with two scenarios (see Appendix 1) regarding unethical issues involving themselves in two different kinds of workplace. Following each, they were asked to respond to a series of questions concerning evaluations of the unethical issues (e.g., moral judgments) and their intentions regarding whether or not they would deceive. Then, they were asked to make their decisions as to whether or not to deceive. Following each scenario, they were also required to complete manipulation check questions assessing their perception of the degree of three independent variables, those of: the stakes of not to deceive, the probability of receiving negative consequence, and the degree of moral intensity. They also completed validation check questions assessing their understanding of the issues described in the scenarios. Moreover, their perceptions of the gaining of deceiving and loss of being detected deceiving

¹³ Qualtrics: <http://qualtrics.com>

were also assessed, so as to test their possible effect on the results in the subsequent data analysis procedures.

After completing the first section above, the participants were presented with the instructions to Section 2 of the survey, in which they were required to complete a few measurements that were independent from the scenarios (e.g., ethical ideology, personality, etc.) and also to provide their demographic information. They then were presented with the debriefing information followed by a test code, which enabled them to claim rewards (\$1.40) on Amazon Mechanical Turk.

2.3. Developing the scenarios

Previous research concerning decisions of deception and unethical issues in the workplace utilised scenarios/vignettes as a common approach (e.g., Rockmann et al., 2008; Zikmund et al., 2010; also, see reviews in O'Fallon & Butterfield, 2005; Weber, 1992). Such an approach involves presenting participants with a short story describing an issue involving deception or unethical actions happening in a given workplace, followed by measurements of designated variables. Using hypothetical scenarios/vignettes is advantageous as it allows for introducing different variables that can be implemented by creating corresponding contents of unethical issues (e.g., Tsalikis et al., 2008). It also offers the opportunity to study simulated issues in the workplace, when the investigation of real life ones is difficult.

In this study, the deception element was introduced into the adapted pre-existing scenarios from Tsalikis et al.'s (2008) study. The scenarios for this current work were chosen and adapted based on four criteria: (1) Each scenario described an unethical issue and proposed the act of deceiving as an optional reaction to it. (2) Only scenarios that were capable of incorporating all six dimensions of moral intensity (the within-subjects independent variable) were included. This

criterion was decided upon based on the belief that the components of moral intensity comprise the standard elements of an unethical issue (e.g., May & Pauli, 2002; McMahon & Harvey, 2007). Many studies using different scenarios have not consistently included all the dimensions of moral intensity (McMahon & Harvey, 2006/2007). The disadvantage of such an approach is that participants' perceptions of moral intensity or their decisions of unethical actions (e.g., deception) may be influenced by the variance of the dimensions presented in the scenarios. Consequently, comparisons of results between such different scenarios may lead to biased conclusions. This study thus sought to avoid such a problem by ensuring all six dimensions of moral intensity were presented in each of the scenarios. (3) Two different kinds of workplace, each appearing in a scenario and reflecting one level of moral intensity (high & low), were used so as to increase the diversity of issues as recommended by previous research (e.g., McMahon & Harvey, 2006; Wasieleski & Hayibor, 2008). (4) Only scenarios that were capable of making sense to the participants while incorporating high and low degrees of the between-subjects independent variables (i.e. stakes of not to deceive and the probability of receiving negative consequence of deceiving) were included.

Amongst the six initially selected scenarios, two of them (please refer to Appendix 1) were finally chosen for this study, as they met the above requirements and proved to be understandable by participants (tested in pilot tests regarding easiness to follow the scenarios and accuracy of the validation questions). Finally, the scenarios were designed to use the first person so as to involve participants into the situations described.

2.4. Experimental manipulation in scenarios

In order to assess the effects of the three independent variables, I needed to compare participants' responses to the different scenarios carrying different information associated with

high and low degrees of the variables. In doing so, I could then propose that the differences yielded between groups were likely to be caused by the varying degrees of these variables (Goodwin, 2010). With this in mind, manipulation of the three independent variables was reflected in the contents of the scenarios (added into Tsalikis et al.'s original scenarios). Please also refer to the flow map of this study in Figure III-a.

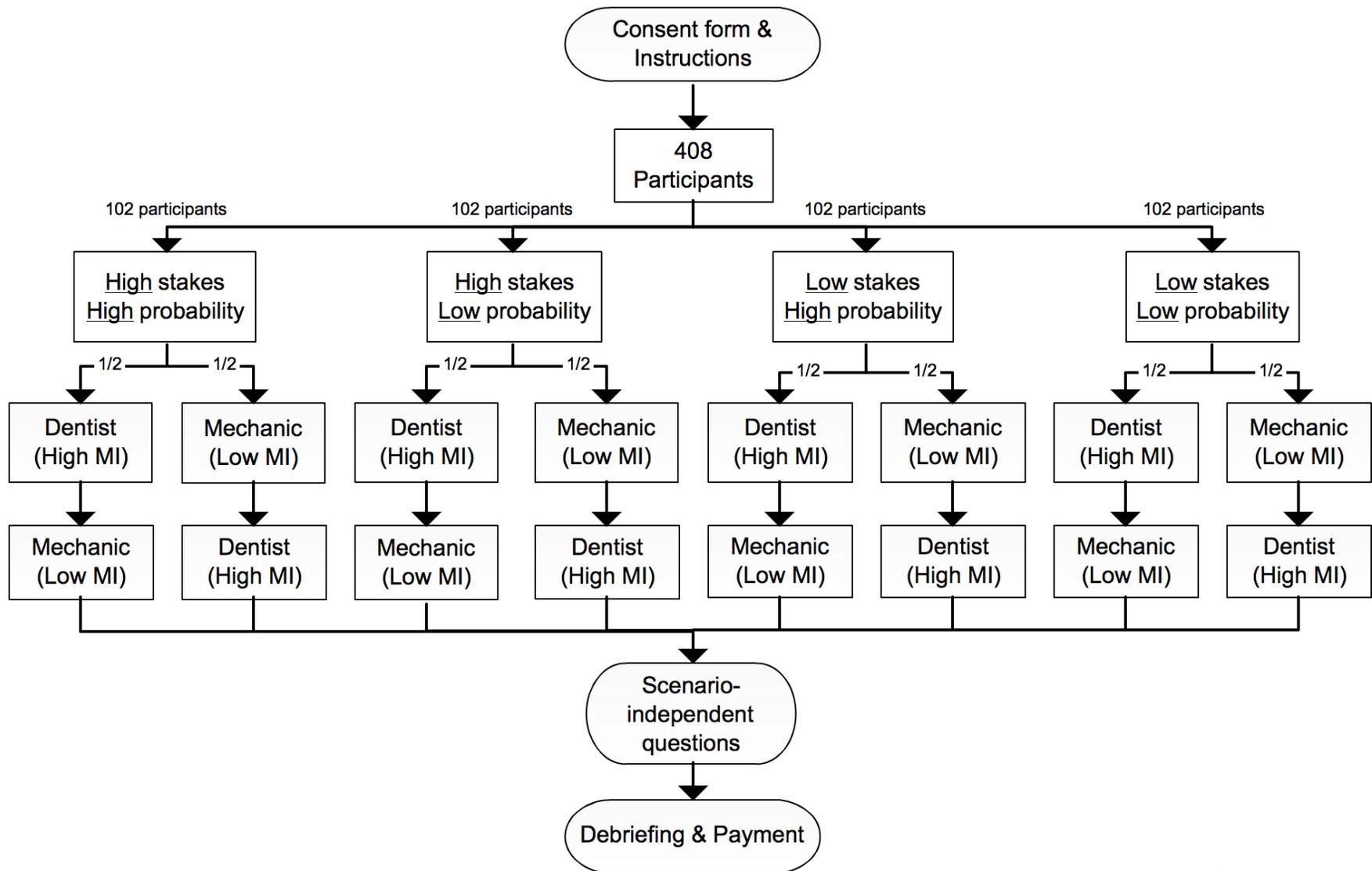


Figure III-a. Flow map of the survey: Scenarios and conditions.

Manipulation of the within-subjects variable.

The within-subjects variable (moral intensity) was manipulated by varying the descriptions of the six moral intensity dimensions (i.e. magnitude of consequences of an action; social consensus; probability of effect of an action; temporal immediacy; proximity; concentration of effect) in the unethical issues. One of the scenarios involves an unethical issue in which a dentist has the chance to replace high quality dental crowns with inferior ones and deceive the patients about what was done. Such a deceptive act is likely to cause monetary cost to patients for replacement in the future. The moral intensity dimensions in this scenario were manipulated at a high level (see scenario details in Appendix 1), whereby the contents were designed to reflect a high level intensity in all of the six dimensions. For instance, the monetary cost to patients is high (great magnitude of consequence), and the dentist is familiar with the patients (high proximity), etc. Since most of the participants were based in the United States and variance in their understanding of dental insurance may have altered their perception of patient cost, a description indicating that such insurance would not cover the cost of crown replacement was added into the scenario. In addition, the participants' perception of the patient's possible cost was measured on a 7-point Likert scale, in order to test their level of agreement on the amount of the cost described in the scenario. The pilot tests showed that the participants understood that patient cost (Mean = 6.73) was high, thus confirming the successful manipulation of this element of moral intensity. Another scenario concerned a mechanic who had the chance to replace minor engine components with cheaper ones and deceive the customers about what was done, which might cause almost no harm for customers in the future. Compared with the dentist scenario, the moral intensity in this scenario was manipulated at a lower level (see scenario details in Appendix 1), that is, the contents were designed to reflect a low level intensity for each of the six

dimensions. For example, the monetary cost to customers is much lower than for patients in the dentist scenario (smaller magnitude of consequence) and the mechanic does not know the customers (low proximity), etc.

Validation check of within-subjects manipulations.

Following Paolillo & Vitell (2002), a 6-item moral intensity measurement (see Appendix 2) was used as a manipulation check of the questions for the degree of moral intensity (one item per dimension: magnitude of consequences, social consensus, probability of effect, temporal immediacy, proximity, and concentration of effect). Participants rated their agreement on a 7-point Likert scale, ranging from “1= Strongly disagree” to “7=Strongly agree”. Since the present study focuses on the effect of different degrees of the overall moral intensity instead of how each dimension influences intentions/decisions to deceive, the scores for the six items were aggregated into one construct of moral intensity following the corresponding literature (e.g., Morris & McDonald, 1995; Jones, 1991). Higher overall scores indicate a higher intensity of an unethical issue (Jones, 1991). According to the pilot tests of the scenarios, the manipulation of the within-subjects variable was successful. That is, the participants’ perception of the difference between the high and low levels of the moral intensity variable was significant, according to the t-test on the aggregated score of ratings on the six dimensions of moral intensity (introduced below): $t(21) = 11.07, p < .001, \text{Mean} = 33.16 \text{ vs. } 20.47$. The success of this manipulation was also confirmed in the formal study: $t(407) = 55.80, p < .001, \text{Mean} = 35.94 \text{ vs. } 17.89$, showing that the dentist scenario was perceived as presenting higher moral intensity than the mechanic scenario.

Manipulation of the between-subjects variables.

First, the probability of receiving a negative consequence of deceiving was manipulated by varying the likelihood (90% vs. 10% chance) that the dentist/mechanic would lose 25% of their patients/customers. The negative consequence of deceiving (loss of 25% of customers/patients) that participants could receive this was controlled for all experimental groups, as it was not a target variable. Since there might be different perceptions of the given degree of negative consequence, this controlled variable was tested as a covariate so as to prevent its potential impact on the results. Second, the degrees of negative consequence (i.e. the stakes) of not to deceive were manipulated by constructing a description regarding the individual's (the dentist/mechanic in the scenarios) economic situation. In the higher stake group, the dentist/mechanic was under serious economic pressure with a danger of bankruptcy, and gaining money from the deceptive act was their last chance to improve the problem. In the lower stake group, their economic situation was fine and their life quality could be maintained at a normal level even if not undertaking the deceptive act. Please also refer to the flow map of the study for the random assignment of conditions (Figure III-a).

Validation check of the between-subjects manipulation.

The two between-subjects variables formed the four experimental conditions of the scenarios (see Appendix 2). The manipulation questions were included to assess the level of the participants' agreement on statements regarding: (1) the degree of negative consequence that they would experience if they abstained from the proposed deceptive action and (2) the probability that they, in the scenario, would receive the negative consequence of deceiving. Participants rated their agreement on a 7-point Likert scale, ranging from "1= Strongly disagree" to "7=Strongly agree". Successful manipulation of the above two variables should result in

significant difference in the participants' perception between the high and low levels of each of the between-subjects variables.

According to the pilot tests of the scenarios, manipulation of the two between-subjects variables was successful. That is, the participants' perception of the difference between the high and low levels of each between-subjects variable was significant according to the t-tests performed on each of the scenarios. The difference in the perception of probability between high and low levels: $t(20) = 19.00$ (dentist scenario); $t(20) = 5.58$ (mechanic scenario), $p < .001$. Mean = 1.63 vs. 6.82. The difference in the perception of stakes of not to deceive between high and low levels for the two scenarios: $t(20) = 18.34$ (dentist scenario); $t(20) = 11.24$ (mechanic scenario), $p < .001$. Mean = 1.36 vs. 6.64. The participants' rating of the above variables appeared to be highly consistent across the two scenarios within the same survey (probability: $\alpha = .90$; stakes of not to deceive: $\alpha = .99$).

In the formal study, manipulation of the two between-subjects variables was also successful. That is, the difference between participants' perception of the high and low levels of each between-subjects variable was also significant, according to t-tests after being performed on both of the scenarios. The difference in probability between high and low levels was: $t(406) = 55.74$ (dentist scenario); $t(406) = 55.16$ (mechanic scenario), $p < .001$. Mean = 1.73 vs. 6.50. The difference in the stakes of not to deceive between high and low was: $t(406) = 77.27$ (dentist scenario); $t(406) = 70.10$ (mechanic scenario), $p < .001$. Mean = 1.24 vs. 6.54. The participants' rating of the above variables also appeared to be highly consistent across the two scenarios within the same survey (probability: $\alpha = .96$; stakes of not to deceive: $\alpha = .98$).

2.5. Measurements of the dependent variable

Intention to deceive.

Participants' intention to engage in the proposed deceptive act was the target dependent variable of this study and was measured using a 3-item measurement, adapted from previous research (e.g., Mayo & Marks, 1990; May & Pauli, 2002; Hunt & Vitell, 1986). The items (see Appendix 2) were adapted based on the content of each scenario, for example: "I would deceive the patients (by covertly replacing the high quality dental crown with an inferior one and charging the agreed higher price)." The participants rated their level of agreement on a 7-point Likert scale, ranging from "1=Strongly disagree" to "7=Strongly agree". Responses to reverse questions were reversely scored and higher scores indicate a greater likelihood of engaging in the proposed deceptive act. Since similar items were used to assess the intention, high reliability was obtained for both of the scenarios (Cronbach's alpha = .94 for dentist scenarios; .97 for mechanic scenarios).

Decision to deceive.

The variable of decision was not the target dependent variable of this study, but was assessed so as to validate that participants' ratings of intentions predict their final decisions. The predictability of intentions was later tested using this measurement of decisions. The decisions as to whether or not to undertake the proposed deceptive act were assessed by three items with reverse statements, so as to increase the reliability. That is, the participants made their decisions regarding three statements (e.g., "I decide to deceive the patients", see details in Appendix 2). Responses to reverse statements were reversely scored. Since similar items were used and the participants were instructed to make sure their choices on the three items were consistently indicating the action of either to or not to deceive (this is because they can only have one decision per scenario), high reliability was obtained for both scenarios (Cronbach's alpha = .97; 1.00).

2.6. Measurements of covariates

Moral judgments.

Moral judgments were assessed and tested as covariates as they may play an essential role in influencing the effect of situational factors on intentions (as stated in Section 1). Following previous research assessing moral judgments, a 4-item scale constructing the “moral equity” dimension of Reidenbach & Robin’s (1990) ethics scale was included. For this, the participants were required to provide an evaluation of the unethical issue described in each scenario, regarding four aspects, such as “unjust - just” and “not morally right - morally right” (7-point scale). Higher scores indicate the judgments of a more “ethical” action (Barnett & Valentine, 2004), and also reflect participants’ beliefs about subjective norms as proposed in the framework of planned behaviour (Ajzen, 1991a/b). The Cronbach’s alpha coefficient for this scale was .73 for the dentist scenario, and .89 for the mechanic scenario, which supported the reliability of the scales (see details in Appendix 2).

Ethical ideologies.

Ethical ideologies in relation to participants’ personal values of unethical activities were also considered to influence the effects of the manipulated situational factors (as discussed in Section 1) on intentions and thus were tested as covariates. They were measured by the widely used 20-item (10 for idealism and 10 for relativism) ethical position questionnaire (EPQ) (Forsyth, 1980) (see Appendix 2), with the participants rating their agreement on the 20 statements using a 7-point Likert scale ranging from “1= Strongly disagree” to “7=Strongly agree”. Higher scores indicate stronger idealism in the associated statements and lower ones represent lower relativism for those statements pertaining to this factor. This measurement was

presented after completion of the scenario-based questions. The Cronbach's alpha coefficient for this scale was .89 for idealism and .87 for relativism.

Social desirability.

Social desirability was found to indicate participants' impression manipulation (also referred to as "social desirability bias"), while making responses (Randall & Fernandes, 1991) and thus it was tested as a covariate. It was measured by a 10-item short form (Ballard, 1992) of Crowne and Marlowe's (1960) social desirability scale (Appendix 2). An example statement was "There have been occasions when I took advantage of someone." Participants chose "True" or "False" besides each and the overall score was calculated based on their choices, with higher scores indicating a higher degree of social desirability. The Cronbach's alpha for this scale tested in this study was .71.

Personality.

A short form 10-item personality inventory (Gosling et al., 2003) was used in this study (Appendix 2) and the personality factors were tested as covariates given their potential effect on the results (as introduced in Section 1). Participants rated their agreement on a 7-point Likert scale ranging from "1=Strongly disagree" to "7=Strongly agree". An example statement was: "I see myself as extraverted, enthusiastic." Moreover, the scores on the five personality dimensions were tested as covariates in the data analysis. Similar to the previous findings (Gosling et al., 2003), the Cronbach's alpha for the scale was not high, but it was still used in this study as Gosling et al. reported high test-retest validity for this scale (Cronbach's alpha: Extraversion = .79, Agreeableness = .50, Conscientiousness = .63, Neuroticism = .80 and Openness = .66).

Demographics.

In line with the possible effects of demographics found in previous research (introduced in Section 1), the relevant characteristics were assessed at the end of the survey (age, gender, nationality, country of residence, years of full-time working experience, highest education level, and current occupation) (see details in Appendix 2). The options for the education level and occupation categories were adapted from *The American Community Survey*. These variables were coded and tested as covariates to prevent their effect on the results. The names of countries in the variables “nationality” and “country of residence” were recoded into two levels (western and nonwestern countries).

Other covariates.

As introduced in Section 1, the negative consequence of deceiving that participants may receive was controlled throughout the scenarios of all the experiment conditions (i.e. participants may lose 25% of patients/customers as a negative consequence of deceiving). One question (see Appendix 2) was included to assess participants’ agreement regarding the degree of such loss so as to assess their perception of this controlled variable. The perception of gaining from deceiving was also tested as covariates in the main analyses (according to Section 1), with participants rating their level of agreement on a 7-point Likert scale ranging from “1= Strongly disagree” to “7=Strongly agree”. These two variables were included in the covariates in order to test and prevent their effect on the results.

For filtering purposes (detailed in Section 3.1) during data collection on Amazon Mechanical Turk, additional validation check questions were presented following each scenario. Participants were instructed to select the correct description of the details of the given issue (e.g., “if the inferior dental crown to be used on the 5 patients failed, they may need to pay additional money for a replacement”, see Appendix 1). The validation check question, together with the

manipulation check questions were used in the first step of the filtering process and participants who failed more than one such question were removed from the valid pool.

3. Data Analysis and Results

3.1. Filtering the invalid responses

Given the possibility that participants may not follow the instructions of a study while completing a self-administered survey online (Best & Krueger, 2004), two filtering steps were performed to exclude invalid responses. In Step 1, invalid responses were identified when those participants failed the manipulation check and validation questions introduced in Section 2.1. In Step 2, those whose responses for the three item “decision to deceive” indicating inconsistent decisions (where they were instructed to make sure their responses to the three items led to a consistent decision, i.e. deceive or not to deceive) were excluded from the final data analysis process.

3.2. Testing the predictability of intentions

In order to test the validity of ratings on intentions, the decision to deceive was assessed to test whether participants’ intentions could predict their subsequent decisions regarding the deceptive act. Therefore, the first step of the data analysis concerned the test of predictability of participants’ rating of intention to deceive. Logistic Regression Analysis was performed for both scenarios following this goal, and the results confirm that the ratings of intention to deceive predicted the decisions (i.e. to deceive or not to deceive) in both the dentist and mechanic scenarios. A test of the model against a constant only model was statistically significant, indicating that the predictor (i.e. intention) reliably distinguished between the decisions to deceive and decisions of not to deceive (Dentist scenario: $\chi^2 = 61.42$, $df = 1$, $p < .001$; Mechanic scenario: $\chi^2 = 363.20$, $df = 1$, $p < .001$). The coefficient for the variable of intention

has a Wald statistic equal to 46.26 (dentist scenario) and 95.11 (mechanic scenario), which were both significant at the $p < .001$ level, with an “odds ratio” of 3.06 ($df = 1$, CI_{95} [2.22, 4.22]) for the dentist scenario and 6.26 ($df = 1$, CI_{95} [4.33, 9.05]) for the mechanic scenario. This indicates that when the ratings of intention to deceive was raised by one unit (one point at the 7-point scale) the participants were three more times likely to decide to deceive in the dentist scenario and six more times likely in the mechanic scenario. The overall success prediction was 95.30% (dentist scenario) and 93.90% (mechanic scenario). In line with this, intention to deceive was considered to be a valid variable that could predict participants’ further decisions in both scenarios and was therefore included as a valid dependent variable in the formal data analyses.

3.3. The effect of probability, stakes, and moral intensity on intentions

Mixed Design of Analysis of Covariance (ANCOVA) was conducted for the dependent variable of deceptive intentions. ANCOVA is built on the basis of Analysis of Variance (ANOVA), which compares means of dependent variables (i.e. the value rated by participants indicating their intention to deceive) from different groups (conditions of independent variables) of participants. On the basis of this, ANCOVA included covariates (e.g., variables systematically vary between conditions of independent variables) that are controlled for their possible impact on the findings through the tests that compare means (Field, 2005). Mixed-design ANCOVA was conducted with the aim to test (1) the main effect of the degree of moral intensity (within-subjects variable), probability of receiving negative consequence of deceiving (between-subjects variable), and stakes of not to deceive (between-subjects variable), and (2) the interaction effect between moral intensity (MI) and the stakes of not to deceive, as well as the interaction effect between MI and the probability of receiving negative consequence of deceiving. As explained above, the dependent variable was intention to deceive. Bonferroni pairwise comparison was

employed to reduce the chance of Type I errors (Field, 2005). Covariates, as detailed in Section 2, were entered into the analysis for the initial round of testing. The order of scenarios was tested as covariates as well, so as to test and prevent the carryover effects on the results (Kantowitz, et al., 2009). Amongst all the variables tested as covariates, moral judgments, ethical ideology, and the perception of the mechanic's gaining from deceiving were found significantly to influence the results and thus were retained in the final ANCOVA analysis.

Results of mixed-design ANCOVA.

Covariates.

Table III-1 & III-2 shows the results for the within-subjects effects as well as the between-subjects effects in the mixed-design ANCOVA conducted for the intention of undertaking deception. The retained covariates, including the perception of the mechanic's gaining from deceiving, idealism, relativism, and moral judgments, were controlled for the analysis (for exact results for the covariates please refer to Table III-1 & III-2). The parameter estimates show that except for idealism, all the other covariates have a positive relationship with the intention to deceive in the corresponding scenario. The role of covariates was discussed in Section 4.

Table III-1

Results for Mixed Design ANCOVAs – Within-Subjects Effects

Variable	Intention of undertaking deception			
	<i>F</i>	<i>df</i>	<i>p</i>	η_p^2
MI main effect	3.88	1, 399	.05	.01
MI × Stake of not to deceive	10.80	1, 399	.00	.03
MI × Probability of negative consequence	0.32	1, 399	.57	.00
Covariate				
MI × Idealism	30.24	1, 399	.00	.07
MI × Relativism	23.08	1, 399	.00	.06
MI × Moral judgement (Dentist)	9.84	1, 399	.00	.02
MI × Moral judgement (Mechanic)	56.60	1, 399	.00	.12
MI × Gain of deceiving (Mechanic)	5.20	1, 399	.02	.01

Note. MI=Moral intensity. η_p^2 = effect size estimate – partial eta squared. Significant effect of variables: $p < .05$, stated in Bold.

Within-subjects effects.

By controlling for the effect of retained covariates, a significant interaction effect between moral intensity (MI) and stakes of not to deceive emerges in the results of the within-subjects effect, where $F(1, 399) = 10.80, p = .001, \eta_p^2 = .03$. As shown in Figure III-b, the interaction between MI × stakes of not to deceive, reveals two statistically different patterns of intention to deceive in relation to these two variables: In the condition where the MI is higher, the intention to deceive is statistically higher when there are higher stakes of not to deceive ($M = 1.62, SD = 0.86$) than the lower stakes condition ($M = 1.23, SD = 0.86$), $d^{14} = 0.45$. Compared with the high MI conditions, the magnitude of changes in the degree of intention to deceive across the stake levels is significantly greater in lower MI conditions and the intention to deceive is also

¹⁴ d = Cohen's d .

statistically greater in higher stakes ($M = 3.21$, $SD = 1.43$) than the lower stakes conditions ($M = 2.30$, $SD = 1.43$), $d = 0.64$, except that the change in the magnitude of intention is more obvious (see Figure III-b). These findings support *Hypothesis 5: When the degree of moral intensity is low, the difference in the deceptive intention between conditions of higher and lower degree of stakes (i.e. the negative consequence of abstaining from deceiving) would be greater than a situation in which the moral intensity is high.*

As predicted, moral intensity also showed a trend of main effect on intentions of undertaking deception $F(1, 399) = 3.88$, $p = .05$, $\eta_p^2 = .01$, this effect is not statistically significant in the general model, whereas it is significant in multivariate tests for MI only, $F(1, 399) = 350.12$, $p = .001$, $\eta_p^2 = .47$, $d = 1.16$, showing that there are, in general, greater intentions to deceive in lower MI conditions ($M = 2.76$, $SD = 1.41$) than higher MI ($M = 1.43$, $SD = 0.81$), regardless of the stakes and probability (see Figure III-b). This supports *Hypothesis 3: Moral intensity, in general, is negatively related to the intention of undertaking deception.* Further discussion is presented in Section 4.

Figure III-b. Moral intensity \times Stakes of not to deceive

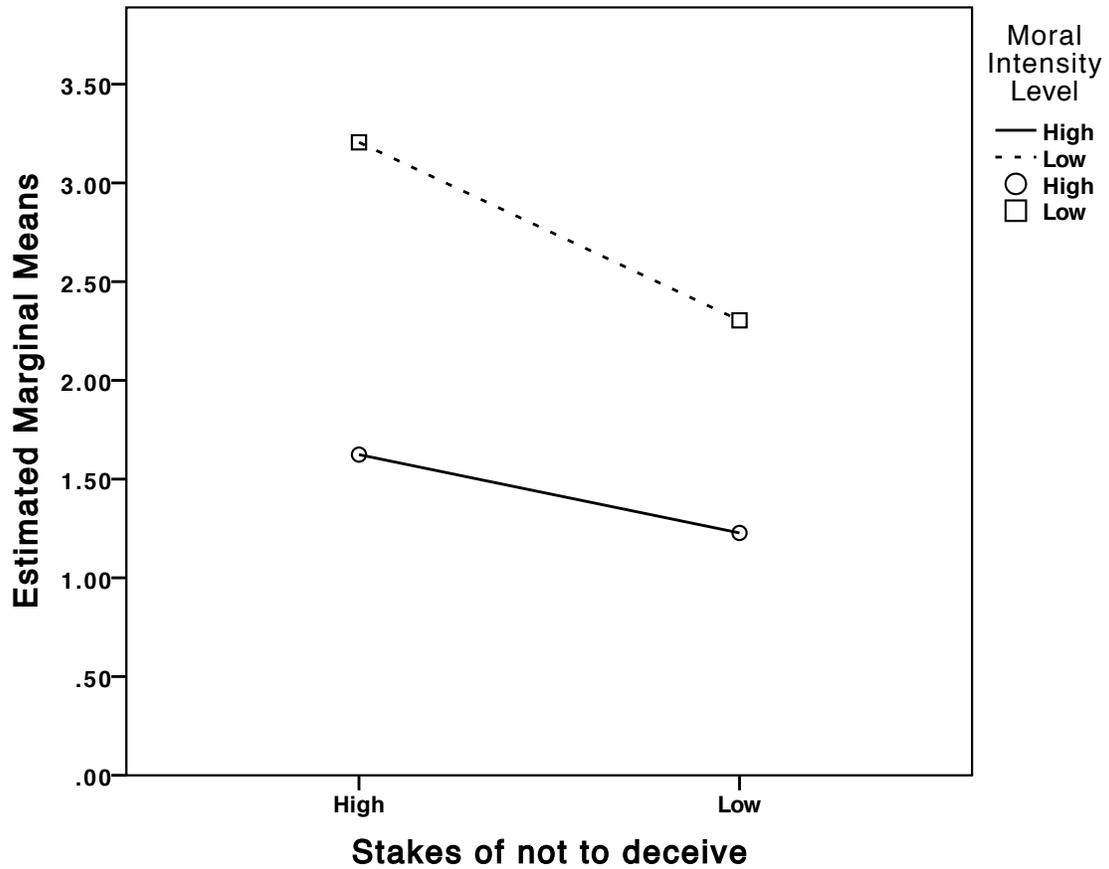


Figure III-b.

The plot shows different patterns of intention of undertaking deception across higher and lower stakes of not to deceive between the higher and lower level of moral intensity. The difference in deceptive intentions between higher and lower stakes is greater in the lower moral intensity condition than in the higher moral intensity condition.

Table III-2

Results for Mixed Design ANCOVAs – Between-Subjects Effects

Variable	Intention of undertaking deception			
	<i>F</i>	<i>df</i>	<i>p</i>	η_p^2
Stake of not to deceive	48.31	1, 399	.00	.11
Probability of negative consequence	4.66	1, 399	.03	.01
Stake × Probability	7.31	1, 399	.01	.02
Covariate				
Idealism	49.64	1, 399	.00	.11
Relativism	32.98	1, 399	.00	.08
Moral judgement (Dentist)	14.19	1, 399	.00	.03
Moral judgement (Mechanic)	51.55	1, 399	.00	.11
Gain of deceiving (Mechanic)	3.82	1, 399	.05	.01

Note. η_p^2 = effect size estimate – partial eta squared. Significant effect of variables: $p < .05$, stated in Bold.

Between-subjects effects.

The results for the between-subjects effects in the mixed design ANCOVA (Table III-2) reveal that by controlling the covariates, the stake of abstaining from deception $F(1, 399) = 48.31, p < .001, \eta_p^2 = .11, d = 0.75$, and the probability of receiving negative consequence of deceiving $F(1, 399) = 4.66, p < .05, \eta_p^2 = .01, d = -0.21$, both influenced the intention to deceive regardless of the moral intensity. Deceptive intentions are significantly greater in higher stakes to deceive ($M = 2.42, SD = 0.87$) than that in lower stakes conditions ($M = 1.77, SD = 0.87$). Such intentions are lower when there is a higher probability of receiving negative consequences ($M = 2.00, SD = 0.87$) than that in lower probability conditions ($M = 2.18, SD = 0.87$). These results support *Hypothesis 1: There will be a stronger intention of undertaking deception being expressed by individuals when the probability of receiving negative consequences is lower,*

compared with higher probability conditions; and Hypothesis 2: There will be a stronger intention of undertaking deception expressed by individuals when the negative consequence (i.e. stakes) of not to deceive is higher, compared with lower stake conditions.

Figure III-c. Probability \times Stakes of not to deceive

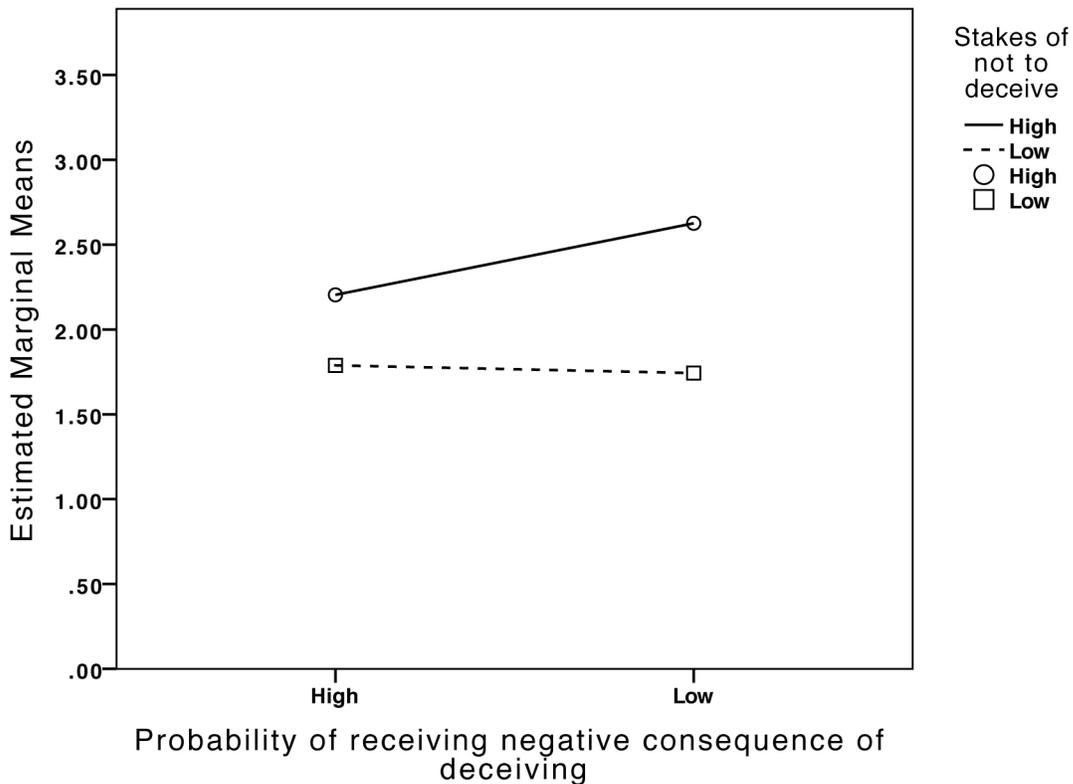


Figure III-c.

The plot shows different patterns of intention of undertaking deception across higher and lower probability of receiving negative consequence of deceiving, between the higher and lower level of stakes. The difference in deceptive intentions between higher and lower probability is greater in the higher stakes condition than in the lower stakes condition.

There was also an interaction effect (shown in Figure III-c) of these two variables $F(1, 399) = 7.31, p < .01, \eta_p^2 = .02$, showing that when the stake of not to deceive is high, intention to deceive is significantly altered by the probability of receiving negative consequences (higher

probability: $M = 2.20$, $SD = 0.91$; versus lower probability: $M = 2.62$, $SE = 0.91$), $d = -0.46$.

However, when the stake of not to deceive is low, probability does not statistically significantly influence the intention to deceive. Further discussion is presented in the next section.

4. Discussion

The present study tested the effect of three situational factors (i.e. probability of receiving negative consequence of deceiving, stakes of not to deceive, and moral intensity) on intentions to deceive in workplace contexts. The results support most of the hypotheses: Hypothesis 1: There will be a stronger intention of undertaking deception being expressed by individuals when the probability of receiving negative consequences is lower, compared with higher probability conditions; Hypothesis 2: There will be a stronger intention of undertaking deception expressed by individuals when the negative consequence (i.e. stakes) of not to deceive is higher, compared with lower stake conditions; and Hypothesis 5: When the degree of moral intensity is low, the difference in the deceptive intention between conditions of higher and lower degree of stakes (i.e. the negative consequence of abstaining from deceiving) would be greater than a situation in which the moral intensity is high.

The data also support Hypothesis 3: Moral intensity, in general, is negatively related to the intention of undertaking deception. Hypothesis 4 is rejected, which indicates that the interactive effect of probability and moral intensity on deceptive intentions is not found in the present study. On another hand, individual factors of moral judgments and ethical ideology are influencing the intention to deceive as predicted. Their effects were controlled for during the data analysis so as to prevent their influencing the results. In addition, my consideration about a potential effect regarding the covariate of perceived gaining of deceiving is supported in the case where moral intensity is low. A detailed discussion on the findings is presented below.

4.1. Main effects of probability and the stakes of not to deceive

Probability of receiving negative consequence of deceiving.

The probability of receiving negative consequences of deceiving is found to have a significant effect on the intentions to deceive, regardless of the effect of moral intensity. Such a finding supports that those for similar kinds of human behaviour (e.g., Ajzen, 1991b; Koller, 2005), whereby deceivers have found to consider the probability associated with negative outcomes of deceiving and hence their intentions are influenced by this (Figure III-c). I want to emphasise that the probability assessed in the present study is not exactly the same as that of being detected deceiving. That is, detection of deception is not the final outcome of deceiving, but instead an intermediary that leads to the final outcome (such as negative consequence for the deceiver), as investigated here. It might be assumed in general that individuals may consider the probability associated with both being detected and receiving negative consequences while making decisions, as in many cases the deceivers do not receive any negative consequence until they are detected.

However, there are cases in which a negative consequence does not necessarily happen to deceivers, even if they are detected (Shulman, 2007). Taking the situation described in the mechanic scenario as an example, customers traveling from other parts of the country come to the mechanic and have flawed engine parts installed in their cars. They may detect the problem in future and figure out that the mechanic deceived them. However, it is unlikely that those who are far away will go back to ask for compensation. It is possible that some of them would post their experience online, but this does not ensure that the mechanic will receive any negative consequence. I believe that the present investigation of probability associated directly with negative consequences addressed this issue and has thus emerged as being essential to studies

concerning deceptive intentions. Moreover, future studies may compare the effect of probability associated with detection of deception vs. the negative consequences, which shapes deceptive intentions and decisions.

Stakes of not to deceive.

One of the most interesting findings is that stakes of not to deceive show a strong main effect on deceptive intention, regardless of the degree of moral intensity. As proposed in Section 1, I believe that high stakes (of not to deceive) that seriously impact upon the decision-maker can lead to a decrease in the perceived ease of not to deceive (i.e. perceived behavioural control, Ajzen, 2002), which further results in reduced intention to be honest. This proposition is supported by the finding (Figure III-b): people in higher stakes of not to deceive conditions tend to give up being honest and choose to deceive more than in lower stakes conditions. Therefore, it is believed that the main effect of stakes can be explained by the predictive role of perceived behavioural control, as proposed in the theory of planned behaviour (Ajzen, 1991b/2002), which implies that individuals may be “forced to deceive” by influential factors that really matter to them. In other words, decision makers of deception are not only considering the negative outcome of undertaking deceptive actions, but are also strongly influenced by the negative outcome of not to deceive. Given this finding, situational factors indicating the negative outcome of not to deceive, such as stakes, should be investigated in more detail in the deception literature.

I also recognise the fine line between the two roles that stakes may play in the framework of planned behaviour: (1) as a situational factor influencing *perceived behavioural control*, or (2) as the negative value influencing *attitudes toward behaviour*. I considered that which role the stakes are playing is determined by the extent of their degree. When the stakes of not to deceive are affordable, the decision maker may evaluate them as have a negative value of not to deceive

and compare them with the gaining of not to deceive. In this case, the stakes of not to deceive are not necessarily leading to deceiving. However, when they are unaffordable (e.g., the serious economic pressure as proposed in this study), such a factor becomes an obstacle that reduces the degree of perceived behavioural control of being honest. Since this study is not aiming to test the framework of the theory of planned behaviour, I did not set out to test the difference between the two roles stakes can play. Future deception research could introduce a moderate level in addition to the present low stakes vs. high stakes level and assess the attitudes toward behaviour as well as perceived behavioural control (via self-efficacy (Ajzen, 2002)). By doing so, researchers may find out whether moderate stakes lead to changes in attitudes and high ones result in changes in perceived behavioural control.

Interactive effect of probability and the stakes.

The interactive effect of the stakes of not to deceive and the probability of receiving negative consequences shows that individuals who are under higher stakes conditions may also be influenced by the probability of receiving such consequences. This finding supports most decision theories under which the consequences and probabilities are two essential factors that are being considered while making decisions (e.g., Breakwell, 2007; Koller, 2005). Interestingly, this finding also shows that in low stakes conditions, the effect of probability becomes not statistically significant (Figure III-c). I consider such a finding is due to most people having the tendency of being honest (Gneezy, 2005; Lundquist et al., 2009; Shalvi et al., 2011) and when the stakes of not to deceive are low, the majority tends to be honest, therefore not needing to consider the probability associated with the negative consequence of deceiving.

However, when the stakes are high, some people enter the process of considering the deceptive option, wherein the probability of receiving negative consequence becomes important

(e.g., Breakwell, 2007; Wallsten, 1980). According to this finding, it would appear that the role of probability regarding receiving a negative consequence of deceiving is mediated by the stakes. I consider such case is only true when the stakes (i.e. negative consequence) of deceiving is less serious than the stakes of not to deceive. This is the case in the present study, where the stakes of deceiving were controlled at a moderate level, so as to prevent their effect on the results. However, when the stakes of deceiving becomes more serious than stakes of not to deceive, the factor which plays the obstacle role may be switched from stakes of not to deceive to those of deceiving. The probability associated with negative consequences of deceiving may become important in all conditions and may not be mediated by the stakes of not to deceive. Future studies comparing deceptive intentions across the different conditions associated with high vs. low stakes of not to deceive, and stakes of deceiving are highly recommended. On the basis of these findings, I consider that (1) the role of the stakes of not to deceive may be different (either to influence perceived behavioural control, and/or to influence attitudes toward behaviour) depending on their degree, and (2) the relationship between the stakes and probabilities may depend on which of the former are higher, the stakes of not to deceive, or those of deceiving. As proposed above, future studies investigating these propositions are recommended.

4.2. Effect of moral intensity and its interaction with the stakes

The finding of the effect of moral intensity supports it as being an essential factor that influences ethical decision-making (e.g., Karacaer et al., 2009; Kish-Gephart et al., 2010; Leitsch, 2006) and deceptive intentions. As proposed by Jones (1991), moral intensity is highly relevant to the situation where the unethical action may take place. The finding here confirms that ethical/unethical decisions including deception are highly influenced by the situations (Church et al., 2005; Craft, 2013).

Interestingly, the interactive effect of moral intensity and the stakes found in the present study indicates that these two factors moderate each other's influence on deceptive intentions. On the one hand, decision makers in higher moral intensity conditions are more likely to avoid unethical actions than under lower moral intensity conditions (in line with, e.g., May & Pauli, 2002; O'Fallon & Butterfield, 2005). That is, when the moral intensity is high (as shown in Figure III-b), most participants are inclined to avoid deceiving and it becomes of not much importance to them to consider the stakes of not to deceive. However, decision makers are less likely to avoid unethical actions when the moral intensity is low (Figure III-b). When the moral intensity is low, some participants may enter the process of considering deceiving when they are facing high stakes of abstaining from deceiving and thus the effect of stakes of deceptive intentions are greater than those under high moral intensity conditions.

On the other hand, the stakes of not to deceive significantly influence the intent to do so in both the high and low moral intensity conditions. The extent of the effect of the factor of stakes appears greater in the low than the high moral intensity condition. This suggests that the effect of stakes of not to deceive is not eliminated by that of moral intensity. Instead, the main effect of moral intensity in the general model has been reduced by the moderation effect of the stakes, leading to a trend but not a statistically significant effect on deceptive intentions.

According to my knowledge, such an interactive effect between moral intensity and the stakes of not to deceive has not been reported in the existing deception literature. That is, although there are a few previous studies that have assessed the effect of other factors proposed in theory of planned behaviour along with moral intensity (e.g., Chen et al., 2009; Flannery & May, 2000), none of them has manipulated factors and assessed the interactive effect between the stakes of not to deceive and moral intensity, as in the present study. For example, Flannery

and May (2000) in their study assessing environmental ethical decision-making investigated the role of components in the theory of planned behaviour framework and their relationship with the single element of negative outcomes for the victims in the moral intensity construct. Given the purpose of testing their model was to combine the theory of planned behaviour and moral intensity, they used scales to measure attitudes, subjective norms, and indicators of perceived behavioural control directly. Such an approach is different from the present study, which does not focus on framework testing, but on investigating the causal relationship between the deceptive intentions and factors in relation to theory of planned behaviour and moral intensity. The causal relationship between the interactive effect and deceptive intentions found in the current study supports my first attempt to understand the relationship between such a unique combination of factors (stakes of not to deceive and moral intensity) as well as their effect on deceptive intentions. This research also provides empirical evidence supporting that the factor concerning the negative outcome in relation to victims of an unethical issue (e.g., moral intensity) and that on decision makers of such an issue (e.g., stakes of not to deceive) are both important in the decision-making process of unethical behaviour. The findings also support the view that some individuals are strongly influenced by moral values or moral intensity, whereas others are more self-focusing (Pitesa & Thau, 2013).

Although the probability of receiving negative consequences of deceiving has shown a main effect on the intention to deceive, no significant interactive relation has been found between moral intensity and the probability of receiving negative consequences. Such a finding suggests that the effect of probability is attenuated by moral intensity, which may indicate that the latter, being concerned with the victims of deception is more influential than the probability regarding the negative impact of deceiving on the deceivers. However, since the impact (i.e.

stakes) of deceiving on the deceiver was controlled to be moderate, I could not use the present data to confirm this possibility and therefore, further studies are required to examine this question in more detail using manipulations of the stakes of deceiving.

4.3. Effect of covariates

As predicted in Section 1, moral judgments and ethical ideology both show significant effects on the intentions of undertaking deception. These also support the previous findings concerning the predictability of Rests's model (1986) on ethical decision-making (see review in Craft, 2013; O'Fallon & Butterfield, 2005). Such factors were retained as covariates in the data analysis so that their effect on the findings is prevented. Amongst the two individual factors, moral judgments reflect personal value of ethical behaviour in response to situations where unethical action occurs (Pan & Sparks, 2012), which is also reflecting the subjective norms proposed in the planned behaviour framework (Ajzen, 1991a/b). Ethical ideologies are more relevant to individual value orientations independent from the characteristics of the issue (Barnett et al., 1994). The confirmation of the significant effects of these individual aspects in the results suggests that studies assessing situational factors should control the effect of such individual factors, otherwise they may become "ghosts" influencing the unethical intentions that are working behind those being manipulated.

The last covariate that significantly influences the results is the perception of the mechanic's gaining from deceiving. Regarding this, the mechanic scenarios were designed to describe lower moral intensity, where the victims' monetary loss was significantly lower than that for the dentist ones. In the scenario (see Appendix 1), the victim's monetary loss emerged as having the same value as the gaining of the mechanic/dentist and thus I consider the perception of gaining may influence the results. This consideration is confirmed in the finding in the

mechanic (low moral intensity) scenarios, possibly because in the high moral intensity conditions (dentist scenario), very few participants tend to deceive. Thus the gaining from deceiving is not considered by them and therefore does not play a significant role in altering their intentions. That is, more participants intend to deceive under low moral intensity conditions (mechanic scenario) and gaining from deceiving becomes an important factor that influences their deceptive intentions (i.e. those who consider this is a high gain are more likely to deceive and vice versa (Burke, 2010)). Again, as discussed in Section 4.1, it is highly recommended for future studies to assess how gaining and the stakes (i.e. negative consequence) of deceiving work with gaining and the stakes of not to deceive in altering deceptive intentions. Evidence of other individual factors, such as demographics and education experience, found in previous studies (O'Fallon & Butterfield, 2005; Valentine & Rittenburg, 2007) was not found, leaving the question about their effect on deceptive intentions for future studies.

4.4. Limitations

The present study has four main limitations. Firstly, as a survey study it relies on the self-reporting of questions/statements. Although self-administered measurements are widely used in the business and psychology fields (e.g., Detert et al., 2008; Thomson & Siegel, 2013), they may lead to impression management biases caused by social desirability (Valentine & Hollingworth, 2012). In order to mitigate this problem, social desirability has been measured in the present study and tested as a covariate (not significantly influencing the results). Nonetheless, future research that employs approaches that do not rely on self-administered data (e.g., behavioural tasks) is highly recommended. Second, although it is common to use scenarios in business ethics research (reviewed by O'Fallon & Butterfield, 2005; Weber, 1992), however, the hypothetical scenarios may deviate from real world situations involving unethical decision-making and

actions (Leitsch, 2006). Nonetheless, by altering descriptions regarding the variables manipulated in this study, the scenario approach has helped me to employ experimental manipulations in this study, which is difficult to execute in a real life setting. I also used multiple scenarios that have been tested in previous research to improve the validity of the scenarios, as well as the diversity of the workplace contexts under investigation (Sweeney & Costello, 2009). Third, although the intention of undertaking unethical actions is widely assessed as a key dependent variable in business ethics research (e.g., Celuch & Dill, 2011; Craft, 2013; Pan & Sparks, 2012), deceptive intentions may not predict actual deceptive behaviour in the real life workplace context. I tried to mitigate such a problem by assessing self-reported decisions of deception and testing the predictability of intentions by using participants' responses to these decisions. However, future research investigating actual deceptive actions is still a very important step beyond the present survey approach. The last limitation is that the online interface, AMT, is considered to have biases of population regarding culture and income (e.g., Ross et al., 2010). I thus measured demographic information from many aspects (detailed in Section 2 & Appendix 2) and tested them as covariates. Similar to Ross et al. (2010), the data do appear to have biases on cultural background (most of the respondents were western) and income (most of them had low incomes). However, all of the demographic characteristics were not found to be significantly influencing the results and thus none of them were retained. It is, nonetheless, recommended to conduct future research using a population with a wider cultural diversity and income range. Cross-cultural comparison would also be interesting as the subjective norms and ethical environment of organisations might be different under diverse cultural backgrounds (e.g., Brunton & Eweje, 2010; Smith, 2012; Wang & Leung, 2010).

4.5. Implications

Theoretical implications.

Understanding how individuals make decisions regarding unethical issues in the workplace is one of the most researched topics in the workplace ethics field (Craft, 2013; May & Pauli, 2002; Mudrack & Mason, 2013). This study focuses on the effect of three factors (i.e. probability, stakes, and moral intensity) that may influence unethical deceptive intentions, based on the theories of planned behaviour and decision-making, Rest's four-component model as well as the issue-contingent model from social psychology and ethics research literature. Specifically, the present research contributes to the literature in relation to four key aspects: First, it provides empirical evidence to the deception literature about the roles of the three situational factors in altering deceptive intentions. While many deception studies have confirmed that the reward for deceiving motivates deception (e.g., Bond et al., 2013; Van Swol et al., 2012), this study raises the issue that people may also be "forced to deceive" when a serious negative consequence of abstaining from doing so is present. Further evidence is provided that such "forced deception" occurs more in less harmful situations (low intensity) than more harmful ones (high intensity). I believe that such a combination of factors is seldom investigated in the deception literature and more studies examining the effect of the stakes of being honest and the impact on the victims (moral intensity, Jones, 1991) of deception could be conducted based on the present findings.

Second, since the factors assessed in this study are inferred from theories in the social psychology and ethics research fields, the confirmation of the factors' effects potentially supports these theories. Specifically, the probability of receiving negative consequence of deceiving is related to attitudes toward deceiving in the planned behaviour framework (Ajzen, 1991a/1991b). By finding the significant effect of probability on deceptive intentions, the present work gives empirical evidence that supports the causal relationship between the probability and

behavioural intentions. Although attitudes were not assessed directly in the study, they were indirectly assessed via the manipulation of probability. Such a causal relationship is not easy to establish in traditional studies testing the theory of planned behaviour, which is usually undertaken via the approach of scale measurements and regression analyses (Ajzen, 1991b). The effect of probability also confirms general decision-making theories that decision makers not only consider values associated with each outcome of their options, but also the probability that the outcome will happen to them (e.g., Emblemståg & Kjølstad, 2002; Koller, 2005). The strong effect of the stakes of not to deceive, considered being an external factor determining the perceived behavioural control of decision makers, indirectly supports the predictability of perceived behavioural control on behavioural intentions, as proposed by Ajzen (1991b). The significant effect of the covariate moral judgments, covering the characteristics of subjective norms proposed in the planned behaviour framework (Ajzen, 1991a/b), also indicates that such norms can predict behavioural intentions. These findings all indicate that the theory of planned behaviour applies to deceptive intentions.

In addition to the indirect support to theory of planned behaviour, the effect of moral intensity on deceptive intentions also supports the role of this situational factor in predicting unethical intentions, as suggested in Jones' (1991) issue-contingent model of ethical decision-making. This finding further suggests that the role of moral intensity can be moderated by the stakes of not to deceive, indicating that the effect of factors proposed in the issue-contingent model (e.g., moral intensity) and the planned behaviour framework (e.g., perceived behavioural control) may work together in predicting ethical/unethical intentions. Such a finding may inspire future studies targeting effective factors influencing ethical/unethical decision-making and deceptive intentions. Moreover, researchers interested in building a more comprehensive model

of ethical decision-making may also wish to draw on the empirical evidence from this study as it involved deploying factors from different fundamental theories.

Third, a similar factor concerning probability associated with negative outcomes for deceiving is found to lead to an increased negative affect and tense emotions while deceiving (Zhang et al., 2013a/b, own publications that Chapters IV - V base), with such emotions belonging to the fundamental psychological processes of deception (Ekman, 1992). The situational factors in relation to the negative outcome for the decision-maker (e.g., deceivers) are important elements in decision-making processes of human behaviour (e.g., Adair, 2007; Schwenk, 1984), which is highly relevant to self-regulation (Vohs et al., 2008). In line with this, the finding supports my view that self-regulation influences the deliberate deception assessed in this study and the factors influencing self-regulation have an impact on intentions to deceive, as introduced earlier in Chapter II.

The last major contribution is that the significant results emerging from this study support the view that the employment of a mixed-design experimental survey can be a useful approach to assess ethical decision-making via the manipulation of the designated variables. This is because it overcomes the disadvantages of the widely used cross-sectional survey design in the ethics research field (e.g., Valentine & Bateman, 2011): researchers are unable to make conclusions of causal effect since they do not manipulate the variables in such surveys. Moreover, mixed-design (including within- and between-subject design) reduces the need for a high population for the between-subjects design, by manipulating factors that are sensitive to individual differences as within-subjects variables (i.e. moral intensity in this study). Therefore, future studies assessing unethical decision-making are recommended to use experimental manipulation and mixed design as employed in this study.

Practical implications.

The findings of this study may also have practical implications that can help human resource professionals in business organisations and professional associations to develop appropriate training and development programmes targeting the influential factors that may prevent and control harmful deceptive behaviour in the workplace. Regarding this, the results indicate that moral value, such as judgments and ethical ideology, moral intensity of the moral issue, as well as individuals' own economic situation and their probability of receiving negative consequence of deceiving, are crucial factors influencing deceptive or unethical intentions. While individual factors may be measured by human resource professionals, the probability of receiving negative consequence of deceiving can also be increased effectively by establishing monitoring/evaluation systems. Providing support or counseling services for employees who having economic problems may also be a possible approach to reduce unethical behaviour. The findings of this research may also benefit practitioners in better predicting and controlling deception or unethical actions by analysing the situational factors, such as the degree of moral intensity regarding the particular issue, the probability of receiving negative consequence, as well as the stakes of not to deceive as pertaining to the potential deceivers.

4.6. Other future studies

In addition to the future studies stated above that could be conducted to improve the present one, I consider that other studies could explore the effect of situational factors on interpersonal deception in a number of directions: First, in line with the present study, the relationship between situational factors concerning the decision-makers themselves (e.g., the probability of consequence) and the situational factors concerning the victim (e.g., moral intensity) needs deeper investigation. In addition to the studies suggested throughout the

discussion above, future explorations could also target the effect of other factors influencing the determinants proposed in the theory of planned behaviour (e.g., self-efficacy in relation to perceived behavioural control, Ajzen, 1991b). In addition, the present study has assessed moral intensity as a whole construct. Other researchers may be interested in testing the effect of each of its element on the decision maker relevant situational factors (e.g., stakes of not to deceive). Other situational factors, such as the ethical climate and ethics code could also be considered together with decision-maker relevant factors. Second, this study assessed some individual factors (e.g., moral judgments) and found they have influenced the results caused by situational factors on intentions. The relationship between individual and situational factors is thus another interesting area to explore. Some well-examined individual factors such as the locus of control (e.g., Forte, 2004; Ho, 2010) was not considered in the present work and may be considered in future studies investigating interactions between individual and situational factors regarding ethical decision-making. Furthermore, there are some factors, such as private self-focus, which may influence individuals' decision preferences, while evaluating the impact on the victims of unethical actions and that on themselves as the decision maker (Pitesa & Thau, 2013). I thus suggest such a factor to be taken into account in future studies exploring the interactive effect between individual and situational factors. Third, future investigations testing similar factors as the present study, but in different contexts inside and/or outside of the workplace, are also recommended. Finally, it is possible that the present finding that a high probability predicts comparatively lower deceptive intentions, being caused by decision makers' negative emotions in relation to deception, is triggered by the high probability suggesting negative consequences of deceiving. Future studies could extend the present scope of research by investigating the effect of similar factors on specific behaviours expressed by deceivers, as they may enhance the

psychological processes (e.g., negative emotion) that elicit behavioural indicators of deception. This idea is tested in the second part of this thesis, being presented in Chapters IV-V (Papers 2 - 3).

5. Conclusion

The present study investigated the factors suggested by theories in the social psychology and ethics research fields and their effects on deceptive intentions in the workplace. Using an experimental online survey, I have eliminated the problem of traditional survey approach by drawing on the causal relationship between the manipulated factors and deceptive intentions. The key finding which has seldom, if ever, been assessed in the literature, is that a strong effect of stakes (negative consequence) of not to deceive on deceptive intentions, as well as the interactive effect between the stakes and moral intensity on deceptive intentions. This finding suggests that people may be “forced to deceive” when there are factors perceived as an obstacle to being honest. However, it has also emerged that the deceptive intentions are generally low when the deception is harmful to others and this indicates that such deceptions are more likely to happen in non-harmful cases. This finding, together with other findings in relation to the negative outcomes for deceiver (e.g., the probability of receiving negative consequences of deceiving), in general, suggests that situational factors in relation to the decision makers and the victims of deceptive behaviour are both influential in altering intention to deceive.

CHAPTER IV

PAPER 2

Deceptive Behaviour and Situational Factors:

Nonverbal Cues to Deception and the Effect of Probability of Detection

Abstract

There are many situations in which deception may arise and the specific behaviours associated with it are influenced by situational factors involved in different settings. This paper is aimed at identifying behavioural cues to deception and the effect of such factors on the exhibition of nonverbal behaviours. Amongst the four behavioural experiments in a laboratory and the field, three examine the impact of the probability associated with being detected deceiving, whilst the fourth investigates the effect of increased cognitive demand raised by duplex deception tasks including reconnaissance and lying about identity. In all four studies, cues to deception are analysed in relation to observable body movements and subjective impressions exhibited by participants. In general, the results indicate a pattern of hand movement reduction by deceivers, and suggest the notion that raising the probability of detection influences deceivers' behaviours. In addition, participants in the higher probability condition displayed increased negative affect (found in deceivers) and tension (found in both deceivers and truth-tellers) than those under lower probability conditions. During a mock security check that enhances the probability of deception detection, cognitive load induced by duplex deception tasks also leads to a greater impression of attempted behavioural control given by deceivers, compared with the situation of a single deception task.

Keywords: nonverbal cues, body movements, impressions, deception, probability, cognitive load, field experiments

Deceptive Behaviour and Situational Factors:

Nonverbal Cues to Deception and the Effect of Probability of Detection

1. Introduction

Deceivers implement their intentions to deceive others through behaviours, such as telling lies during communications with the victim or the so called the receiver of deception (Buller & Burgoon, 1996; Vrij, 2008). While engaging in deception, liars may leak behaviours that convey cues giving their lies away (Ekman, 1992/2003). As introduced in Chapter II, behavioural cues related to deception include both verbal and nonverbal indicators (DePaulo et al., 2003; Vrij, 2008) exhibited by deceivers, which are linked to three fundamental psychological processes of deception: emotion, cognitive effort, and attempted behavioural control (Vrij, 2008; Zuckerman et al., 1981, also see Table II-1). It has been argued that nonverbal cues are not as stable as some verbal indicators (e.g., Vrij & Granhag, 2012), which might be due to cues presented by deceivers being determined to some extent by the situation in which they occur (Port & tenBrinke, 2008). For example, a terrorist may not have to speak to anyone when passing through a public space, thus only nonverbal cues may be available to be assessed by others. Although the complexity of nonverbal cues to deception makes their investigation difficult, there is still a great demand for studies assessing them (DePaulo & Bond, 2012; Porter & ten Brinke, 2010). In line with this, I intend to investigate nonverbal behavioural indicators to deception, so as to provide more useful data to deception researchers and practitioners who need to spot deceivers based on this kind of cues.

In addition to passively observing nonverbal cues to deception, psychologists also attempt to explore situational factors that may alter deceptive behaviours (e.g., Vrij et al., 2008). Their

efforts have two main goals: first, they aim to understand what specific deceptive behaviours are sensitive to situational factors (reviewed by DePaulo et al., 2003; Vrij, 2008); and second, they try to identify an effective approach to detect deception via magnifying deception cues using interventions developed based on influential situational factors (Vrij & Granhag, 2012). Given the existing findings indicating that stakes of deception in relation to the consequence of deceiving could magnify deception cues (e.g., Caso et al., 2005; tenBrinke & Port, 2012), I consider that the probability of being detected associated with the consequence of deceiving may also influence these cues. This is also in line with my consideration that situational factors, such as the probability, may not only influence intentions to deceive, but also have an impact on the behaviours exhibited by deceivers (as discussed in Chapter III Section 3).

Considering the diversity of contexts in which deception may occur as well as the situational factors involved in these settings (Brown, 2006; Kihlstrom, 2013), I conducted four experiments in different research settings (see details in Section 1.2) so as to investigate specific nonverbal cues to deception exhibited in such diverse situations. I believe that gaining understanding of nonverbal cues exhibited in a range of contexts, including both the laboratory and the field in the present research, not only enriches the literature about behavioural cues in relation to deception, but also helps practitioners to spot deception in similar contexts. More specifically, this research focuses on cues that are observable to other people from a distance, so as to provide the information regarding nonverbal deception cues that could be spotted without verbal contact or in a short conversation, where lie detectors can only rely on their own eyes to detect deception. Furthermore, different forms of deception, including pure behavioural concealment without conversation are assessed in this research. The behavioural data collected

from these forms of deception can help researchers to understand whether nonverbal cues can be observed from such kinds of deception.

It has been argued that no single cue can reliably identify deception due to the lack of developed coding schemes that have generated poor results in previous studies (Vrij, 2008). Therefore, in the current research, a coding protocol (detailed in Section 2) was developed as an elaboration of a previous scheme related to cues identified across different sections of the body (Vrij et al., 1996). Moreover, impressions given by individuals based on the fundamental processes of deception (e.g., negative affect in relation to negative emotions) were also coded and tested as a part of behaviours in relation to deception.

1.1. Psychological processes underpin cues to deception

In the literature, there are many nonverbal cues related to the underlying psychological processes of deception. Some are negative emotions such as fear or guilt, whilst others are positive emotions, such as excitement, relief and pride (Ekman, 1992; Ekman & Frank, 1993; Porter & ten Brinke, 2008). There are macro negative emotional cues such as reduced hand and arm movements during speech (Vrij, 2008) and impression cues such as being pleased (Ekman et al., 1988; ten Brinke et al., 2012). In addition to the involvement of emotions, the process of lying may require extra cognitive effort as liars suppress true information whilst forming lies and remembering false information (Langleben et al., 2002; Spence et al., 2001; Vrij et al., 2008; Walczyk et al., 2005). Liars also need to monitor their own behaviour (Vrij & Mann, 2005) and their target's reactions (Burgoon et al., 2008), which places a high demand on their cognitive processing (Carrión et al., 2010). Visible cues to cognitive effort are, for instance, fewer hand and/or arm movements (Ekman, 1997; Memon et al., 2003), less blinking (Bagley & Manelis, 1979), more gaze aversion, etc. (Ekman, 1997; Doherty-Sneddon & Phelps, 2005). The last

process concerning attempted behavioural control varies at an individual level (Ajzen, 1991b) and can be influenced by emotional demands and cognitive load (Vrij, 2008). However, the deliberate behavioural regulation involved in deceiving can sometimes make a liar's behaviour appear contrived, tense, and over-controlled (DePaulo & Kirkendol, 1989; DePaulo et al., 2003; Vrij, 2008).

1.2. Nonverbal cues to deception and the effects of situational factors

Cues related to the above fundamental processes of emotion, cognitive effort, and attempted behavioural control, are not consistently presented by liars. For example, fewer hand or arm movements can be an indication of cognitive overload (Ekman, 1997; Memon et al, 2003) as well as negative emotions (Vrij, 2008). Therefore, it is widely believed that no single cue can reliably identify deception (DePaulo et al., 1985; Vrij, 2008; Vrij et al., 2001). In addition, according to Interpersonal Deception Theory (IDT) (Buller & Burgoon, 1996) liars adjust their behaviour with the aim to avoid 'dishonest' behaviours (Burgoon et al., 1996), which increases the difficulty to spot deception cues reliably. The inconsistencies of the psychological processes involved in deception are likely to due to the situational factors in different contexts (Vrij, 2008) and therefore, I consider that these factors are important determinants of deceptive behaviour.

Probability of detection: Factor in relation to the negative outcome.

Deception cues can be influenced by situational factors, such as the degree of stakes of deception (i.e. the extent of the positive or negative consequence of deception) (e.g., Hartwig et al., 2006; ten Brinke & Porter, 2012) and task complexity (Lancaster et al., 2013; Vrij et al., 2011). Such situational factors can introduce variance with regard to specific deception cues, for instance, when faced with higher stakes, liars tend to illustrate more behavioural reductions and signs of increased cognitive activity (i.e. they appear to be 'thinking hard') (Porter & ten Brinke,

2010; Vrij & Mann, 2001). In fact, researchers consider that stakes influence deceptive behaviour via the psychological processes of deception (Mann et al., 2002; Vrij, 2008). For example, high stakes of deception lead to fear emotion (Frank & Ekman, 1997), which may arouse nervousness that further results in cognitive load and behavioural control due to the effort to inhibit the inappropriate emotion (Christ et al., 2009; Porter & ten Brinke, 2008). The effect of stakes of deception suggests that deceivers' behaviour can be influenced by factors indicating the consequences of deceiving (Koller, 2005; Sip et al., 2010). Since the consideration of the value of consequences (e.g., stakes of deceiving) is an essential element in the reasoning and decision-making process of human behaviour (Ajzen, 1991b; Locke & Latham, 1990), it is likely that other factors influencing such a logical evaluation of consequences may also have an impact on behaviours exhibited by deceivers. In addition to factors concerning the extent of consequences of behaviour (e.g., stakes), the probability associated with receiving negative consequences of behaviour, as introduced in Chapter III - Paper 1, is another essential factor in the reasoning process of behaviour (Ajzen, 1991b; Breakwell, 2007; Sip et al., 2010). Hence, the probability of being detected deceiving, which is directly connected to receiving negative consequences of deceiving, may influence the psychological processes of deception similarly as the extent of the consequences of deception (i.e. stakes). Unlike the effect of the stakes of deception, not many studies have assessed the role of probability of detection in nonverbal behaviours associated with deception. To provide empirical data addressing this, I manipulated the degree of probability in this research, so as to assess how it might influence deceptive behaviours.

Duplex deception tasks: Effects of enhanced cognitive load.

As introduced in Chapter II, deceiving does not usually happen as a single event but often entails multiple deceptions such as remembering scripts, controlling behaviour and monitoring

the target's responses (Vrij, 2008). It has been found that increasing cognitive loading via interview techniques can elicit deception cues (e.g., Vrij et al., 2009). Cognitive loading may also be enhanced when the tasks involved in deceiving are complex and difficult (Lancaster et al., 2013). Taking a serious case as an example, terrorists who perform reconnaissance tasks not only need to memorise the environment, but may also need to successfully deceive about their identity, while passing security checks (O'Brien, 2008). Such a situation involves duplex deception tasks including lying about their identity and covert memorization. It would be interesting to see how deceivers' nonverbal behaviour is influenced by such task complexity (duplex deception tasks), while the probability of being detected is already high (under a security check). This question is addressed in the last study presented in this paper.

Contexts of deception.

Given the effect of situational factors and contexts recognized in the literature (introduced in Chapter II), this research assessed different contexts and situations, so as to broaden the established understanding of nonverbal deception cues in those specific settings. The present research sought to investigate situations other than the traditional laboratory settings, where participants usually remain seated throughout experiments with an interviewer. Such posture in the traditional laboratory settings restricts the mobility of the participants, which may have an impact on the nonverbal behaviours exhibited by them (Vrij, 2008, ten Brinke & Porter, 2012). In addition, deception not only takes the form of verbal statements (e.g., lying), but also behaviours without statements (e.g., concealing an object or an intention) (Vrij, 2008, Ekman, 1992). Although different nonverbal cues to deception were found in the literature, as introduced earlier, exploration of more cues in relation to diverse forms of deception, such as concealment

and verbal falsification, have been demanded (DePaulo & Bond, 2012). In line with the above, four studies were designed to assess different forms of deception in different contexts:

Study 1 - Lying in front of peers in a semi public space (a classroom).

Study 2 - Preparing alone, as well as lying during interaction with another person in a private space (in a laboratory).

Study 3 - Concealing an object while walking through a public space (an open pathway near a building).

Study 4 - Lying and performing reconnaissance tasks whilst passing through a security control point in a public space (the corridor of a building).

1. 3. Predictions and hypotheses

Predictions in relation to nonverbal cues to deception.

The general goal for this research is to investigate observable nonverbal cues in relation to deception and the influences from situational factors (i.e. probability and duplex deception). To address this goal, I needed to observe nonverbal cues exhibited by deceivers. In stead of targeting specific cues, I tested a number of nonverbal body movements across body parts, as observed by people using the coding protocol, as specified in Section 2. The investigation without a specific focus on cues is due to the wide range of potential nonverbal behaviours that may be exhibited by deceivers across the diverse contexts (DePaulo et al., 2003; Vrij, 2008) assessed in this study, and targeting specific ones may overlook other potential deception cues. In addition to nonverbal body movements, this research also investigated general impressions given by deceivers associated with the fundamental processes of deception (e.g., positive affect that indicates delight emotions), based on the literature regarding the involvement of the three psychological processes in deceiving (Vrij, 2008). Another reason for assessing impressions is

based on meta-analysis showing that intuitive feelings are effective cues for some people good at detecting deception (Hartwig & Bond, 2011). The impressions assessed based on such gut feelings of observers regarding deception may thus reveal whether such intuitive cues can be accurately interpreted when coming from deceivers.

In line with the above, four general hypotheses assessing nonverbal cues related to deception were proposed:

Hypothesis 1: Deceivers will present different amounts of observable body movements, as compared with truth-tellers.

Hypothesis 2: Impressions related to emotional process of deception (either negative and/or positive affect) will be presented by deceivers as compared with truth-tellers.

Hypothesis 3: Impressions related to cognitive effort of deception will be presented by deceivers as compared with truth-tellers.

Hypothesis 4: Impressions related to attempted behavioural control processes of deception will be presented by deceivers as compared with truth-tellers.

Predictions in relation to the effect of situational factors.

In Studies 1 and 3, the manipulation of the probability was achieved through the introduction of evaluated and non-evaluated deception conditions, given that introducing an evaluation of truthfulness increases the possibility of being detected deceiving (Ekman, 1992). In Study 2, the degree of probability was manipulated by altering the evaluators: that is, evaluations performed by a mock security staff while interacting with participants elicit a higher level of probability of deception detection, compared to evaluations performed by a lay person. Given the introduction in Section 1.2, I propose that higher probability might result in a higher extent of involvement of psychological processes. I therefore propose another two general hypotheses

(regardless of specific cues) in testing the effect of the probability of deception detection on nonverbal behavioural cues to deception:

Hypothesis 5: There will be a greater extent of observable nonverbal cue(s) (either body movement(s) and/or impression(s)) exhibited in deceivers when the probability of detection is higher, compared with lower probability conditions.

Hypothesis 6: The extent of such observable cues will be positively correlated with the level of probability of deception detection; the higher the probability the more cues will be observed.

(The greater the extent of cues such as “reduced hand movements” means even fewer hand movements.)

In order to investigate the effect of cognitive loading in a situation where the probability of detection is high, in Study 4 duplex deception tasks concerning lying about identity and reconnaissance tasks were assessed, during a security check that induced the probability of deception detection. A final hypothesis was developed accordingly:

Hypothesis 7: Deceivers performing a reconnaissance task in addition to lying will display more observable nonverbal cues than deceivers performing only one task.

Demographic characteristics (age, gender, and cultural differences) and other individual factors (listed below) may influence human nonverbal behaviours (Vrij, 2008, Vrij et al., 1997), risk-taking behaviour (Byrnes et al., 1999; Rhodes & Pivik, 2011), and the reasoning regarding undertaking deception (Ajzen, 1991b). The effect of individual factors on deceptive behaviour is recognized (Jiang et al., 2013; Wright et al., 2012; Vrij, 2008) and although they are not within the scope of this research, they were tested as covariates in the data analysis so as to prevent a significant influence on the results.

1. Big Five Scale (Goldberg, 1992) and the Big Five Inventory (John et al., 1991)
2. Public Self-Consciousness scale (PSC) the tendency to see oneself as the focus of other people's attention that relates to deceptive behaviours (Fenigstein et al., 1975; Vrij et al., 2001)
3. Ability to Control Behaviour scale (ACB) as found to relate to deceptive behaviours (Vrij et al., 1997)
4. Self-Monitoring scale (SM) in relation to self-regulation that is involved in the presence of deceptive behaviours (Carver & Scheier, 1998)

2. A Coding Protocol for Identifying Cues to Deception

Across all four studies, behaviour data were collected and edited into video clips. There were 437 clips in total (32 clips in Study 1, 210 clips in Study 2, 100 clips in Study 3, and 95 clips in Study 4) that were then reviewed and coded into numerical data, using a coding scheme based on the nonverbal cues literature (DePaulo, et al, 2003; Vrij, et al., 1996; Vrij, 2008) (Table IV-1). The specific movements coded were slightly different according to study settings and the details are presented in Tables IV-1 and IV-2. Hand and arm data were scrutinised in more detail (Table IV-2).

Three coders (MSc and PhD students in social sciences at a UK university) subjectively coded 10% of the video clips, taken as a random sample, for inter-rater reliability test purposes. A selection criterion for inter rater reliability (Cronbach's $\alpha > .70$) was applied across all four studies for each body section and impression category. Since adequate values for inter-rater reliability tests were obtained, numerical data obtained from the three coders were averaged and combined under each item with the remaining video clips that were then coded by two of the three coders. The coders were blind to the experimental conditions and coded the frequency and

duration of movements across the body sections using separate 7-point scales ranging from 1 = *exists (frequency) or brief (duration)* to 7 = *always (frequency) or whole session (duration)*. The missing values in body movement variables were coded as '0', representing the 'absent' status of movements.

As introduced in sections 1 and 1.2, detailed categorisations of impressions given by participants were also coded (Table IV-3). In Studies 1 and 2, the coders coded impressions elicited by participants in the video using a 5-point Likert scale ranging from 1 = *not at all* to 5 = *to a great extent*. The coding scheme was extended by using a 7-point scale across the same descriptors in Studies 3 and 4 to increase the sensitivity of the data.

Two filtering steps were performed on the dependent variables before data analyses were conducted:

1. In order to filter out movements that seldom occurred in the participant pool, descriptive statistics were obtained and movement variables that were shown by fewer than 30% of the participants were excluded from the data analysis.
2. As the cut-off point filtered out different variables across the four studies, the common items of dependent variables across all four studies were retained.

These filtering processes were employed given the particular purpose of this study, that of targeting nonverbal behaviours easily observable in human beings. However, it is worth noting that such processes may have influenced the significance testing of differences between conditions. For instance, an overall greater chance of significant results may have been emerged from the remaining higher frequent behavioural variables, compared with results based on all the variables including less frequent ones (less than 30%), which were filtered out following these processes.

Table IV-1

Coding of nonverbal cues - Body sections excluding hand/arm

Body sections^a	Variable name^a (movements)	Coding Details (frequency/length)
Head	Head movement (all studies)	All types (e.g. nod, shake, turn, tilt, etc)
Eye	Aversion/shifts (all studies)	Brief change of gaze direction
	Staring at other places (Study 1 and 2)	Fixed gaze direction
	Staring at folder (Study 2)	Fixed gaze in the direction of the folder
	Avoiding eye contact with others (Study 4)	Gaze aversion
	Eye/eyebrow (all studies)	Other eye movements to those above
Trunk	Indirect orientation while standing (Study 1)	Tilting at waist while being spoken to
	Lean towards other people while seated (Study 2)	Body moving toward people being talked to
	Lean back while seated (Study 2)	Body moving away from people being talked to
	Position shift (Study 2)	Changes to the way of sitting that involve multiple body parts
	Sway (Study 4)	Waist moving slowly or rhythmically from side to side
Foot/Leg	Feet and legs (all studies)	Movements of legs and feet together
	Foot only (all studies)	Movements of feet without moving legs
	Leg only (all studies)	Movements of legs without moving feet

Note. ^aBody sections/movements in Bold were included in the analysis (according to the filtering steps stated in Section 2).

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Table IV-2

Coding of nonverbal cues - Hand/arm

Body sections^a	Variable name^a (movements)	Coding Details (frequency/length)
Hands/arms	Hands and arms (all studies)	Movement of hands and arms together
	Hands only (all studies)	Movement of hands without moving arms
	Crossing arms (all studies)	Arms crossed in front of chest
	Hand(s) in pocket(s) (all studies)	Movement of hand to/from pockets
	Hand holding (Study 1 and 2)	Two hands hold together in front/behind trunk
	Hand hiding and legs (Study 2)	Holding hands between knees
	Hand and objects (Study 3)	Movements of hands holding bag or objects

Note. ^aBody sections/movements in Bold were included in the analysis (according to the filtering steps stated in section 2).

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Table IV-3

Coding of nonverbal cues – Impressions

Three Processes	Variable Name (impressions)	Coding Details (the degree of impressions)
Emotion	Positive affect	Being pleased in general throughout the session
	Negative affect	Being displeased in general throughout the session
	Tension ^a	Being tense and not being relaxed in general throughout the session
Cognitive effort	Thinking hard (Studies 1-2, 4)	Being considering carefully while talking (about the card/folder/name)
Attempted behavioural control	Attempted control	Attempting to manipulate behaviour
Task-related	Looking around (Study 4)	Observing the environment

Note. ^aTension was calculated by averaging the score of 'being tense' and the reverse score of 'being relaxed.' All variables listed were included in data analyses.

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3. Study 1 – Lying in Front of Peers

3.1. Method

Participants.

For this study, 34 University students were recruited. Participants with invalid data (e.g., incomplete/unclear video footages) were excluded. Valid data from 32 participants (17 males, 15 females, $M_{\text{age}} = 22.86$ years, $SD = 3.89$) were included in the analyses. To participate, students were required to have normal, or corrected to normal vision and hearing, as well as normal ability of body movement and communication.

Apparatus.

The experiment, conducted by three people, took place in a university lecture room. An envelope for each participant contained an instruction sheet, an evaluation sheet, and a token. The token was a small card with one of nine possible combinations of its features based on three colors (e.g., red, blue or yellow) and three shapes (e.g., heart, square or triangle). A covariate battery including a short self-rating manipulation check questionnaire assessing levels of nervousness, perception of levels of task difficulty and motivation etc., a demographic information completion sheet (e.g., age, gender and nationality), and scales assessing the individual factors specified in Section 1.3 were included. Two high-definition video cameras were used to record behaviours. Each participant received a confectionery reward for completing the study.

Design and procedure.

In this study the independent variables of deception and degree of probability of detection were manipulated in a 2 (veracity: deceptive vs. honest) \times 2 (probability level: higher vs. lower) between-subjects design and participants were randomly assigned to the four groups. Veracity

was manipulated by instructing participants to deceive or tell truth about the color and shape of the token they received. Probability levels were manipulated by whether or not asking peers of the participants to evaluate whether the participants were being deceptive about the token they had. Upon receiving an envelope containing task instructions and a token, participants were instructed not to expose the token during the experiment. Each participant stood at the front of the classroom and gave a short presentation to the audience, including their student number, name, a curious fact about themselves (e.g., “I run five miles every day”) and a description of their token containing its color and shape (e.g., “I have a blue triangle”). The content of the presentation, as related to participants themselves, was designed with the purpose of enhancing motivation to perform well by introducing self identity-related tasks (DePaulo et al., 2003).

The group ‘deceiver & evaluated’ (DE) lied about the token and were evaluated by their peers. Then the group ‘truth-teller & evaluated’ (TE) performed the task and did not lie about the token but were also evaluated by their peers. Participants in these two groups were told that the overall group ranking was to be announced later to the class members; however, this was designed purely as a mechanism to manipulate the level of probability involved in the evaluated presentations. Groups of ‘deceiver & non-evaluated’ (DN) and ‘truth-teller & non-evaluated’ (TN) participated similarly as DE and TE but were not evaluated by their peers. After their presentations, participants completed the questionnaire pack together with manipulation check questions and then received their confectionery reward for their participation. Behavioural data were recorded using video cameras and transferred into numerical data through the coding processes.

3.2. Analysis and Results

The previous research concerning behavioural indicators of deception has usually performed the analysis of variance (ANOVA) on each behavioural unit (e.g., Lancaster et al., 2013; Mann et al., 2012; Van Swol et al., 2012, etc.), so as to assess the effect of independent variables on each body movement. ANOVA is widely used given its proven ability of comparing means from different groups (e.g., high and low level of the probability, and deceive or honest conditions) simultaneously, which is a favourable feature for comparative experimental studies (Field, 2005). In line with this, a series of analyses of covariance (ANCOVA), which was built on the basis of ANOVA and additionally controls the effect of covariates, were conducted within each of the four studies for analysing body movement and impression variables. Bonferroni corrections were employed to reduce the chance of Type I errors (Field, 2005) and demographic information, including age, gender and nationality (coded into western/non-western), as well as individual variables (see reliability of scales in Table IV-4) including personality, public self-consciousness, ability to control behaviour, and self-monitoring, were assessed as covariates. The ANCOVA tests run across all four studies indicate that the covariates of the individual factors did not consistently influence the results. Thus, only the demographic characteristics were retained in the final data analyses as a consistent set of covariates across the four studies.

Table IV-4:

Reliability for the scales

	Cronbach's alpha			
	<i>Study 1</i>	<i>Study 2</i>	<i>Study 3</i>	<i>Study 4</i>
Big Five Scale/ BFI				
Extraversion	.85	.86	.84	.83
Agreeableness	.84	.80	.71	.77
Conscientiousness	.85	.85	.78	.75
Neuroticism	.82	.83	.79	.84
Openness	.42	.87	.71	.60
Public Self-consciousness Scale	.76	.73	.75	.59
Self-monitoring Scale	.69	.67	.56	.63
Ability to Control Behaviour Scale	.67	.78	.69	.76

Note. Big Five Scale was used in Study 1 & 2, whereas BFI was used in Study 3 & 4.

In this study, ANCOVAs were conducted for all dependent variables, followed by Bonferroni pairwise comparison. Age, gender and nationality (western/non-western) were retained as covariates. Based on the coding of video data, the results of ANCOVAs for the significant dependent variables are presented in Table IV-5. By controlling for the covariates including age, gender and nationality (see details in Table IV-5), a significant effect of veracity emerged for holding of hands: $F(1, 21) = 4.75, p < .05, \eta_p^2 = .18, d = 0.83$. This illustrated that hand holding was higher for liars ($M = 4.74, SD = 4.07$) than truth-tellers ($M = 1.36, SD = 4.05$). Holding of hands was classified under hand/arm movements and indicated movement reduction and moderately tense behaviour (Mehrabian, 1968). This finding supports *Hypothesis 1: Deceivers will present different amounts of observable body movements, as compared with truth-tellers.*

There was a trend towards significance for hand/arm movements for the evaluation variable indicating the probability of detection: $F(1, 21) = 4.29, p = .051, \eta_p^2 = .17, d = -0.80$. The evaluation condition yielded fewer hand/arm movements ($M = 2.19, SD = 4.61$) than the

non-evaluation condition ($M = 5.90$, $SD = 4.62$). As decreased limb movement is one of the recognised cues to deception, this finding shows some support, although not statistically significant, for *Hypothesis 5: There will be a greater extent of observable nonverbal cue(s) (either body movement(s) and/or impression(s)) exhibited in deceivers when the probability of detection is higher, compared with lower probability conditions*. Nonetheless, the finding of the trend of effect for the probability of detection across veracity conditions indicates that the same effect applies for truth-tellers as well. No covariates were statistically significant in relation to the level of probability. Values of mean and standard deviation for all the analysed dependent variables are presented in Appendix 3 Table A-1.

Table IV-5

ANCOVA results for Study 1^a

	Deception				Level of Probability			
	<i>F</i>	<i>df</i>	<i>p</i>	η_p^2	<i>F</i>	<i>df</i>	<i>p</i>	η_p^2
Movements and Covariates								
Hand and arm*	1.14	1, 21	.30	.05	4.29	1, 21	.51	.17
Age	1.58	1, 21	.22	.07	1.58	1, 21	.22	.07
Gender	1.23	1, 21	.28	.06	1.23	1, 21	.28	.06
Western/Non-western	0.63	1, 21	.44	.03	0.63	1, 21	.44	.03
Hand holding**	4.75	1, 21	.04	.18	2.24	1, 21	.15	.10
Age	5.62	1, 21	.03	.21	5.62	1, 21	.03	.21
Gender	6.98	1, 21	.02	.25	6.98	1, 21	.02	.25
Western/Non-western	0.01	1, 21	.94	.00	0.01	1, 21	.94	.00

Note. ^aInsignificant dependent variables were not listed. η_p^2 = effect size estimate – partial eta squared.

**Significant effect of variables: $p < .05$ states in Bold; *trend of significant effect of variables: $P < .055$ states in Bold.

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3.3. Discussion

This study revealed that the probability of deception detection might have a similar effect as veracity (deception) in altering nonverbal behaviour (e.g., a reduction in hand movements).

The finding suggests that not only the stakes (i.e. the extent of consequences of deception) as

found in previous research (e.g., Caso et al., 2005; Vrij, 2008), but also the probability associated with the consequences might have a magnification effect on deceivers' behaviours. However, similar to stakes, enhancing the probability of detection can lead to misjudgment as to whether or not someone is lying, since truth-tellers under higher probabilities can present similar reduced hand movements as deceivers. In addition, it is unknown whether there are unmeasured individual differences in perceiving the levels of probability of deception detection. To further address these matters, Study 2 used a within-subjects design to compare behaviour exhibited by the *same* person across *different* conditions of veracity and the probability of deception detection. Different levels of probabilities (low, moderate, and high) were assessed to investigate if the extent of nonverbal behaviours presented by the same individual is affected by increased probability levels.

4. Study 2 – Lying During Interaction with Another Person

4.1. Method

Participants.

For this study, 40 University students were recruited. Participants with invalid data (e.g., incomplete/unclear video footages) were excluded. Valid data from 35 participants (7 males, 28 females, $M_{\text{age}} = 27.40$ years, $SD = 7.91$) were included in the analyses. To participate, students were required to have normal, or corrected to normal vision and hearing, as well as normal ability regarding body movement and communication.

Apparatus.

Each participant received a folder containing either one article (about education) or two articles (one about education and another about deception). The same covariate battery was used from Study 1, together with manipulation check questions. Two high-definition video cameras

were used to record behaviours. This study was conducted by three experimenters, two of whom played the roles of confederates (e.g., ‘student’ and ‘security guard’). Each participant received a £5 voucher as well as a confectionery reward for completing the study.

Design and Procedure.

In this study the independent variables of deception and probability were manipulated in a 2 (veracity: deceptive vs. honest) \times 3 (level of probability: low vs. moderate vs. high) within-subjects design, and the assignment of the six conditions was counterbalanced. Participants either deceived or told truth about the articles they had in each condition. The level of probability of deception detection was manipulated with the confederates engaging in face-to-face evaluations regarding the veracity of participants’ statements about the article. There are three levels of the probability variable, the lowest, moderate, and highest probability of being detected.

In the deception conditions participants were provided with a folder containing two written articles and instructed to conceal and lie about having the deception article throughout the tasks. The deception article gave a non-detailed introduction of deception. It did not include any information about nonverbal cues of deception, in order to prevent influencing participants’ nonverbal behaviour. Participants were first left alone in the room to read the articles whilst their behaviour was video recorded (condition ‘deceiving & alone’ = lowest probability of detection). This condition involved no social interaction with other people and therefore there was the lowest probability of being detected amongst the three levels of the probability variable. In this section, participants’ behaviour was analysed so as to identify whether they demonstrated any specific cues in relation to deception while planning and preparing for lying. This was based on previous work (Lawson et al., 2013), which indicated that individuals intending to lie would behave differently to those intending to tell the truth. That is, although no statement was

involved, deceivers were experiencing concealed intention of deceiving whereas truth-tellers were not. After five minutes, a confederate who assumed the appearance of a student entered the room and interacted with the participant (condition ‘deceiving & layperson’ = moderate probability of detection). During this phase of the experiment the participant was encouraged to act normally and not to draw attention to him/herself or raise suspicions of having the deception article. After five minutes the student left and a ‘security guard’ entered the room and conducted a mock security interview (condition ‘deceiving & security guard’ = highest probability of detection). The participants were instructed that the guard was skilled in deception detection and had the authority to remove them from the study if they were caught lying. For experimental consistency, the guard interviewed all participants and purposefully ‘failed’ to detect any deceptive cues in any participants. The order of the three sessions was counterbalanced.

In the truth-telling conditions (‘truth-telling & alone’, ‘truth-telling & layperson’, and ‘truth-telling & security guard’) the task was identical to the deception conditions except that participants did not have the deception article and thus did not have to lie about it to the confederates. Since truth-tellers would still be evaluated in the sections, the deception article was intentionally removed from what they would be reading so as to prevent the impact of the deception contents on truth-tellers. The order of the three sessions for truth-telling conditions was counterbalanced as well. The time between the sessions ranged from one to two minutes. After each set of three conditions participants completed the manipulation check questions. They then completed the covariate battery followed by a debrief session and were given a £5 voucher and an extra confectionery reward for their participation. Behavioural data were recorded using video cameras and transferred into numerical data through the coding processes.

4.2. Results

Similar to Study 1, a series of ANCOVAs (repeated-measures) were conducted for all dependent variables, followed by Bonferroni pairwise comparison. As specified in Section 3, the covariates of age, gender and nationality (western/non-western) were retained in the tests. The results of ANCOVAs for the significant dependent variables are presented in Table IV-6. By controlling for the covariates including age, gender and nationality the results revealed no significant effects of deception. Hand holding movements were significant for probability of detection, $F(2, 56) = 3.46, p < .05, \eta_p^2 = .11$. The probability level 1 (i.e. alone in room) ($M = 3.66, SD = 1.54, CI_{95} [3.10, 4.22]$) and probability level 2 (i.e. interact with layperson) ($M = 5.93, SD = 4.01, CI_{95} [4.47, 7.38]$); and level 3 (i.e. interact with confederate security guard) ($M = 7.23, SD = 4.06, CI_{95} [5.76, 8.70]$). The results showed a significant main effect of probabilities on hand holding, where such movements were significantly increased in the two conditions with social interactions (level 2 & level 3), compared to the condition when participants were alone (level 1). However, the difference between level 2 and level 3 did not reach the statistical significance level, according to Bonferroni corrected post-hoc tests (paired t-test).

Table IV-6

ANCOVA results for Study 2^a

	Deception				Level of Probability			
	<i>F</i>	<i>df</i>	<i>p</i>	η_p^2	<i>F</i>	<i>df</i>	<i>p</i>	η_p^2
Movements and Covariates								
Hand holding**	0.10	1, 28	.75	.00	3.46	2, 56	.04	.11
Age	0.60	1, 28	.45	.02	0.44	2, 56	.65	.02
Gender	1.40	1, 28	.25	.05	0.18	2, 56	.84	.01
Western/Non-western	1.15	1, 28	.29	.04	1.83	2, 56	.17	.06
Impressions and Covariates								
Tension** ^b	0.52	1, 28	.48	.02	3.92	1.63, 45.52	.04	.12
Age	0.11	1, 28	.74	.00	4.74	1.63, 45.52	.02	.15
Gender	0.38	1, 28	.54	.01	2.31	1.63, 45.52	.12	.08
Western/Non-western	0.00	1, 28	1.00	.00	0.64	1.63, 45.52	.08	.09
Negative affect**	0.91	1, 28	.35	.03	4.24	2, 56	.02	.13
Age	1.67	1, 28	.21	.06	0.18	2, 56	.84	.01
Gender	0.05	1, 28	.82	.00	1.08	2, 56	.35	.04
Western/Non-western	0.00	1, 28	.99	.00	1.10	2, 56	.34	.04

Note. ^aInsignificant dependent variables were not listed. η_p^2 = effect size estimate – partial eta squared.

**Significant effect of variables: $p < .05$ states in Bold. ^bGreenhouse-Geisser correction figures presented for the condition of level of probability.

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A significant main effect of probability of detection emerged in the impression of negative affect (unpleased impression), $F(2, 56) = 4.24$, $p < .05$, $\eta_p^2 = .13$. There was greater negative affect associated with higher probability levels than lower levels, with CI_{95} [1.55, 1.85] for level 1 ($M = 1.70$, $SD = 0.42$), CI_{95} [1.67, 1.98] for level 2 ($M = 1.82$, $SD = 0.44$), and CI_{95} [1.84, 2.21] for level 3 ($M = 2.03$, $SD = 0.52$). The subsequent Bonferroni corrected post-hoc test showed a significant difference of negative affect between level 1 and level 3, $t(34) = -3.10$, $p < .01$, $d = -1.06$; and level 2 and level 3, $t(34) = -2.60$, $p = .01$, $d = -0.89$. However, such significant difference was only found in deceivers and even then not between level 2 and level 3. The impression of tension was mainly influenced by the probability of detection as well, $F(1.63, 45.52) = 3.92$, $p < .05$, $\eta_p^2 = .12$, level 1 ($M = 2.56$, $SD = 0.35$), CI_{95} [2.43, 2.69], level 2 ($M = 2.78$, $SD = 0.54$), CI_{95} [2.58, 2.97], and level 3 ($M = 3.18$, $SD = 0.35$), CI_{95} [3.05, 3.30]. Tension

impression was significantly different between level 1 and level 3, as well as level 2 and level 3. The subsequent Bonferroni corrected post-hoc tests showed a significant difference of tension impression between level 1 and level 2, $t(34) = -3.37, p < .01, d = -1.16$, in truth-tellers but not in deceivers.

The main effect of probability of detection partially supports *Hypothesis 5: There will be a greater extent of observable nonverbal cue(s) (either body movement(s) and/or impression(s)) exhibited in deceivers when the probability of detection is higher, compared with lower probability conditions.* The significant difference in the extent of nonverbal cues between levels of probabilities was not found in all comparisons. Therefore the results did not show fully support to *Hypothesis 6: The extent of such observable cues will be positively correlated with the level of probability of deception detection; the higher the probability the more cues will be observed.* Notably, although the findings suggest that higher probabilities can lead to increased nonverbal cues presented by deceivers than in lower probability conditions, a main effect of probability influences both deceivers and truth-tellers. Values of mean and standard deviation for all the analysed dependent variables are presented in Appendix 3 Table A-2.

4.3. Discussion

Study 2 revealed that the probability of detection leads to reduction in hand movements (hand holding is categorised as a reduced hand movement). Hand movements significantly decreased while participants engaged in interaction with confederates compared with when they were alone. However, it is possible that engaging in conversation changed participants' hand holding movements irrespective of the probability variable. Study 2 also showed that impressions of negative affect and tension increases under higher probabilities of detection. Deceivers showed significant increased negative affect in the highest probability condition,

compared with the two lower probability conditions. Truth-tellers did not show a similar pattern of negative affect. In addition, there was also a significant increase in the extent of tension impression in the highest probability condition. However, both deceivers and truth-tellers were influenced, suggesting that probability of detection has a strong influence on the tension impression regardless of veracity. The difference of such nonverbal cues was not statistically significant between probability level 1 and level 2. However, the highest probability of detection (i.e. level 3: evaluated by a security confederate) did significantly influence nonverbal cues, compared to the other two lower probability levels.

As discussed in section 1.2, deception takes different forms, including verbal statements assessed in Studies 1 and 2, as well as nonverbal behaviours. I therefore designed Study 3, so as to investigate how people behave while engaging in deception that involves only nonverbal behaviours. In addition, given the findings about the effect of probability of detection so far, Study 3 also aims to broaden the understanding of the effect of probability of detection on individuals' behaviour in relation to such pure nonverbal deception.

5. Study 3 – Concealing while Walking

5.1. Method

Participants.

For this study, 120 University students were recruited. Participants with invalid data (e.g., incomplete/unclear video footages) were excluded. Valid data from 100 participants (54 males, 46 females, $M_{\text{age}} = 22.18$ years, $SD = 5.13$) were included in the analyses. To participate, students were required to have normal, or corrected to normal vision and hearing, as well as normal ability of body movement and communication.

Apparatus.

The experiment, conducted by three doctoral experimenters, took place in an open area of a UK University. The experiment area was a designated pathway against the wall of a University building (with a 90° turn in the middle of the pathway). Participants were either concealing or not concealing a token (a timer with alarm) while walking through the pathway. Each participant needed to memorise a series of numbers (8 digits) while performing the task. The same covariate battery was used from Studies 1 and 2 (except for replacing Goldberg's Big Five Scale with a shorter scale namely Big Five Inventory, see section 1.2), together with manipulation check questions. Two high-definition video cameras were used to record behaviour. A professional high-definition video camera was used where face-to-face judgment was introduced (see details below). Each participant received a £5 voucher as the reward for completing the study.

Design and procedure.

In this study, the independent variables of deception and degree of the probability of detection were manipulated in a 2 (veracity: deceptive vs. honest) \times 2 (probability level: higher vs. lower) between-subjects design, and participants were randomly assigned to the four groups. Veracity was manipulated by instructing participants to hide a timer on their person and walk through the pathway, or to walk through the pathway without hiding anything. The level of probability of deception detection was manipulated in terms of whether or not to involve a confederate examiner engaging in face-to-face evaluations (after monitoring participants' performance using a professional camera) regarding whether (s/he doubted) the participants were hiding the timer. The confederate wrote down the evaluation for each participant without interacting with them directly. As discussed in Section 1.2 and Chapter II, evaluations introduced a higher level of probability of deception detection, compared with conditions without evaluations.

Upon giving their consent to take part in the study, participants were instructed to queue at a waiting area (where they could not see the entire experiment area). Once called by an experimenter, each participant stood at the starting point of the pathway and received detailed oral instructions about their task. Then participants were provided with an 8-digit series of numbers which needed to be memorised and reported at the end of the pathway. The memorisation task, as performed by all participants, was introduced with the purpose of balancing the complexity of the simple walking task. When they were ready, participants walked through the designated pathway, following signs on the floor. At the end of the pathway, all the participants reported to another experimenter about the number that they could remember. Their performance was scored and an identity-related incentive was given (serving motivating roles, DePaulo et al., 2003) by informing them that the names of the top 10 players would be posted on the university website. In order to ensure all participants walked through the pathway at normal speed, a loose time pressure was set by telling them they needed to finish the walking task within 2 minutes (normally needs less than 1 minute). Details about the experimental conditions are specified below.

The group ‘deceptive & evaluated’ (DE) hid the timer on their person while walking through the pathway. A monitor (a big professional camera) was presented behind the 90° turning on the pathway. Participants were told that an examiner (role-played by an experimenter) was monitoring them via this camera, and s/he would give an immediate judgment as to whether s/he doubted the participants were hiding the alarm on their person. The DE group was instructed to try not to be identified as a person who was carrying the timer.

Then, the group ‘honest & evaluated’ (HE) performed a similar task, and was also evaluated by the examiner, except for the fact that they did not carry the timer while walking

through the pathway. Groups of ‘deceptive & non-evaluated’ (DN) and ‘honest & non-evaluated’ (HN) participated in a similar way to DE and HE, but were not evaluated by the examiner. No monitor or examiner was presented on those participants’ routes.

Following the behavioural tasks, participants received questionnaires regarding manipulation check and demographic information, etc., as in Studies 1-2. Finally, participants were debriefed, and received a £5 voucher as a reward for completing the study. Behavioural data were recorded using video cameras and transferred into numerical data through the coding process introduced in Section 2. Values of mean and standard deviation for all the analysed dependent variables are presented in Appendix 3 Table A-3.

5.2. Results

Similar to Study 1, a series of ANCOVAs were conducted for all dependent variables, followed by Bonferroni pairwise comparison. Same covariates retained in the previous two studies were retained in the tests for Study 3. Table IV-7 presents the results for Study 3, from which no significant effects of veracity or probability of detection were found. This is discussed below.

Table IV-7

ANCOVA results for Study 3^a

	Deception				Level of Probability			
	<i>F</i>	<i>df</i>	<i>p</i>	η_p^2	<i>F</i>	<i>df</i>	<i>p</i>	η_p^2
Movements and Covariates								
Eye/eye brow	3.05	1, 88	.08	.03	0.62	1, 88	.43	.01
Age	0.09	1, 88	.77	.00	0.09	1, 88	.77	.00
Gender	1.29	1, 88	.26	.01	1.29	1, 88	.26	.01
Western/Non-western	0.25	1, 88	.62	.00	0.25	1, 88	.62	.00
Hand and arm	0.77	1, 88	.38	.01	0.30	1, 88	.58	.00
Age	0.68	1, 88	.41	.01	0.68	1, 88	.41	.01
Gender	0.06	1, 88	.80	.00	0.06	1, 88	.80	.00
Western/Non-western	0.13	1, 88	.72	.00	0.13	1, 88	.72	.00
Impressions and Covariates								
Tension	0.77	1, 88	.38	.01	0.09	1, 88	.77	.00
Age	10.40	1, 88	.00	.11	10.40	1, 88	.00	.11
Gender	1.27	1, 88	.26	.01	1.27	1, 88	.26	.01
Western/Non-western	2.78	1, 88	.10	.03	2.78	1, 88	.10	.03
Attempted control	1.01	1, 88	.32	.01	1.30	1, 88	.26	.02
Age	3.42	1, 88	.07	.04	3.42	1, 88	.07	.04
Gender	0.02	1, 88	.89	.00	0.02	1, 88	.89	.00
Western/Non-western	0.01	1, 88	.94	.00	0.01	1, 88	.94	.00
Positive affect	0.00	1, 88	.95	.00	1.84	1, 88	.18	.02
Age	14.03	1, 88	.00	.14	14.03	1, 88	.00	.14
Gender	1.17	1, 88	.28	.01	1.17	1, 88	.28	.01
Western/Non-western	2.16	1, 88	.15	.02	2.16	1, 88	.15	.02
Negative affect	0.73	1, 88	.40	.01	0.00	1, 88	.97	.00
Age	2.99	1, 88	.09	.03	2.99	1, 88	.09	.03
Gender	0.10	1, 88	.05	.00	0.10	1, 88	.05	.00
Western/Non-western	0.11	1, 88	.74	.00	0.11	1, 88	.74	.00

Note. ^aThere is no significant results found in this study. η_p^2 = effect size estimate – partial eta squared.

5.3. Discussion

Given the results showing that no effect of deception or probability levels was found, Study 3 indicates some context-related issues that may have influenced individuals' behaviour: (1) it is difficult to elicit/observe a difference between deceivers' and honest individuals' behaviour when there is no social interaction or verbal statement involved in the deception-related tasks; (2) there needs to be adequate length of behavioural tasks, so as to elicit/observe

the difference in behaviour between deceivers and honest individuals; (3) although the memorisation task was introduced into the study for increasing task complexity, there is insufficient behavioural data to be elicited and analysed when the behaviours involved in the task are too simple (e.g., simply hiding an object while walking).

Based on the importance of task complexity as indicated by the results of this study, I intended to investigate the effect of task complexity on deceivers' behaviour when the probability of detection is already high. Study 4 was thus designed to assess dual deception tasks in order to increase task complexity, which is considered to increase cognitive loading in individuals (Vrij et al., 2009). On the basis of enhanced probability of detection, the effect of cognitive loading was tested by introducing a simulated security identity check as well as a reconnaissance task, which could be conducted by terrorists (O'Brien, 2008). The aim for this study was to investigate nonverbal cues that could be observed in such specific contexts with induced probability of detection as well as duplex or single deception tasks.

6. Study 4 - Lying and Reconnaissance whilst Passing Through a Security Control Point

6.1. Method

Participants.

For this study, 100 university students were recruited and participants with invalid data (e.g., incomplete/unclear video footages) were excluded. Valid data from 95 participants (22 males, 75 females, $M_{\text{age}} = 26.53$ years, $SD = 8.66$) were included in the analyses. To participate, students were required to have normal, or corrected to normal vision and hearing, as well as normal ability of body movement and communication.

Apparatus.

The experiment took place in the corridor of a university main building. Each participant placed an adhesive label over their name on their university ID card. The same covariate battery was used from Study 3 together with manipulation check questions. Two high-definition video cameras were used to record behaviours. Three experimenters, one of whom played the role of a ‘security guard’, conducted this study. Each participant received a £5 voucher as well as a confectionery reward for completing the study.

Design and Procedure.

In this study the independent variables of duplex deception were manipulated in a 2 (veracity: deceptive vs. honest) \times 2 (reconnaissance task: present vs. absent) between-subjects design. Participants were randomly assigned to one of the four groups. Veracity was manipulated by instructing participants to either lie or tell the truth about their names. The reconnaissance task was manipulated by instructing participants to either covertly memorise objects in the environment (e.g., how many chairs in the room) or not to memorise objects. The context of this study aimed to simulate a public security checkpoint scenario and typical reconnaissance activities conducted in public spaces.

Participants were asked to pass through a security door set up at the entrance of an office. While monitoring the security door a confederate security guard asked for and checked each person’s name on the label of his/her student ID card. Groups of ‘deceiver & reconnaissance’ and ‘deceiver & no-reconnaissance’ put a fake name on the label of their student ID card and lied about their real names. These groups were informed that they would lose entitlement to an extra reward if they were caught lying; this was not applicable for the truth-tellers. For experimental consistency, the guard quickly interviewed all participants and purposefully ‘failed’ to detect deceptive cues in any participants. The ‘deceiver & reconnaissance’ group also covertly

memorised the notable objects while passing through the space. After completing the deception task, they were required to identify observed objects on a list and then complete the questionnaire pack.

The ‘truth-teller & reconnaissance’ group followed the same process but told truth about their names. The ‘truth-teller & no-reconnaissance’ group neither lied about their names nor performed the reconnaissance task. When the study was completed, an experimenter would debrief and reward each of the participants with a £5 voucher and extra confectionery for their participation. Behavioural data were recorded using video cameras and transferred into numerical data through the coding processes detailed in section 2.

6.2. Results

ANCOVAs were conducted for all dependent variables, followed by Bonferroni pairwise comparison. Age, gender and nationality (western/non-western) were retained as covariates in the tests. The results of ANCOVAs for the significant dependent variables are presented in Table IV-8. By controlling for the covariates including age, gender and nationality there was a trend towards significance in deception with trunk movements: $F(1, 85) = 3.82, p = .054, \eta_p^2 = .05, d = -0.41$, revealing that liars presented fewer trunk movements ($M = 1.69, SD = 1.72$) than truth-tellers ($M = 2.40, SD = 1.72$). A similar trend of decreased hand and arm movements emerged, $F(1, 85) = 3.85, p = .053, \eta_p^2 = .04, d = -0.42$, with fewer such movements for deceivers ($M = 2.41, SD = 3.06$) than truth-tellers ($M = 3.68, SD = 3.06$). These findings indicate a trend of decreases in limb movements thus providing evidence to support *Hypothesis 1: Deceivers will present different amounts of observable body movements, as compared with truth-tellers.* Subjective impressions of positive affect were significantly influenced by deception, $F(1, 85) = 5.94, p < .05, \eta_p^2 = .07, d = 0.52$. Liars displayed more positive affect ($M = 3.01, SD = 1.08$)

compared with truth-tellers ($M = 2.45$, $SD = 1.09$) supporting *Hypothesis 2: Impressions related to emotional process of deception (either negative and/or positive affect) will be presented by deceivers as compared with truth-tellers.*

Eye/eyebrow movements were significantly influenced by reconnaissance, $F(1, 85) = 5.68$, $p < .05$, $\eta_p^2 = .06$, $d = 0.51$. Covert information collection conditions yielded more eye/eyebrow movements ($M = 3.79$, $SD = 1.00$) than conditions where there were no reconnaissance activities ($M = 3.28$, $SD = 1.00$). In addition, the impression showing attempted manipulation of behaviour is found in relation to the task complexity, $F(1, 85) = 4.67$, $p < .05$, $\eta_p^2 = .10$. Participants who performed duplex deception tasks (including lying about their identity and reconnaissance) expressed a greater impression of attempted manipulation of behaviour ($M = 3.25$, $SD = 0.84$) than those who only performed a single deception task (either lying or reconnaissance) ($M = 2.67$, $SD = 0.83$), $d = 0.69$. Interestingly, those who did not perform any deceptive task showed a moderate level of such an impression, as compared to deceivers conducting duplex and single tasks ($M = 3.13$, $SD = 0.86$). Values of mean and standard deviation for all the analysed dependent variables are presented in Appendix 3 Table A-4.

Table IV-8

ANCOVA results for Study 4^a

	Deception				Reconnaissance			
	<i>F</i>	<i>df</i>	<i>p</i>	η_p^2	<i>F</i>	<i>df</i>	<i>p</i>	η_p^2
Movements and Covariates								
Eye/eye brow**	0.07	1, 85	.80	.00	5.68	1, 85	.02	.06
Age	2.29	1, 85	.13	.03	2.29	1, 85	.13	.03
Gender	0.08	1, 85	.78	.00	0.08	1, 85	.78	.00
Western/Non-western	0.62	1, 85	.44	.01	0.62	1, 85	.44	.01
Trunk*	3.82	1, 85	.05	.04	3.62	1, 85	.06	.04
Age	0.00	1, 85	.99	.00	0.00	1, 85	.99	.00
Gender	0.03	1, 85	.86	.00	0.03	1, 85	.86	.00
Western/Non-western	1.67	1, 85	.20	.02	1.67	1, 85	.20	.02
Hand and arm*	3.85	1, 85	.05	.04	0.60	1, 85	.44	.01
Age	3.93	1, 85	.05	.04	3.93	1, 85	.05	.04
Gender	4.76	1, 85	.03	.05	4.76	1, 85	.03	.05
Western/Non-western	0.03	1, 85	.87	.00	0.03	1, 85	.87	.00
Impressions and Covariates								
Positive affect**	5.94	1, 85	.02	.07	0.36	1, 85	.55	.00
Age	1.39	1, 85	.24	.02	1.39	1, 85	.24	.02
Gender	0.44	1, 85	.51	.01	0.44	1, 85	.51	.01
Western/Non-western	0.35	1, 85	.56	.00	0.35	1, 85	.56	.00

Note. ^aInsignificant dependent variables were not listed. η_p^2 = effect size estimate – partial eta squared.

**Significant effect of variables: $p < .05$ states in Bold; *trend of significant effect of variables: $P < .055$ states in Bold.

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6.3. Discussion

The trend for hand movement reduction found in this study reflected the similar findings in Study 1. That is, the replicated trend of hand movement reduction suggests it might be a consistent cue across the two contexts assessed in Studies 1 and 4. In addition, a positive affect was observed as an indicator associated with the underlying emotion process of deception. The only cue found in relation to reconnaissance was the increased eye/eyebrow movements. However, this is considered a task-related result since participants looked around as part of the reconnaissance activity. Furthermore, deceivers performing duplex tasks gave a more attempted control impression than those performing a single deception task. This does support *Hypothesis*

7: Deceivers performing a reconnaissance task in addition to lying will display more observable nonverbal cues than deceivers performing only one task; and Hypothesis 4: Impressions related to attempted behavioural control processes of deception will be presented by deceivers as compared with truth-tellers. On another hand, the finding showing that participants performing no deceptive tasks do not express difference in their controlled impression than deceivers, suggests such a cue may not serve to discriminate deceivers from truth-tellers.

No significant body movements in relation to the dual deception tasks were found, implying that the nonverbal cues of body movements investigated in this study might not be as sensitive as the verbal ones (e.g., as found in Vrij et al., 2011) in relation to cognitive loading. However, the greater impression of attempted behavioural control that directly indicates the corresponding psychological process of deception found in duplex- rather than single-task deceivers implies that cognitive loading still influences deceivers and leads to enhanced attempted behavioural control. Hypothesis 3 was not supported by any of the four studies.

7. General Discussion

The present research consisted of four studies assessing different behaviours in relation to deception including preparation of deception, behavioural concealment without interaction, and lying in conversations. The research contexts ranged from a private space (in a laboratory) to a public space (in the field), involving manipulations such as the probability of deception detection and duplex deception concerning reconnaissance tasks, as well as diverse contexts that could not be manipulated (e.g., passersby as an audience when the deception is conducted in a public space). In addition to investigating deception that can happen in regular life (Studies 1 - 2), I also simulated deception tasks that may occur in specific instances and could violate public safety (i.e. deceiving a member of security staff in Study 2, concealing an object while being monitored

in Study 3, and the undertaking reconnaissance task while deceiving in Study 4). Most of the predictions were supported or partially supported by the findings, except Hypothesis 3 that predicting deceivers will express an impression cue of cognitive loading. Taking the four studies as a whole, I discuss the findings from a general perspective as below.

7.1. Nonverbal cues in relation to deception

The findings (shown as either significant or a trend of significance) in Studies 1, 2 and 4 in relation to deception suggest that the three fundamental psychological processes (i.e. emotion, cognitive effort, and attempted behavioural control) are involved in deceptive behaviour. More specifically, the trunk and limb movement reductions (including hand holding (Mehrabian, 1968)) indicate nonverbal cues to deception in relation to tension (Ekman, 1985; McNeill, 1992), cognitive overload (Ekman, 1997; Memon et al., 2003), and behavioural control (Meservy et al., 2005; Vrij et al., 1997). The findings about nonverbal body movements of deception in the current research support the established view that the psychological processes of deception can lead to behavioural cues to deception (Vrij, 2008). In addition, the present research indicates that the deception cue of limb reduction is found for situations under which deceivers are standing (in Study 1) or moving around (in Study 4) and therefore extends the traditional paradigm of using seated participants with an interviewer in laboratory settings. In addition to the findings about body movements, deceivers appeared to exhibit more positive emotions than truth-tellers, which provides direct evidence of this relation regarding deception as found by other researchers (Ekman, 2001; Memon et al., 2003). Taken as a whole, the effect of the three psychological processes of deception (i.e. emotions, cognitive effort, and attempted behavioural control) on deceivers' behaviour is supported by the nonverbal body movement cues found across Studies 1 – 2, & 4.

7.2. Effects of situational factors

Probability of being detected deceiving.

The findings in Studies 1, 2, and 4 suggest that increased hand holding and reduction in hand and arm movements related to the psychological processes of deception are presented as cues in relation to deception as well as those elicited by enhanced probability levels. This finding suggests that such nonverbal cues to deception might be magnified by enhanced probability of detection, thus revealing a similar effect to that of increased stakes of deception (DePaulo et al., 2003), as posited earlier in Section 1.2. However, since the results of such cues in Study 1 and Study 2 do not reach a statistically significant level (around .05), such a magnification effect of probability needs to be examined in more studies. In addition, Study 2 shows that the probability of detection leads to differences in the extent of impression of tension, which is greater in the highest probability (security evaluation) level than the other two lower probability levels. This might be due to the fact that a higher probability leads to a fear emotion (Ekman, 1992), subsequently leading to tense emotion in deceivers, compared with truth-tellers. Notably, these nonverbal cues associated with enhanced probability were also presented by truth-tellers, suggesting a need for future research endeavouring to solve the dilemma of discriminating liars from truth-tellers who might behave like deceivers (DePaulo, 1992; Ofshe & Leo, 1997). Such an issue is likely to be due to a similar negative emotion “fear of being disbelieved” being experienced by truth-tellers while under higher probability of detection (Ekman, 1992). A possible solution might be using the manipulation of probability of detection together with other manageable situational factors. This is because the involvement of multiple factors might increase the extent of involvement of the psychological processes underneath deception. Given the discussion that self-regulation resources can be demanded by the deception processes

(Chapter II Section 5), the enhanced processes may further lead to depleted resources, which results in self-regulation failure and a greater extent of behavioural indicators.

Nonetheless, the impression of negative affect was significantly increased in the highest probability level, compared to the other two levels. This trend was only significant in deceivers, suggesting a possible solution to discriminate deceivers from truth-tellers by observing the extent of negative affect across probability levels. However, since the results did not show a robust difference across all three levels, further studies are needed for testing this nonverbal impression. These findings about the significant increase in nonverbal cues in the highest probability overwhelming the other levels suggests that a security check (as simulated in Study 2) might influence deceivers and/or truth-tellers' behaviour. I thus recommend this to be brought to the attention of security/public safety practitioners. Notably, the nonverbal behaviours influenced by the probability of detection may be expressed by truth-tellers as well and such an issue needs to be taken into account in practices of lie detection too.

Cognitive loading induced by duplex deception tasks.

Deceivers performing duplex tasks are found to give a greater impression of attempted behavioural control than those who only perform one deception task. This indicates that the cognitive load, induced by the duplex deception tasks, leads to deliberate behavioural manipulation (Buller & Burgoon, 1996). This finding may also have practical implications in that terrorists performing reconnaissance tasks may express impressions of manipulated behaviour. No specific body movements were detected in relation to this situational factor, which implies that nonverbal body movements are not explicitly influenced by the duplex tasks assessed in this research. In addition, truth-tellers did not present significantly different impressions than deceivers, which again raises the dilemma of similarity in behaviours between

deceivers and truth-tellers. As indicated in the above section too, a further study (presented in Paper 3) was conducted with the aim to solve this problem.

Contextual effects.

From the inconsistent nonverbal indicators of deception and behaviours influenced by probability of detection found across the four studies, it can be inferred that nonverbal behaviours are significantly influenced by contexts (Vrij, 2008). Amongst the four studies assessing the contexts where participants were sitting, standing, and walking, behaviours mostly found are still upper body movements, due to the limited amount of foot and leg movements available to analyse. This suggests that upper body movements are likely to be a better focus for lie detection based on human eyes, rather than foot and leg movements, as they provide more behavioural units to be observed and analysed by lie detectors. Furthermore, in some contexts, such as that in Study 3, no significant behaviours could be detected, which again implies that the effect of environments and tasks shape nonverbal behaviours significantly.

7.3. Effects of individual factors.

In relation to the covariates being controlled, age and gender were found to be significantly related to reduction in hand movement whilst telling lies. Age also influenced tension impressions related to the probability of detection. A possible explanation is that age and gender can influence nonverbal behaviour exhibited by individuals, in line with evidence of age and cultural influences on nonverbal behaviour (Vrij, 2008; Vrij & Winkel, 1991). The result suggests that the effect of such individual factors should not be neglected in future research and failing to take these into account may adversely impact the validity of results found in studies assessing nonverbal cues to deception. Individual factors such as personality and public self-consciousness were not found to consistently influence deceptive behaviour. However, given the

literature that supports their potential influences on deceptive behaviour (e.g., Vrij et al., 2001; Vrij, 2008), it is recommended to measure an appropriate number of those variables and test their effects as covariates in the data analysis.

7.4. Limitations.

This research may have limitations regarding the probability of deception detection introduced in experiments, which are not as dramatic as those in real life deception situations (ten Brinke & Porter, 2012). However, the participants were aware that the probability induced in the experiments was enhanced in higher probability conditions more than under the lower ones, e.g., they knew that the confederate met during the highest probability condition was good at detecting lies. In addition, the results from the ANCOVA method in relation to probability do not indicate that nonverbal behaviours are linked to the specific levels of probability as assessed in this research. Instead, the results show that the difference in nonverbal behaviours can be elicited by changes in the probability level. Therefore, I contend that the aim for assessing the effect of probability has been successfully addressed by the experimental manipulations of this situational factor in this research. However, it will be useful to examine the effect of probability in more field settings, which are closer to real life settings and the high stakes associated with deception.

A further limitation is that in Study 2, deceivers read an extra article about deception, which might have had impact on their deceptive tasks. Although the article did not include information about nonverbal cues to deception, it might still have had an effect on the psychological processes that deceivers experienced and thus might indirectly influence deceivers' behaviour. Researchers conducting future deception studies might want to consider such potential effects while designing their own experimental materials. In addition, the

ecological validity of lies performed in laboratory studies such as Study 2 is a recognised limitation in deception research (Koning et al., 2011). Nevertheless, when deception tasks in laboratories are assigned to participants, the cognitive processes still influence behavioural control and shapes behaviour (Hadar et al., 2012; Ito et al., 2012; Kozel et al., 2005).

As discussed in Study 3 and in Section 7.2, I consider that there are some potential confounding context-related factors (e.g., inadequate period of tasks) which may influence the observation/investigation of deceptive behaviour. It is thus important to take these issues into account in future studies assessing deceptive behaviour. The failure to find any cues in relation to nonverbal behavioural tasks assessed in Study 3 also implies that deceptive behaviour is difficult to detect in some specific contexts (e.g., where no social interaction is involved). In spite of Study 3, no significant deception cues were found in Study 2, whilst in the other two studies, these were apparent. This was possibly because participants were seated throughout this study, thus reducing the presence of overall visible nonverbal cues. If similar findings were upheld in studies replicating these research contexts, this would provide evidence that it is important to consider a range of situational factors including the settings where deception happens. Finally, I consider the sample size per condition in Study 1 was comparatively small (DePaulo et al., 2003). This issue has been avoided in the remaining experiments conducted for this research (Studies 2-4 in this paper and the study presented in Paper 3).

8. Concluding Remarks

Taken as a whole, the findings demonstrate and contribute to both theory and practice by extending the existing evidence base regarding deception-related behaviours across different situations. This work is another step forward in understanding more clearly the difference between deceivers and truth-tellers in settings other than interview situations. The findings about

the effect of the probability of being detected, which are related to deceivers' negative outcomes from deceiving, suggests that the reasoning and decision-making process behind deception can influence deceivers' behaviour. The findings about nonverbal cues to deception found in this research could be important for security stakeholders in many settings as they continually strive to make improvements to approaches of deception detection. A focus on observable nonverbal cues could benefit security officials who are not able to directly interact with suspect individuals and who do not use detailed behavioural analysis when a judgment of deception is needed immediately. In addition, the present research provides evidence of nonverbal deception cues not only being limited to body movements, but also to impressions given by deceivers, which are related to the three psychological processes of deception and suggest the significant influence of such processes on deceivers' behaviours. This research also sheds light on effective manipulations such as levels of probability, which may further be improved or managed together with other situational factors, in helping to increase deception detection accuracy.

CHAPTER V

PAPER 3

Telling the Difference between Deceiving and Truth Telling:

An Experiment in a Public Space

Abstract

The behavioural experiment presented in this paper investigated deception tasks (both concealment and lying) undertaken in a public space. This study targets (1) the effect of situational factors in relation to the negative outcome of deceiving, and (2) the role of self-regulation failure led by ego-depletion as a key part of the cognitive mechanism behind behavioural leakages of deception. To investigate these two targets, the degree of probability of deception detection and the demands of psychological resources required by self-regulation are manipulated. The results show a significant interaction effect between veracity and the probability of deception detection, emerged for the body movement of “hand(s) in pocket(s)”. The incidence of “hand(s) in pocket(s)” is found to increase from truth-telling to deceiving conditions when the probability of detection is higher, which is significantly different from the lower probability condition, where no statistical difference is found between deceiving and truth-telling. Higher probability of deception detection is also found in magnifying the “overall negative and controlled impression” displayed by both deceivers and truth-tellers, compared with the lower probability of detection condition. The possible effects of probability of deception detection and ego-depletion of self-regulation on eliciting deception cues are discussed.

Keywords: deception; impressions; nonverbal cues; probability of deception detection; self-regulation failure; ego-depletion

Telling the Difference between Deceiving and Truth Telling:
An Experiment in a Public Space

1. Introduction

Researchers have endeavoured to identify deception-related behaviours since the 1930s (Trovillo, 1939). Much of the research conducted in the field of deceptive behaviours is oriented towards practical outputs serving for lie detection, and targets four of the areas of most interest (see reviews in Bond & DePaulo, 2006; Vrij, 2008). First, what are the behavioural cues to deception? Second, what behavioural cues to deception relate to what underlying psychological processes? Third, what are the factors influencing deceptive behaviours? Fourth, and most importantly, is how to discriminate deceivers from truth-tellers. The final goal may further help research and practices in controlling deceptive behaviour and detection of lies. In line with other deception researchers, I address the above four questions in this paper, by using an experiment conducted in a public space so as to understand deceptive behaviour regarding lying and concealment in this context. In addition to deception related behaviours, I investigated situational factors (i.e. in relation to the negative outcome for the deceivers and demand on self-regulation) that may alter behavioural cues to deception and thereby distinguish deceivers from truth-tellers. In line with Chapters II and IV, nonverbal behaviours are the focus of this study and were manually coded using coding schemes for both body movements and impressions displayed by individuals.

1.1. Cues to Deception

As introduced in Chapter II, the widely recognised categories of interpersonal deception indicators are nonverbal and verbal cues (DePaulo et al., 2003). It has been argued (e.g., Vrij &

Granhag, 2012) that nonverbal cues are unstable and could be influenced by factors such as stakes (i.e. the extent of negative or positive consequences of deceiving, Porter & ten Brinke, 2010; Vrij, 2008). The findings from Paper 2 also indicate that such cues are highly sensitive to the situational factors such as the probability of being detected. However, I consider that the unstable pattern of nonverbal cues across settings is the key reason for conducting more studies targeting such kind of behaviour. Researchers need more data concerning nonverbal behaviour exhibited in different settings, not only in laboratories, but also in the field (DePaulo & Bond, 2012; ten Brinke & Porter, 2012). In addition, nonverbal cues are important since verbal statements are sometimes not involved in interactions. On some occasions, such as those involving immediate judgments of deceit (e.g., a security officer briefly interacting with a suspicious individual), detailed behavioural analyses are infeasible. This study thus continues to investigate nonverbal cues as with the studies presented in Paper 2. Similarly, this paper focuses on the nonverbal cues that are notable to people (e.g., hand movements) from a distance instead of minor cues, such as micro-facial expressions (Ekman, 2003), so as to address the situations where judgments can only be made by relying on coarse nonverbal cues that are clearly observable by human eyes.

Deceptive behaviours are presented inconsistently from time to time and more than 20 nonverbal observable indicators were identified in the meta-analysis of deception cues (DePaulo et al., 2003). Specific deception cues, such as increase in deliberate eye contact (Mann et al., 2012), decrease in hand/finger movements, and change in foot movements, were found in different studies (e.g., DePaulo et al., 2003; Hillman et al., 2012; Vrij, 2008). However, given the inconsistent findings emerging in the literature, it is recommended that more investigations be conducted so as to replicate and confirm previous findings, or to explore deception cues

displayed by individuals in different settings (DePaulo & Bond, 2012; Vrij, 2008). Similar to Chapter IV, the investigation of observable nonverbal cues in this research was thus exploratory: that is, this research did not target specific movements, but tested a number of observable nonverbal behaviours across body sections, as recognised by laypersons following the coding process specified in Section 3.4.

In addition to the specific body movements, there are some cues identified as impressions displayed by deceivers (e.g., “tension”) (DePaulo et al., 2003). These impressions may contain indicators of deception that are associated with the psychological processes underlying deceptive behaviour (specified below and in Section 3.4) (Vrij, 2008). Investigating impressions may also help researchers to understand intuitions that are used by successful deception detectors, as they sometimes could not specify on which cues they rely on but could detect lies based on intuitive feelings (Hartwig & Bond, 2011). Such implicit criteria might be decoded by the investigation of impressions, as a kind of general behavioural cues presented by deceivers. Given the important information that impression cues may carry, this work also involved studying impressions displayed by deceivers as was the case with those presented in Chapter IV - Paper 2. The acquisition of impressions was conducted via a blind coding process where the impression items were developed according to the three fundamental psychological processes of deception (specified below).

1.2. Psychological processes underlying deception cues

Most deception cues have been linked to the specific psychological processes involved in deception (i.e. emotion, cognitive effort and attempted behavioural control) (see Table II-a in Chapter II, reviewed in Vrij, 2008). For example, an impression of tension might indicate a negative emotion of fear (Ekman, 1992; Porter & ten Brinke, 2008), and decrease in hand and

arm movements might be a result of cognitive inhibition reacting to high cognitive demand (Christ et al., 2009; Vrij, 2008). As introduced in Chapter II, the three underlying psychological processes are supported by theories (e.g., Ekman, 1992; Buller & Burgoon, 1996) and empirical evidence (e.g., Carrión et al., 2010; Lancaster et al., 2013; Vrij et al., 2008), which suggest that deception cues are driven by the involvement of such processes. However, a solid connection between the exhibition of cues to deception and the three processes is not yet established, as it has been found that deception cues are not consistently presented by deceivers in studies that took place in different physical contexts or surroundings (as in Paper2, and in DePaulo & Bond, 2012; Vrij, 2008). This reveals the demands for investigation in terms of the situational factors that may alter deception cues, as discussed in the next section.

2. Contexts and Situational Factors Altering Deceptive Behaviours

2.1. Deception cues are subject to contexts

Contexts of deception firstly determine forms of deception. According to previous research reviewed in Chapter II, there are three forms of deception identified by psychologists working on interpersonal deception (DePaulo & Bell, 1996; Vrij, 2008): outright deception, exaggerations, and subtle deception. Outright deception (also referred to as falsifications, Ekman, 1997), concerning the lies when the information provided is completely different from, or at least contradictory to, the ‘truth’ that the deceiver believes. Exaggerations are deceptions whereby information provided exceeds the truth; however, this kind of deception is built on the foundation of the truth that the deceiver believes. The first two forms of deception are normally used when there are statements involved in interpersonal interaction. Subsequently, subtle deception includes truth, but the information provided is misleading, such as “concealment”, (Ekman, 1997) is widely used in daily life (Vrij, 2008). Compared with outright deception

(falsifications that present untrue information), concealing information is easier to conduct (Vrij & Heaven, 1999) because of the following characteristics: (1) cognitive capacity is less overloaded in concealment, since deceivers do not need to create false statements but only need to ignore certain parts of the truth; (2) concealment involves fewer negative emotions, and is easier to morally justify. For example, deceivers have fewer negative feelings and moral embarrassment when they treat concealments as failing to mention some details (Vrij, 2008). In addition, concealment is sometimes difficult to detect. Regarding this, Study 3 presented in Chapter IV - Paper 2 found no nonverbal cues observable from the context that deceivers were simply hiding something on them and passing by the camera. Luckily, in real life deception sometimes does not only take one form (e.g., falsification or concealment), but may be presented as a combination of different forms (Ekman, 1997; Vrij, 2008). In the last study presented in Paper 2, it emerged that duplex deception concerning multiple tasks may lead to increased cognitive effort and attempted control of behaviour. Such a finding suggests that deceivers in a context where they need to perform a combination of deceptive tasks may leak behavioural cues.

Another reason that context has been emphasised as important to deceptive behaviours is that this as well as situational factors involved in various contexts can shape such behaviours through manipulating the involvement of the psychological processes of deception (Vrij, 2008; DePaulo & Bond, 2012). For example, an individual may not need to speak while hiding some objects and walking through. Perhaps s/he only needs to successfully conceal the objects. His or her behaviours are determined by such specific form of deception (concealment); thus no verbal cues are presented. A deceiver who needs to perform a difficult deception task may experience great cognitive load that leads to nonverbal cues, such as reduction in hand movements, which might not be exhibited by one simply hiding something and walking away. The form of

deception and relevant behaviours, as well as the involvement of varying psychological processes are inconsistent across contexts (Vrij, 2008), which result in different cues being presented by individuals. However, by assessing deception in different settings involving combined forms of it and different situational factors, researchers will have a better idea of how to discriminate between deceivers and truth-tellers in similar settings. This is in line with DePaulo and Bond's (2012) recent claim, encouraging researchers to explore deception in diverse contexts.

The present study investigated deception tasks undertaken in a public space in order to provide behavioural data about non lab-based deception. The deception task combined both concealment of a timer and a subsequent brief conversation with a role-played confederate (see the details in Section 3.3.). This design was employed to provide data regarding combined forms of deception and nonverbal cues expressed in public spaces. In addition, this study also assessed situational factors that may potentially influence nonverbal indicators of deception, which are introduced below.

2.2. Probability of failure to convincingly deceive: Deception detection

It has been discussed above that situational factors in diverse contexts are influential in deceptive behaviour, as they may impact individuals' psychological processes and further influence behaviours. Deception in many cases is a risk-taking behaviour, because failing to convincingly deceive or being detected deceiving can lead to negative consequences for the deceiver (Ekman, 1992; Vrij, 2008). For example, the relationship between two people may be affected following a discovered betrayal or a criminal getting caught lying can lead to serious punishment for him/herself. People who engage in risk-taking behaviour not only consider the seriousness of their negative outcome that could result from the failure to convincingly deceive

or being detected, but also consider the probability associated with the failure or detection (e.g., Breakwell, 2007; Emblemsvåg & Kjølstad, 2002; Sip et al., 2010). As discussed in Chapters II & III, these two elements are not only considered in risk-taking behaviour, but also much other human behaviour involving making decisions of undertaking an action (Ajzen, 1991a/b). As introduced in Chapter III – Paper 1, the situational factors in relation to the value of outcomes and the probability associated with these influence one's reasoning process of forming intentions and decisions (Ajzen, 1991b). The former element relates to the stakes of deception (i.e. the extent of negative or positive consequences of deceiving) (Vrij, 2008), which have been assessed by many deception studies and found to have an effect of magnifying deception cues. The latter relates to how likely a deception will fail, associated with a negative consequence for the deceiver, which has not been much investigated in the literature regarding deceptive behaviour. Similar to Papers 1 and 2 in the previous Chapters, in the present paper I also assess the latter factor in terms of the probability of being detected deceiving. Such probability is further related to the negative outcome of losing a game and thus failing to receive an extra reward.

Since probability of detection directly determines whether the consequence of deception (i.e. stakes) will occur, I propose that the probability of deception detection has a similar effect as stakes (identified as magnifying the extent to which the psychological processes are involved in deception (e.g., ten Brinke & Porter, 2012; Vrij, 2008)), and thus alters behaviours presented by the deceivers. This proposition is supported in some of the studies presented in Chapter IV of this thesis. In the present study, the probability of detection is also manipulated, so as to test if replicated findings emerged in this particular context. In addition, by manipulating the degree of probability of detection instead of the stakes of deception in this study, I seek to minimise the problem of having few stakes high enough introduced in controlled laboratory experiments (ten

Brinke & Porter, 2012). This is because it is possible to introduce a great difference in probability of detection in behavioural studies by involving a confederate playing the role of a “well-trained lie detector” to participants, who is said to have a significantly higher probability of detecting deception than a layperson. The present study thus manipulates the degree of probability of detection by involving a confederate, playing either a trained lie detector or a layperson, on different days. As found in the studies presented in Chapter IV of this thesis, such manipulation results in difference in behavioural cues presented across different levels of probability. In this study, the difference in nonverbal behaviour was also tested by comparing the incidence of behaviour under the two conditions of high and low probability of detection.

Going back to the effect of the deceiver-relevant situational factors, it is found that stakes may magnify deception cues. However, it is also found that stakes can influence truth-tellers’ behaviours in a similar way (in Paper 2, and in DePaulo, 1992). Given the above discussion about the link between probability of detection and stakes, this problem may also be raised in the probability factor. In addition, deception cues are difficult to detect, not only because they are influenced by situational factors, but also because deceivers may attempt to manipulate their behaviours during interactions by controlling the specific behaviours they present (Buller & Burgoon, 1996; Burgoon et al., 1996). That is, they may try to be credible and present similar behaviours as truth-tellers (DePaulo et al., 2003). To minimize this issue, I introduce another situational factor (i.e. self-regulation demand), and predict that the joint effect of these two factors can elicit a difference in nonverbal behaviour between deceivers and truth-tellers (specified below).

2.3. Missing Key Part of the Cognitive Mechanism behind Leakages of Deception Cues

Self-regulation is one of the fundamental cognitive processes of deliberate behavioural control (as introduced in Chapter II). Deliberate deception requires voluntary behavioural control, and suppressing the truth can place high demands on the psychological resources for self-regulation (Gombos, 2006). The Self-Regulatory Resources Model (Baumeister, 2002; Baumeister et al., 2007) proposes that self-regulation can be temporarily depleted (i.e. ego-depletion) due to high demand of psychological resources, and may result in failure or impaired self-regulation (e.g., Vohs & Heatherton, 2000). Individuals with depleted resources that are required by proper self-regulation may also fail to control their emotional, cognitive and/or behavioural responses (Baumeister, 2002). Since deception relates to deliberate behavioural control, overcoming emotions, and inhibiting the conflict between the false information and the default truth, all may place high demand on the psychological resources for self-regulation (Christ et al., 2009; Langleben et al., 2002), I propose that impaired or depleted resources for self-regulation due to deception tasks may result in deceivers' failure to manipulate/fake behaviour, which further leads to the leaking of behavioural cues while deceiving. Although deception researchers have proposed different reasons leading to the behavioural leakages of deception (e.g., Ekman, 1997; Vrij, 2008), the cognitive mechanism behind the leakage of deception cues is uncompleted. We know that enhancing the psychological processes of deception can lead to behavioural cues (Zuckerman et al., 1981), but no in depth explanation has been given about why this happens. By proposing the role of self-regulation failure led by ego-depletion (as above and also in Chapter II), I contend that the impairment or depletion of ego resources required by proper self-regulation is the key for the cognitive mechanism of leakages of deception cues. Previous findings indicate that ego-depletion can influence lie detection (Reinhard et al., 2012), intentions of deception (Gino et al., 2011), and the process of attempted

behavioural control during deception (DePaulo et al., 2003). However, as introduced in Chapter II, I contend that self-regulation failure led by ego-depletion is not only triggered by attempted behavioural control, but may also be by any factors/psychological processes that over demand self-regulation resources while deceiving. This idea is tested in this study, by comparing the nonverbal behaviours between the condition that enhanced demands for self-regulation and the control condition.

The manipulation of self-regulation was implemented by introducing a furnishing intervention in a public space (specified below), instead of introducing exhaustive tasks that deplete participants via demanding cognitive effort artificially (in Muraven et al., 1998). This is because artificial tasks may not be easily introduced in real life in helping to spot deceivers from truth-tellers. Nevertheless, it is recognised that self-focus (usually manipulated by inducing self-awareness with a mirror, Carver & Scheier, 1978; Geller & Shaver, 1976) can lead to task-focus, which is highly relevant to enhancing the demands of psychological resources for self-regulation (Carver & Scheier, 1998). Therefore, in order to alter the extent of the demands on resources for self-regulation, I intended to induce self-focus by installing a digital mirror and instructing participants to prepare for the deception task in front of the mirror. This might not only have increased the self-focus relating to task-focus, but might also have primed participants to control their behaviour prior to undertaking their tasks. By introducing this manipulation in the study, the demand on the resources for self-regulation will be increased in the condition where the digital mirror is present, when compared to the control condition.

2.4. Predictions and Hypotheses

In line with the above, the present study aims to test whether there are significant nonverbal cues and observable impressions discriminating deceivers from truth-tellers. Similar to

Paper 2, this work did not test any specific trend of nonverbal cues of deception; instead, it investigated any significant difference in the incidence (either increase or decrease in the amount) of a number of nonverbal body movements across body sections. In addition, impressions in relation to the underlying psychological processes given by deceivers were examined in this study (see details in Section 3.4.).

Based on the introduction in Sections 2.2. and 2.3., situational factors including probability of deception detection and the demands of psychological resources required for self-regulation are proposed to influence the psychological processes of deception (i.e. emotion, cognitive effort, and attempted behavioural control). Driven by such psychological processes, nonverbal behaviours may be altered by the probability of detection and demand of self-regulation, showing a difference in their incidence between deceptive and honest conditions. By manipulating the demand of self-regulation and the probability of detection jointly, I aim to amplify the effects of each of these two factors on behaviours and predict a more significant difference between deceivers and truth-tellers. The joint manipulation is also expected to mitigate the problem that the probability of being detected may not only influence deceivers, but also truth-tellers.

The study involved placing participants in high and low probability detection groups, and enhanced the demands of the psychological resources required by proper self-regulation (control groups of self-regulation were in place for making comparisons). Each participant undertook both deceiving and truth telling tasks. There are three factors that enhance the demand of self-regulation to the deceiving condition: (1) Compared with truth telling, deceivers' efforts to convincingly deceive increases demands on self-regulation, as discussed above. (2) When a higher probability of detection magnifies the extent of psychological processes of deception

(e.g., cognitive effort and attempted control, as found in studies presented in Paper 2 of this thesis), the magnified processes then place higher demands on resources required for self-regulation, compared with lower probability conditions (Leary & Tangney, 2003). (3) The intervention inducing self-focus also places demands on self-regulation (Carver & Scheier, 1998), compared with the control condition.

Since it is proposed that self-regulation has limited strength, which can be depleted due to overloading of demand on the ego resources (Baumeister et al., 1998), deceivers under conditions of higher probability and enhanced demand of self-regulation may experience higher overall demand of self-regulation than truth-tellers, as truth telling does not require as much cognitive resources as deceiving (e.g., Vrij, 2008, Vrij et al., 2011). The resources for self-regulation in deceivers are thus more likely to be exhausted. Following the introduction in Section 2.3 and Chapter II, when the overall demands exhaust the resources of self-regulation, the failure to control one's behaviour may occur. Deceivers who fail to manipulate their behaviour properly may thus leak cues such as body movements and/or impressions, compared with the condition when they are telling the truth. Taken as a whole, I predict that when the demands of self-regulation are enhanced, deceivers in the group with the enhanced probability of deception detection are more likely to have their self-regulation impaired compared to their own behaviour while telling truth under the same probability condition. This would lead to the expression of nonverbal behaviours being presented differently between deceiving and truth telling within the same person.

However, different patterns of behavioural changes are predicted in groups with a lower probability of deception detection. The impact of probability of detection on psychological processes of deception is decreased when deceivers are unlikely to be detected, and hence the

demand of resources for self-regulation is reduced. In line with the strength model of self-regulation (Baumeister et al., 2007), the overall demands on the resources of self-regulation are thus not as high as those in the higher probability conditions. Deceivers in this condition are less likely to be exhausted and may still be able to successfully control their behaviours. As suggested by interpersonal deception theory (Buller & Burgoon, 1996), deceivers will try to present fewer suspicious and similar behaviours than when they are telling the truth. As a result, no significant behaviour associated with deception will be found under such a condition.

If as predicted above, by altering the probability levels under higher demand for self-regulation, researchers might be able to discriminate deceivers from truth-tellers according to the distinct patterns of nonverbal cues. Overall, the hypotheses for these joint manipulations are as follows.

When the demand of self-regulation is enhanced:

Hypothesis 1. There will be a greater difference¹⁵ in the incidence of nonverbal body movements between deceivers and truth-tellers under higher probability of deception detection, compared with the lower probability groups.

Hypothesis 2. There will be a greater difference in the extent of the psychological process-related impressions between deceivers and truth-tellers under higher probability of deception detection, compared with the lower probability groups.

In addition, individual factors such as age, gender, cultural differences, and personality characteristics are assessed in this study, in line with Chapter IV - Paper 2. The effect of these factors is not the main focus of this study, but they are included as covariates so as to prevent a significant influence on the results.

¹⁵ This difference concerns both increases and decreases in the amount of behaviours.

3. Methods

3.1. Participants

Ninety-two university students were recruited for a study entitled “A Smuggling Game”. Valid data from 83 participants (38 males, 45 females) were included in the analyses ($M_{\text{age}} = 20.86$ years; $SD = 2.42$). To participate, students were required to have normal, or corrected to normal vision and hearing, as well as normal ability of body movement and communication.

3.2. Apparatus

The experiment, conducted by three doctoral experimenters (including the confederate playing different roles), took place in the corridor of a university building (see the layout of the settings in Figure V-a). As a busy departmental main building, there were passers-by walking through the corridor and passing the experiment area. The average number of journeys made by passers-by in the corridor was approximately 1,270 per day (one single passer-by may have made multiple journeys within the experiment area). Normally, passers-by did not stay in the experiment area, and three participants who were disturbed by passers-by were excluded from the data analysis. Four computer bags, together with two egg timers, were used in the experiment. Similar to the studies in Chapter IV, self-rated questionnaires were administered, containing (1) the Big Five Inventory (BFI) (John et al., 1991) assessing the five factors of personality, (2) a demographics form assessing age, gender, and country of residence for the majority of one’s life and (3), a short self-rating questionnaire checking that the manipulations for veracity (i.e. deceiving or telling truth), self-rated perception of self-focus, and perceived probability of deception detection were understood. For instance, the item “I was telling lies during the conversation” served to check whether people performed the instructed task for the deceptive condition or not. Data from three participants who did not understand the experimental

task were excluded from the analyses. Two video cameras were used to record behaviours, one at the waiting area and another at the conversation area of the experiment. Each participant received £7 for the one-hour experiment as well as a small extra reward of chocolates.

Figure V-a. Layout of the experiment area.

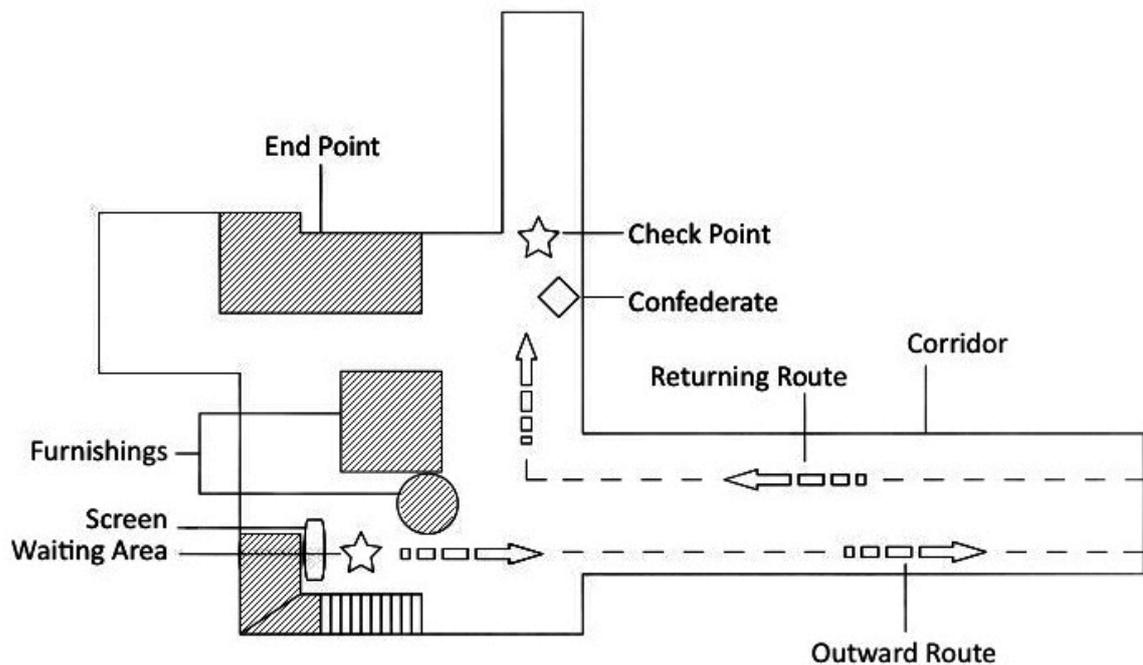


Figure V-a. The long corridor continues to the right side and, in all, is three times the length shown in the figure. See details in section 3.2. © 2013 IEEE <https://ieeexplore.ieee.org/document/6553800>

3.3. Design and Procedures

Dependent variables were (1) individual nonverbal body movements and (2) impressions displayed by participants, both extracted from the video clips of the experiment sessions via human content coding (see details in Section 3.4.). The independent variables were manipulated

in a 2 (veracity: deceptive vs. honest) \times 2 (probability level: higher vs. lower) \times 2 (demand of self-regulation: enhanced vs. not enhanced) mixed design, with veracity as within-subject variable (i.e. all participants did the tasks for both the deceptive and honest conditions) and probability of detection and demand of self-regulation as between-subject variables (i.e. participants were randomly separated into four groups, with each group doing tasks for one of the four combinations of conditions). The within-subject design of the deception variable (veracity), as recommended by Vrij (2008), can eliminate the potential impact of individual differences on deceptive behaviour.

Participants were invited to take part into “a smuggler game”, where each of them completed a behavioural task session, followed by a questionnaire session. In the behavioural task session, participants were randomly assigned to the four between-subject conditions (specified below) and each of them performed a similar task twice: one round for deceiving and one round for truth telling. The sequence of veracity conditions was counterbalanced (i.e. all the possible orders of conditions were used) so as to control the carryover effect (Kantowitz, et al., 2009). For each round, participants were provided with a computer bag, and after two minutes of waiting in the waiting area, they then walked along the corridor of the university building following a route pre-designated by the experimenter (as in Figure V-a, they walked towards the end of the corridor then took the returning route towards a checkpoint). Near the end of their routes, participants reached the checkpoint (the conversation area) and had a conversation (on average lasting two minutes) with the confederate. Once the conversation finished, participants completed the short self-rated questionnaire to check that they understood the task. After a 5-10 minute break, they undertook a similar task again, with the other veracity condition. Following the completion of two rounds of behavioural tasks and the manipulation check questionnaires,

participants completed the questionnaire pack introduced above and received £7 and chocolates. Debriefing forms were distributed to participants. The entire session with each participant lasted approximately one hour.

Deception was introduced in two forms: first, participants were provided with a timer that they needed to “smuggle” by carrying it inside of a computer bag and walking through the route without being detected by others (including the confederate and all the passersby), and second, they were instructed to be completely deceptive during their conversation with the confederate at the checkpoint. They were informed that being detected would result in losing the game and an extra reward (i.e. chocolates, blind to participants). This was done in order to introduce negative consequences of being detected. In fact, no detection was performed. In truth telling conditions, participants were not given the timer to conceal and they were asked to tell the truth during their conversation with the confederate. They were instructed to be as natural as possible. All the participants received the extra reward of chocolates at the end of the experiment.

Probability of deception detection was induced by altering the role played by a confederate. For higher probability conditions, the confederate played a formally dressed researcher, carrying a folder from the FBI academy. Participants in this condition were told that the confederate was a researcher from the FBI academy who was well trained to detect deceivers and would be looking for “smugglers” in the game. The confederate asked questions in an inquisitive manner about participants’ identity and background information, their subject of study, their activity for the day, the length of time that they would be in the building and the contents of the bag. The questions for each round were different but within the same scope, except for the overlapping questions about participants’ identity and background information. Participants were instructed to tell complete lies or the truth (depending on their condition of

veracity), regardless of what questions were asked. For lower probability conditions, the same confederate played the role of a student visitor who was new to the university. She asked participants to have a chat, since she was waiting for a friend. She also showed curiosity about the content of the bag. The conversation involved similar topics asked by the FBI confederate, but in a friendly rather than inquisitive way. However, participants were told that the student confederate was not trying to spot smugglers. Hence, the probability of being detected is much lower than for the FBI confederate condition.

Demand for self-regulation was enhanced by inducing self-focus, as discussed in Section 2.3. During the waiting period, participants were standing in front of a digital mirror in the waiting area (Figure V-a), and instructed to be well prepared for the task. For control groups, participants were standing in front of a digital screen displaying artwork, and were instructed simply to wait for the start signal from the experimenter. In all, each participant did both the deceptive and truth telling rounds and were randomly assigned to the four between-subject groups, each including one of the two conditions in the variables of high or low probability of detection and self-regulation demanded or control conditions.

3.4. Coding of Nonverbal Behaviours

Behaviour data were collected via video recording, and the tapes were edited into video clips. There were 166 clips (each for one round of the behavioural task, with a length of 1 minute 16 seconds on average) in total that were then reviewed and coded using (1) Coding Scheme-A (Table V-1) developed based on the literature for nonverbal movements (DePaulo et al., 2003; Vrij, 2008) and (2) Coding Scheme-B (Table V-2) assessing the impression related to psychological processes of emotions, cognitive load, and attempted behavioural control. Four coders (One undergraduate and three masters students in social sciences at a UK university)

trained for three hours and coded a 10% random sample of the video clips for inter-rater reliability test (Cronbach's alpha for different sections of cues: eye section = .96, trunk section = .83, hand/arm section = .93, leg/foot section = .75, and impressions = .75). Following the acceptable inter-rater reliability, the remaining 90% of clips were coded by two of four coders. The numerical data for each clip were finalised by averaging the ratings. The coders were blind to the experimental conditions and hypotheses, and the clips were muted in order to exclude the noise of voices. Movements that were presented in fewer than 40% of the participant pool were excluded from coding as they were considered less frequent movements. The valid movements were presented in Table V-1.

Table V-1

Coding Scheme – A (Body Movement Items)

Body Sections	Variable Name^a
Eye	Eye contact; Eyes averted; Other eye movements
Trunk	Trunk sway; Trunk lean towards; Trunk lean backwards
Hands/Arms	Hands and arms; Hands only; Fidgeting; Hands & objects; Hand(s) in pocket(s); Arms crossed; Hand holding
Legs/Feet	Legs and/or feet

Note. ^aBody movements being included in the analysis were in Bold. © 2013 IEEE <https://ieeexplore.ieee.org/document/6553800>

Using the Coding Scheme-A, the coders coded the movements across the body sections. Firstly, they used two separate 7-point scales to code (1) frequency of movements ranging from 1 = exists to 7 = always (i.e. happens all the time in a given clip), and (2) duration of movements ranging from 1 = brief to 7 = whole session (i.e. lasts for the whole session in a given clip). Then they gave an overall rating of the proportion of a movement that appeared in the full session in one clip (according to the ratings of frequency and duration) using a 7-point scale ranging from

1= very briefly existed to 7= existed during the entire session. The scores of the overall ratings were used in the final analyses. Missing values were coded as 0, so as to represent the absent status of movements. Using the Coding Scheme-B, the coders rated the impressions displayed by participants in each clip assessing 12 items, on a 7-point scale ranging from 0 = impression wasn't detected to 6 = to the greatest extent (e.g., the highest degree of tense). The individual impression items were grouped into subcategories of impressions with reverse coding of positive items (See Table V-2). The subcategories of impressions were later found to be all significantly correlated to each other, and were then averaged into one item, called “negative and controlled impression” displayed by participants.

Table V-2

Coding Scheme – B (Impression Items)

Underlying Psychological Processes	Variable Name (Appears to be ...)	Subcategories of Impressions^a
Emotional process	Relaxed	Tense
	Tense	
	Pleased	Unpleased
	Unpleased	
	Friendly	Unfriendly
Unfriendly		
Cognitive effort	Thinking hard	Thinking hard
	Formal	Formal
Casual		
Attempted behavioural control	Rigid in movements	Rigid
	Smooth in movements	
	Endeavoring to manipulate behavior	Behavioural manipulation

Note. ^aCreated by grouping the items listed in the second column. The mean of the subcategories was included in the data analysis as the overall impression item (due to significant correlation between subcategories).

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3.5. Data Analysis

Similar to the study presented in Chapter III, the present study used a mixed design, which contained one within-subject variable and two between-subject variables. Therefore, similar

Mixed Design ANCOVA tests were conducted separately for individual movements and the impression item, which test both the main effect of veracity (i.e. within-subject variable) as well as the interaction effects of probability, self-regulation, and veracity. The latter interaction effects are the focus of the present study, as they may reveal the difference in the incidence of dependent variables between deceivers and truth-tellers across conditions of probability and/or self-regulation. Demographic information and the order of tasks did not significantly influence any of the dependent variables, and thus was removed from the covariate battery. The Big Five Inventory scores were retained as covariates in the ANCOVAs for the dependent variables including ten body movements and one impression item, as some of the five personality traits have a significant effect on the results. Cronbach's alpha for BFI scores are: Extraversion (Bfie) = .86, Agreeableness (Bfia) = .71, Conscientiousness (Bfic) = .79, Neuroticism (Bfin) = .76, and Openness (Bfio) = .72).

4. Results

4.1. Body Movements

Table V-3 shows the results for the within-subject effects in the mixed design ANCOVA conducted for the ten body movements, followed by Bonferroni pairwise comparison. By controlling BFI scores as covariates, significant interaction effects between veracity and probability of detection are found in “hand(s) in pocket(s)” $F(1, 74) = 4.57, p < .05, \eta p^2 = .06$. Amongst the five covariates, agreeableness produced a significant effect on the finding, $F(1, 74) = 7.28, p < .05, \eta p^2 = .09$. An explanation of the possible reasons is discussed in Section 5.1. There is no significant main effect for veracity, which suggests that in the mixed model considers the veracity, the probability of detection, and self-regulation variables, no significant difference in “hand(s) in pocket(s)” between deceiving and truth-telling conditions has emerged. However,

the veracity \times probability of detection interaction reveals two significantly different patterns of “hand(s) in pocket(s)” movements in relation to probability of detection and veracity: in the higher probability of detection conditions, the amount of “hand(s) in pocket(s)” movements decrease from the deceiving ($M = 4.13$, $SD = 3.23$) to the truth telling condition ($M = 3.29$, $SD = 3.03$), $d = 0.27$; this pattern is significantly different from that in lower probability conditions, where “hand(s) in pocket(s)” increase from the deceiving ($M = 3.24$, $SD = 3.19$) to the truth telling condition ($M = 3.46$, $SD = 2.99$), $d = -0.07$ (see Figure V-b). In line with Cohen’s d values for the mean differences, the subsequent Bonferroni corrected post-hoc tests shows that when the probability is higher, the extent of such a behavioural cue found in deceptive and honest conditions is significantly different, $t(42) = 2.48$, $p < .05$, $d = 0.77$; whereas when the probability is lower, there is no significant difference in the incidence of such a behavioural cue presented in deceptive and honest conditions. These findings were predicted in hypothesis 1, under the situation when self-regulation was demanded; however, no significant effect of self-regulation emerged in the results, as discussed in Section 5.1.

Table V-3

Results for Mixed Design ANCOVAs^a – Within-Subject Comparisons

	Body Movements			
	<i>F</i>	<i>df</i>	<i>p</i>	η_p^2
Hand(s) in Pocket				
Veracity main effect	0.41	1, 74	.53	.01
Veracity × Probability of detection	4.57	1, 74	.04	.06
Veracity × Self regulation	2.31	1, 74	.13	.03
Veracity × Bfie	1.33	1, 74	.25	.02
Veracity × Bfia	7.28	1, 74	.01	.09
Veracity × Bfic	0.97	1, 74	.33	.01
Veracity × Bfin	0.01	1, 74	.91	.00
Veracity × Bfio	0.04	1, 74	.84	.00

Note. ^aInsignificant dependent variables were not listed. η_p^2 = effect size estimate – partial eta squared.

*Significant effect of variables: $p < .05$, stated in Bold. © 2013 IEEE <https://ieeexplore.ieee.org/document/6553800>

Figure V-b. Plot of the Veracity × Probability of detection interaction.

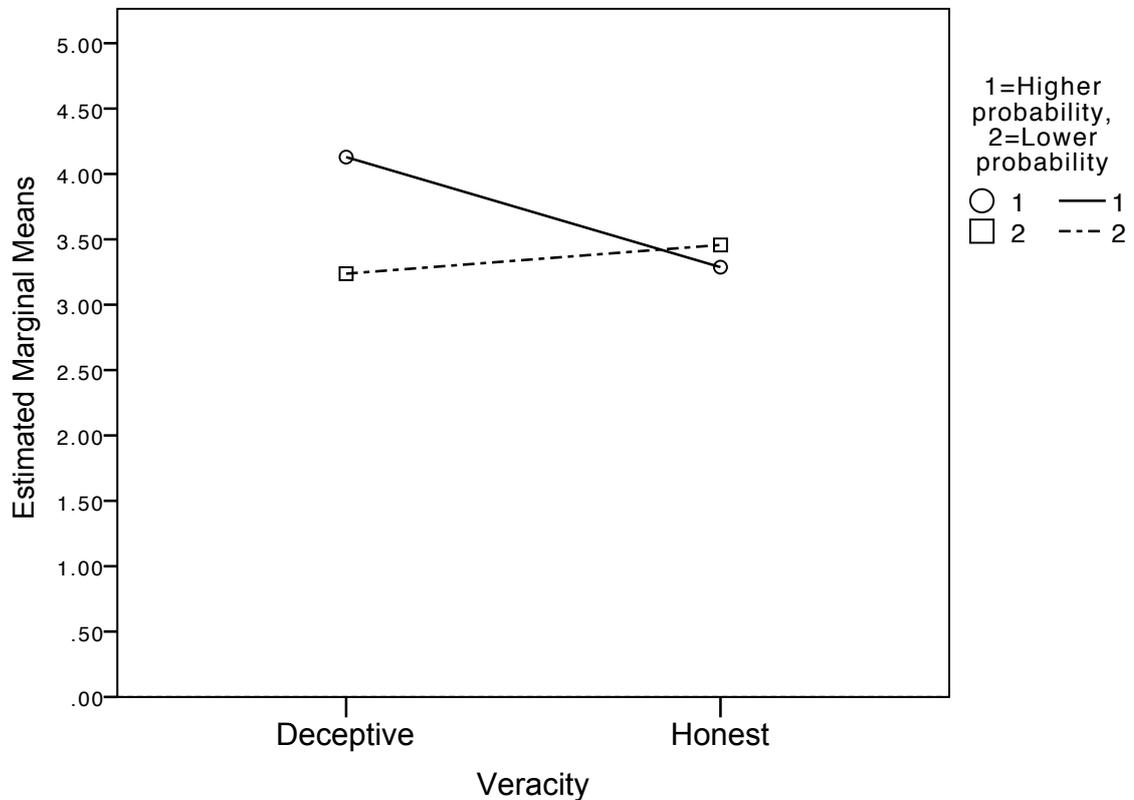


Figure V-b. The plot shows significantly different patterns of hand(s) in pocket(s) movements across deceiving and truth telling (honest) conditions between the higher and lower probability of detection groups. © 2013 IEEE <https://ieeexplore.ieee.org/document/6553800>

4.2. Impressions

The results for the between-subject effects in the mixed design ANCOVA (Table V-4) also revealed that by controlling BFI scores as covariates, probability of detection has a strong effect in magnifying the “overall negative and controlled impression” (this item is created by taking the mean of all the subcategories of impressions as introduced above) $F(1, 74) = 18.72, p < .001, \eta^2 = .20, d = 0.99$. Amongst the five covariates, extroversion had a significant effect on the finding,

$F(1, 74) = 5.75, p < .05, \eta_p^2 = .07$, as discussed in Section 5.2. There was a greater degree of negative and controlled impression associated with higher probability of detection levels ($M = 2.51, SD = 0.38$) versus the lower probability of detection levels ($M = 2.14, SD = 0.37$). These findings partially support the prediction that probability of deception detection can magnify impressions. However, this effect was found regardless of the veracity conditions. There was no effect of self-regulation on impressions. Further discussions are presented in Section 5.2. Values of mean and standard deviation for all the analysed dependent variables are presented in Appendix 3 Table A-5 and Table A-6.

Table V-4

Results for Mixed Design ANCOVAs^a – Between-Subject Comparisons

	Impressions			
	<i>F</i>	<i>df</i>	<i>p</i>	η_p^2
Negative & Controlled Impression				
Probability of detection	18.72	1, 74	.00	.20
Self regulation	1.46	1, 74	.23	.02
Probability of detection × Self-regulation	2.02	1, 74	.16	.03
Bfie	5.75	1, 74	.02	.07
Bfia	0.04	1, 74	.84	.01
Bfic	0.01	1, 74	.93	.00
Bfin	2.13	1, 74	.15	.03
Bfio	2.48	1, 74	.12	.03

Note. ^aInsignificant dependent variables were not listed. η_p^2 = effect size estimate – partial eta squared.

*Significant effect of variables: $p < .05$, stated in Bold. © 2013 IEEE <https://ieeexplore.ieee.org/document/6553800>

5. Discussion

5.1. Deception and Body Movements

The probability of deception detection leads to differences in the amount of “hand(s) in pocket(s)” behaviour presented by the same person in deceiving vs. truth telling conditions. When the probability of deception detection is higher, people who are telling lies are more likely to put their hands in their pockets, compared with when they are telling truth. This pattern is significantly different in groups with a lower probability of detection (no significant difference between deceiving and truth telling), suggesting that it is possible to discriminate between deceiving and truth telling in the same person by comparing the pattern of change in one’s “hand(s) in pocket(s)” under higher and lower probability of detection conditions. This finding also supports the proposition that probability of detection can alter deceptive behaviour. Putting one’s “hand(s) in pocket(s)” is considered to be a sign of self-restrained behaviour (Isley et al., 1991). Increases in such behaviour may be related to overcontrol of behaviours during deception.

The finding regarding the different pattern of changes in the incidence of the “hand(s) in pocket(s)” deception cue between higher and lower probability groups supports the prediction (Hypothesis 1) under the self-regulation demanded condition. A higher probability of detection, together with deceiving, is predicted to place a high demand for self-regulation on individuals. In line with my prediction, such high demand triggered the impairment or complete ego-depletion of the psychological resources for self-regulation, resulting in a significant difference of the nonverbal cues being presented between deceptive and honest conditions. This is likely to be due to the demands on self-regulation resulting in a loss of proper behavioural control and presenting overcontrol of behaviour, as a result of impaired self-regulation (Vohn & Heatherton, 2000). This finding about the nonverbal cue indicating overcontrol, considered as a nonstrategic deception cue (Burgoon & Buller, 1994), is in line with my proposition that the impairment or failure of self-regulation leads to nonstrategic behavioural leakages. Consistent with the

prediction (Hypothesis 2), the finding here supports that deceiving in the lower probability of detection condition does not necessarily lead to a overloading demand on self-regulation. That is, depletion does not occur and deceivers are still able to control their behaviour deliberately and present no statistically significant different behaviour compared with when they are telling the truth.

The above findings were exactly predicted under the condition of self-regulation induced conditions. However, there is no significant difference found in the cue between self-regulation demanded and the control groups. One possible explanation is that by participating in the behavioural tasks in a public space, participants already had a high level of self-focus and led to high demands of self-regulation resources. That is, the situational factors involved in such a busy public space, such as being watched by many passers-by as well as preparing lies for the conversation, may have contributed to the high demand of resources for self-regulation. Such an effect suppressed the manipulation of self-focus prior to the task.

This result, together with my previous discussions about the role of self-regulation and depletion of psychological resources required by it, suggests that the threshold of self-regulation depletion might determine the magnitude of differences between deceivers and truth-tellers' behaviour. That is, it is not necessarily the case that only the self-regulation tasks lead to depletion. Instead, an additive effect of a combination of the manipulation including the self-regulation tasks, the higher probability of detection, together with deceiving leads to depletion of self-regulation. Notably, such a combination of tasks may also lead to depletion of self-regulation in truth-tellers, when the additive effect exceeds their capacity for self-regulation. As a result, truth-tellers may also exhibit tense and over-controlled behaviour that is similar to deceivers. For example, in the condition when the probability of detection is lower (Figure V-b),

deceivers and truth-tellers did not express a significant difference in hand(s) in pocket(s) behaviour. Taken as a whole, the greatest magnitude of behavioural difference (e.g., deception leakages) between deceivers and truth-tellers may be elicited by manipulating factors that lead to depletion in deceivers but not in truth-tellers. This would result in the deceivers' failure of self-regulation and behavioural leakages that are out of control, while truth-tellers would still be able to regulate themselves normally. Future studies are highly recommended to explore and test appropriate combinations of such manipulations and supportive findings would help practitioners to identify sets of interventions that could be used to elicit deception cues.

In addition, this finding also indicates the possible contextual effect on deceptive behaviours and supports the view that more practical-oriented deception studies should be conducted in contexts outside of the laboratory (ten Brinke & Porter, 2012), since the contextual factors may influence the effects of the manipulation of situational factors. By considering the difficulty of broadly generalising the findings from one specific context (DePaulo & Bond, 2012), I consider it is more appropriate to explore deceptive behaviours in several specific contexts and to use the findings for lie detection only in similar settings. I also recommend future research to compare deceptive behaviours with truth telling behaviours within the same person. This will reduce any unknown influence of individual differences in relation to deceptive behaviour (Vrij, 2008).

In line with the above, this finding partially supports my proposition about the role of ego-depletion leading to self-regulation failure in terms of triggering the behavioural leakages of deception. Considering this indirect evidence as well as the essential role of self-regulation on deliberate deceptive behaviour as introduced in Chapter II, I contend that self-regulation led by ego-depletion is likely to be the key missing part of the cognitive mechanism behind the leakage

of deception cues that has failed to be addressed in the literature. That is, to complement Zuckerman et al.'s (1981) proposition suggesting that enhancing the psychological processes of deception (e.g., emotion, cognitive effort) lead to deception cues, I propose that the deception cues are not directly generated from the enhanced psychological processes involved in deception, but are leaked due to the impaired self-regulation or complete ego-depletion resulted from the psychological demands from enhanced emotions, cognitive effort, etc. Before this study, ego-depletion had only been discussed in relation to lie detection accuracy performed by lie detectors and on deceptive intentions (Gino et al., 2011), or been linked to attempted behavioural control only (DePaulo et al., 2003). By introducing the role of self-regulation in influencing deceptive behaviour, I propose that self-regulation failure led by ego-depletion may be elicited by any factors/processes that place overloading demands on the self-regulation resources. This is the first attempt to link ego-depletion to all the psychological processes of deception, which form the cognitive mechanism underpinning the behavioural leakages of deception. Indeed, more empirical studies are encouraged to be carried out to test this proposition, by manipulating factors that could potentially enhance the demands on the psychological resources required for self-regulation.

Individual factors also have effect on the behavioural leakages of deception. Amongst the five factors of personality, agreeableness is found to be significantly influencing the deception cue of “hand(s) in pocket(s)”. This might due to the fact that agreeableness has been found in relation to perception of probability (Chauvin et al., 2007) and interaction quality (Berry & Hansen, 2000). Because personality is not the focus of this study, these individual factors were controlled so as to prevent their impact on the findings. However, further studies may be

conducted so as to test the relationship between individual factors and cues of deception, or to test the interactive effect between individual and situational factors on deceptive behaviour.

5.2. Probability of Detection and Overall Impressions

Probability of deception detection shows a strong effect on the overall negative and controlled impression displayed by individuals. Such a general impression is considered a sign of negative emotion and overcontrol of behaviour, which are part of psychological processes of deception (Vrij, 2008). This finding suggests that with a higher probability of detection, deceivers tend to demonstrate a more negative affect and controlled behaviour, as compared to when the probability of detection is lower. This shows that the probability of deception detection can lead to magnified impression cues in deceivers. However, as predicted, this effect also strongly influences truth-tellers, who presented a pattern similar to deceivers. This replicated finding (also found in Chapter IV - Paper 2 of this thesis) supports my view that the probability of deception detection has similar properties to the stakes (extent of consequence) of deceiving, which could magnify the behaviours exhibited by both deceivers and truth-tellers (DePaulo, 1992). Due to the strong effect of the probability of detection on impressions displayed by both deceiving and truth telling individuals, it is recommended that future studies pay as much attention to the probability of detection as to the stakes with regard to how the probability of detection can influence nonverbal behaviours, including impressions presented by individuals. I recommend future research that tries to magnify the difference between deceivers and truth-tellers to consider introducing multiple factors in addition to the probability, such as cognitive load, as I am of the view that multiple factors and deceiving combine to demand resources for self-regulation, which may finally lead to failure to manipulate behaviour to such an extent that the deceivers' behaviours can be distinguished from those of truth-tellers. This study also shows

that the personality factor of extraversion significantly influences the impressions displayed by participants. Although it has been found that extraverts and introverts present different behaviour when they lie (Vrij, 2008), further studies may be conducted so as to explore any direct relationship between this personality factor and impressions presented by deceivers.

5.3. Limitations and Future Studies

There are other methods to assess veracity, probability of detection, and the demands of self-regulation. For example, the demand of self-regulation can be increased by introducing additional self-regulatory tasks or questionnaires prior the deception task (e.g., in Muraven et al., 1998). However, these tasks were not used, as I intended to use a realistic intervention (mirror) that introduces few artificial effects into the experiment. In addition, it is recognised that field experiments like this study and those presented in Paper 2 may have lower internal validity compared to laboratory studies (Brown, 2006; Kantowitz, et al., 2009). However, given the practical goal concerning lie detection and control of deception for this whole research, I consider it is worthwhile to conduct field studies that can provide meaningful information regarding deceptive behaviour in real world settings. Field studies also have better ecological validity than artificial laboratory settings, in that the findings can be generalised to cover a range of true events, rather than just replicate experiments, as in the context of highly controlled laboratories (Elmes et al., 2003). Nonetheless, it will be useful to test the effect of the self-regulation failure on deception in purified settings after this first examination, as a highly controlled laboratory environment would eliminate the impact of confounding factors, such as the influences of the public space that emerged in this study, which would thus establish a more solid causal relationship between self-regulation failure and deception leakages (Goodwin, 2010)

In addition, this study administered subjective coding so as to assess cues that could be easily observed by human beings. It is also recommend the automatic annotation of a broader range of behavioural cues to be performed, in order to assess more detailed deceptive behaviours that are more than observable cues based only on the human eye. Desteno et al. (2012) recently found that by combining individual body movements into one variable, deception can be distinguished from truth telling. However, combining the individual movements properly requires specific temporal information for each movement. The onset/offset of cues is an important criterion in determining which individual movements could be combined together to serve as a movement set. This information can be obtained by using video annotation applications and I encourage future studies in the field of computer vision to perform analysis on such information.

On the other hand, although the deception cue observed from this study is generated from human coding, it is possible that lie detectors in real life are still unable to notice the small difference in the hand(s) in pocket(s) behaviour between the high and low probability of detection conditions. This problem also persists for many other deception cues found in the deception literature and in Paper 2 (Vrij, 2008). In line with this, researchers also try to test cues to deception in the automatic recognition field (e.g., Jensen et al., 2010; Nunamaker et al., 2012; Zhang et al., 2012), by developing automatic tracking and movement recognition systems to detect deception cues that could be far more detailed than those that are observable by human eyes. I believe that the findings of this study will provide information concerning nonverbal deceptive behaviour to these researchers within the community of computer vision and multimodal interaction. The proposition regarding the role of ego-depletion on behavioural leakages not only applies for a specific coding technique as used in this study, but can also help

researchers in any field to understand better about how deception cues are generated as well as how to elicit leakage cues by enhancing the demand of psychological resources of self-regulation.

6. Conclusion

This field experiment assessed nonverbal body movements and impressions expressed by deceivers in a public space. The nonverbal behaviours found in this study reflected individuals' reactions to another person during face-to-face interaction and their reaction to situational factors (e.g., probability of detection). The specific body movement of "hand(s) in pocket(s)" found in relation to deception indicates overcontrolled behaviour of individuals as influenced by the situational factors assessed in this study. The findings regarding this specific deception cue and the negative and controlled impression magnified by the probability of detection could help lie detection researchers and practitioners to understand deceptive behaviour happening in this specific context. As predicted, the finding partially supports the proposition that self-regulation failure led by impairment or ego-depletion of psychological resources can eventually lead to behavioural leakages revealing deception. Such a proposition may benefit deception researchers in explaining why deception cues are leaked and how to elicit leakage cues by manipulating situational factors that enhance demands on self-regulation resources. Further, the present study has assessed deception, including both the concealment of an object and lying. In line with limitations identified in Chapter IV - Paper 2, I recommend attempts to investigate deception involving multiple types and greater task complexity, as complex deception leads to greater cognitive load (Vrij et al., 2008; Vrij & Granhag, 2012) than simple tasks and this may contribute to self-regulation failure led by ego-depletion. I believe that extending the investigation to natural settings with different tasks will be beneficial to further real world

applications of experimental findings. As DePaulo and Bond (2012) have suggested, the exploration of deceptive behaviour should not be limited to a specific context or paradigm. There are diverse kinds of deceit, and also diverse situational factors in the real world.

CHAPTER VI
SUMMARY
AND
GENERAL CONCLUSION

The present research targeting deceptive behaviour consists of six empirical studies taking the forms of an online experimental survey and behavioural experiments in diverse contexts, including: hypothetical scenarios of workplace and daily life contexts, as well as security check situations. These six pieces of work have investigated interpersonal deception from the forming of intentions to the exhibition of nonverbal behavioural indicators. The findings not only contribute to the literatures regarding deception research, but also to those concerning ethical decision-making in the workplace context. In addition, the findings relating to the effects of situational factors on deceptive intentions and behaviours also indirectly support social psychology theories concerning the effects of situational factors in relation to decision-making processes and self-regulation on human behaviour. Furthermore, this research may also benefit practitioners who want to prevent, detect and control deception in the field. The following sections consider all six studies as a whole, and summarise the main findings across the three papers of this thesis. Then, I discuss the general theoretical implications together with proposals for future studies, which is followed by consideration of the practical implications. Please also refer to the discussion sections in each paper for the limitations as well as the detailed discussions for each study.

1. Main Findings

From an overall view of all three papers, there are generally three main findings, each supporting one general prediction of this research (in Chapter II): (1) Situational factors in relation to negative outcomes for deceivers and victims work together in influencing the early stage of deceptive behaviour, i.e. the forming of deceptive intentions; (2) Situational factors in relation to negative outcomes for the deceiver can also shape the late stage of deceptive behaviour, i.e. nonverbal body movements and/or impressions exhibited by deceivers; and (3)

My proposition drawn from the literature, which is partially supported by deception cues elicited by situational factors, implies that self-regulation failure led by ego-depletion is likely to be a key part of the cognitive mechanism behind behavioural leakages of deception.

Taking the three papers as a whole, the above three main findings can be further specified in terms of five points. First, situational factors in relation to the deceiver's negative outcome, including the probability associated with the negative consequences of deceiving and the stakes of not to deceive, both influence deceptive intentions in different directions. Regarding this, a higher probability of a negative outcome for the deceiver predicts lower deceptive intention, compared with a lower probability situation. By contrast, higher stakes of not to deceive predict greater deceptive intention when compared with lower stakes. These two factors also have an interactive effect on deceptive intentions, suggesting that the role of the probability is mediated by the stakes. That is, when the stakes of not to deceive are low, the probability no longer influences deceptive intentions.

Second, the situational factor of moral intensity, relating to the seriousness of the victim's negative consequences of being deceived, has an effect on deceptive intentions. Similar to studies in the field of ethical decision-making (reviewed by Craft, 2013), it is found that greater moral intensity, which indicates greater harm to victims of unethical behaviour (Jones, 1991), predicts lower intentions to undertake unethical behaviour (i.e. deceptive behaviour in this study) compared with lower moral intensity. More interestingly, moral intensity interacts with the stakes of not to deceive, which is relevant to the negative outcome for the deceiver (or called the decision-maker). The interactive effect further shows that these two factors moderate each other's effect on deceptive intentions. In brief, this finding indicates that people may be "forced to deceive" when there are factors serving as obstacles to being honest. Notably, such "forced

deception” happens more frequently in low moral intensity than in high intensity situations. The interactive effect between the stakes and moral intensity indicates that situational factors in relation to both the deceiver and the victim of deception, work together in determining deceptive intentions.

Third, the probability associated with the deceiver’s outcome (i.e. negative consequence) of deceiving influences not only deceptive intentions, as summarised above, but also nonverbal indicators of deception. Amongst the five studies assessed specific behaviours in relation to deception, nonverbal behaviours, such as the impression of negative and controlled affect and reduced hand and arm movements, were elicited when there is a higher probability of being detected deceiving, compared with lower probability conditions. These findings support the importance of probability associated with the negative outcome for deceivers in shaping deceptive behaviour from intentions to exhibition of specific behavioural cues. In addition, duplex deception tasks under induced probability of detection also leads to a greater increase in the impression cue of manipulated behaviour than a single deception task, which suggests that task complexity can make a difference in deceivers’ behaviour under higher probability of detection.

Fourth, the findings partially support the proposition that self-regulation failure, caused by ego-depletion, leads to behavioural leakages of deception (as in Chapter V). More specifically, the results of Study 6 support the prediction that demands for self-regulation facilitate ego-depletion and further results in the leakage of deception cues (i.e. increased hand(s) in pocket(s) behaviour). However, such a deception cue is not statistically influenced by the manipulation of self-regulation demands. In paper 3 (Chapter V), I have explained that this issue is most likely due to the public space where the study took place. That is, the crowded place where participants

received a great amount of attention, and the cognitive demanding tasks of deceiving, placed a great demand on self-focus and self-regulation. In other words, the high demands of self-regulation resulting from such a context overwhelmed the experimental manipulation of self-regulation demands in this study. This led to the non-significant effect of manipulation of self-regulation, as the overall demands of this was high even under the condition where the experimental manipulation of self-regulation demand was low.

Finally, it emerged that nonverbal indicators of deception are influenced by research contexts, thus supporting the views of Ekman (1992), Vrij (2008), DePaulo and Bond (2012), etc. Table VI-1, summarising the nonverbal cues found across the present studies, suggests that many of these cues to deception are not consistently exhibited by deceivers, thus implying deceptive behaviours are sensitive to contexts. In addition, although nonverbal deception cues similar to those found in this research were previously discussed by deception researchers (e.g., Ekman, 1997; Vrij, 2008), none of these cues showed a large effect in the previous meta-analysis study conducted by DePaulo et al. (2003). This might also be due to the effect of diverse contexts assessed in the different studies, which leads to a difference in behavioural cues found between the present studies and the previous ones that were included in the meta-analysis. Notwithstanding this, the hands seem to be the body parts that are most likely to reveal deception, for they leak most of the cues to deception across these studies (see Table VI-1). In the next section, I discuss the present findings, in terms of their implications for theory and future research.

Table VI-1

Nonverbal behaviours altered by deception and probability across studies

Nonverbal cues (Body movements & Impressions)		Deception	Probability of detection
Body movements	Hand & Arm	Chapter IV Study 4*	Chapter IV Study 1*
	Hand holding	Chapter IV Study 1**	Chapter IV Study 2*
	Hand(s) in pocket(s)	Chapter V** (Deception × Probability)	
	Trunk	Chapter IV Study 4 *	
Impressions	Negative affect		Chapter IV Study 2**
	Negative & controlled		Chapter V**
	Manipulated behaviour	Chapter IV Study 4 ** (Duplex deception)	
	Tense		Chapter IV Study 2**
	Positive affect	Chapter IV Study 4**	

Note. **Significant effect of variables: $p < .05$; *trend of significant effect of variables: $P < .055$.

2. Theoretical Implications and Future Studies

Taking the three papers as a whole, the investigation assessing the effects of situational factors on interpersonal deception presents a comparatively complete picture covering the forming of deceptive intentions to the exhibition of the nonverbal indicators of deception. The solid theoretical basis of this research (e.g., theory of planned behaviour, psychological processes of deception, and ego-depletion, etc.) established a clear rationale for assessing deceptive intentions and behaviours, together with specific situational factors throughout the three papers. In addition, this research explored factors that are seldom visited in the literature, such as the stakes of not to deceive and their interaction effect with moral intensity on deceptive intentions. Further, this research also identified that the probability associated with the negative consequence of deceiving (including the probability of detection) influences deceptive behaviour across the early and late stages of deception (i.e. from intentions to behaviours). In addition, the behavioural indicators have been examined in this research based on a coding scheme assessing body movements and general impressions. Such a systematic investigation into both of these two kinds of nonverbal behaviours contributes to better understanding of deceptive behaviour as well

as the role of the psychological processes (i.e. emotion, cognitive effort, and attempted behavioural control) underneath deception cues. More importantly, the proposition suggesting of there being a missing part in the cognitive mechanism behind behavioural leakages of deception in the form of self-regulation failure (caused by ego-depletion), is the first attempt to explain the origin of deception leakages in depth. Finally, this research involved visiting diverse contexts (e.g., workplace, security contexts, etc.) and different environments (e.g., laboratory, public space, etc.) where deception can happen. As a result, the findings that have emerged enrich the deception literature with empirical data that add new insights into such behaviour associated with different situations. In sum, by investigating interpersonal deception in relation to the above aspects, the present research has several theoretical implications not only for the deception literature, but also that pertaining to ethics and social psychology. The main theoretical implications for the whole thesis, followed by suggestions for future studies, are considered below.

2.1. From intentions to specific behaviours: Situational factors and self-regulation

Theoretical implications.

The six studies comprising the present research overall support the view that deception can be influenced by situational factors from the early stage of intention forming, to the late stage of behaviour exhibition. More specifically, the findings from this research have suggested what situational factors (e.g., the probability of receiving negative consequences) contribute to such an effect and how these factors work together in forming deceptive intentions (e.g., influenced by the stakes of not to deceive and moral intensity) and behavioural cues (e.g., influenced by the probability of detection and demands of self-regulation).

From a specific perspective, the probability associated with the negative consequences of

deceiving, as an essential element of reasoning process (Ajzen, 1991b), has been found to influence not only deceptive intentions, but also deceptive behaviours in the present research. Such a general finding suggests that the reasoning process of deceiving (on the negative outcomes for deceivers) plays an essential role in altering their behaviour throughout the early to late stages of deception. Since self-regulation plays an essential role in controlling reasoning with the assistance of the central executive (Hofmann et al., 2011), this finding also indirectly supports the view that deceptive behaviour is highly dependent on the deliberate control from self-regulation (Baumeister et al., 1994), and the reflective system (Hofmann et al., 2009). From a broad perspective, this research provides further empirical evidence that human behaviour is strongly influenced by situational factors (Lewin, 1951).

Future studies.

More investigation into factors in relation to the reasoning and self-regulation processes in deception studies is recommended. Since the situational factors investigated in the current research represent only some of the potentially influential ones (Kihlstrom, 2013), future research could extend the scope and test other factors on the basis of the present findings. Researchers in the cognitive psychology field have conducted studies assessing the role of the central executive (in working memory, Abe et al., 2006; Gombos, 2006) on deceptive behaviour. They may also consider the effect of factors, such as the probability associated with the negative consequences of deceiving, as well as the stakes of not to deceive, as assessed in this research. Future research aiming to confirm the role of self-regulation may also introduce depletion tasks prior to the decision-making regarding deception (Muraven et al., 1998), because as evidenced in the literature people who are ego-depleted may tend to be influenced greater by the impulsive system than the reflective one (Hofmann et al., 2009, as introduced in Chapter II). Consequently,

their intentions to deceive under the depleted conditions may be different from those when not depleted. Such study would not only shed further light on the role of self-regulation, but also test the effect of ego-depletion on deceptive intentions.

2.2. Psychological processes of deception: Media of influences from situational factors

Theoretical implications.

The role of the psychological processes of deception (i.e. emotions, cognitive effort, and attempted behavioural control) (Vrij, 2008; Zuckerman et al., 1981) is supported by the present findings concerning deceptive intentions and behaviours. In terms of deceptive intentions, deceivers tend to avoid deception in high moral intensity situations that imply very harmful outcomes for the victims. This indicates that a guilt emotion triggered by the negative impact on the victims of deception (Ekman, 1992) might be involved in the forming of deceptive intentions. On the other hand, a high stake of not to deceive may lead to justification for deceiving as well as fear of receiving negative consequences of abstaining from deception, may moderate the feeling of guilt triggered by moral intensity (Ekman, 1992). This implication is indicated by the finding that the stakes of not to deceive and moral intensity moderate each other's effect on deceptive intentions.

In terms of nonverbal indicators of deception, the involvement of the emotional process is supported by the impression cues, such as negative affects exhibited by the deceivers (Ekman, 1985). In addition, reduction of hand and trunk movements presented by deceivers infers the involvement of cognitive effort (Memon et al., 2003) and possible overcontrol of behaviour (DePaulo et al., 2003; Vrij et al., 1997). The finding of nonverbal behavioural cues (including body movements and impressions) to deception contributes to the literature about effective deception indicators that may be used in lie detection studies. Nonetheless, when the probability

associated with the negative consequences of deceiving is high, truth-tellers sometimes present similar nonverbal behaviours as deceivers. This finding confirms Vrij (2008) and DePaulo's (1992) proposition that the indicators of the psychological processes of deception are also found in truth-tellers. Such an overlap of behaviour is due to the fact that the high probability associated with, for instance, security check contexts, results in physiological arousals associated with "fear of being disbelieved" (Ekman, 1992 p. 51). Such nervousness triggers negative emotion and the attempt for inhibiting such an inappropriate emotion results in overcontrolled behaviour even in truth-tellers (Christ et al., 2009; Vartanian et al., 2012; Vrij, 2008), thus leading to their nonverbal behaviour being similar to that of deceivers.

From this finding of this research, it can be inferred that the situational factors are likely to influence deceptive intentions and behavioural cues via their influences on the corresponding psychological processes of deception. In addition, the finding highlights the view that psychological processes of deception are fundamental to deception, by showing that their effect exists from the early stage (i.e. forming of intentions) and lasts through to the late stage (i.e. exhibition of specific behaviours) (Ekman, 1992; Vrij, 2008; Zuckerman et al., 1981). Furthermore, this finding confirms the view that the psychological processes of deception can be enhanced by situational factors and that such processes, in some cases may, also be elicited in truth-tellers (DePaulo, 1992; Vrij, 2008). Such an overlap might be due to self-regulation having similar processes as those three for deception, as discussed in Chapter II. That is, truth-tellers who experience enhanced self-regulation processes that are similar to those for deception (e.g., emotional control for the fear of being disbelieved (Ekman, 1992)) consequently exhibiting behaviours similar to those associated with the deception processes (e.g., negative affect), which leads to the aforementioned overlap of behaviours between truth-tellers and deceivers.

Future studies.

Although the behavioural indicators of deception associated with the three psychological processes (Table II-1) have been widely assessed in the deception literature (reviewed by DePaulo et al., 2003; Vrij, 2008), the effect of the same factor (i.e. the probability in this research) for eliciting these processes throughout the early and late stages of deception requires more investigation. The present research may, therefore, inspire more future research probing factors (e.g., harm to the victim that may lead to a guilt emotion) in relation to these processes and their effects on deceptive intentions and behaviours. In terms of nonverbal cues to deception, some of the impressions given by deceivers have been found to be indicators of psychological processes of deception. This kind of cue needs more systematic investigation and future research could extend the present coding scheme (Chapters IV - V) to explore their role in revealing deception. Notably, the overlap between nonverbal behaviours exhibited by deceivers and truth-tellers in high probability conditions suggests that situational factors facilitating psychological processes similar to those for deception can lead to similar behaviours between deceivers and truth-tellers. The last study that introduced factors in relation to self-regulation for the present research was conducted in order to solve this issue. In line with this, it is also worthwhile introducing other factors into deceptive behaviour studies so as to be able to discriminate deceivers from truth-tellers effectively.

2.3. Deceptive intentions: Roles of the stake of not to deceive and moral intensity

Theoretical implications.

By extracting situational factors suggested by ethics and social psychology theories (e.g., Ajzen, 1991a/b; Jones, 1991), the findings from the first part of the research indicate that specific situational factors in relation to the negative outcomes for the deceivers and the victims can be

influential on deceptive intentions in the workplace context involving service providers and customers. The finding suggesting that people may be “forced to deceive” in less harmful situations fills the research gap as it provides evidence concerning (1) the strong effects of the negative consequences (stakes) of not to deceive leading to deceptive intentions; and (2) the interaction between the stake of not to deceive and moral intensity showing that these two factors are moderating each other’s effect on deceptive intentions. A further implication of this finding is that the situational factors in relation to the negative outcome for decision-makers regarding unethical behaviour, as well as factors in relation to the negative outcome for the victim of such behaviour, are both influential in the forming of unethical intentions. Hence, this part of the research not only contributes to the deception literature, but also to the ethics literature regarding decision-making of unethical behaviour and that concerning ethical decision-making in the workplace. Furthermore, it has been introduced (in Chapter III - Paper 1) that the high stakes of not to deceive may lead to a low perceived behavioural control associated with the action of being honest (Ajzen, 1991b). The present finding confirming that high stakes of not to deceive leads to increased deceptive intention, indirectly supports the proposition that low perceived behavioural control leads to low behavioural intentions (in this study: low honest intentions), as suggested by the theory of planned behaviour (Ajzen, 1991a). On another hand, the finding concerning the role of moral intensity (see details in Chapter III) supports John’s issue-contingent model (1991), which proposes that moral intensity in relation to the harmfulness to victims of unethical behaviour is negatively related to unethical decisions.

Future studies.

There are plenty of future studies that could be based on the above findings. For instance the effect of different kinds of stakes of not to deceive for the decision-maker and their

relationship with specific elements of moral intensity, such as the negative consequence for the victim of deception, could be explored. Researchers interested in workplace unethical behaviours may also want to consider other factors forcing individuals to deceive or to undertake unethical behaviour, such as pressures from co-workers or leaders, and the motivations for covering existing unethical actions (Fleming & Zyglidopoulos, 2008). The relationship between such “forcing factors” and the ethical climate or ethics code may also be of interest to researchers. Based on the present finding indicating the significant effect of individual factors (assessed as covariates so as to eliminate their affecting the results) such as moral judgments and ethical ideology on deceptive intentions, future research may elaborate upon the current research’s scope by including these factors and testing their relationship with the situational factors investigated here. It is also possible to build a more complementary model of decision-making of unethical behaviour in the future, based on the present research as well as deeper investigations into the interactive effect between factors as suggested by the theory of planned behaviour (e.g., factors in relation to the decision-maker’s negative outcome, such as the stakes of not to deceive), ethical theories such as the issue-contingent model (e.g., factors in relation to the victim’s negative outcome, such as moral intensity) and Rests’ four-component model (e.g., individual factors, such as moral recognition and moral judgments).

2.4. Self-regulation failure and behavioural leakages of deception

Theoretical implications.

The finding indicating the role of self-regulation demands in the magnification of deception cues partially supports my proposition of its key role in the cognitive mechanism behind behavioural leakages of deception. In line with the feature of ego-depletion (Baumeister et al., 1998), multiple factors demanding ego resources may result in aggregated demands on these

resources. Consequently, the unaffordable demands from this may lead to substantial further depletion of the psychological resources required for effective self-regulation. In the last study of the present research (Chapter V - Paper 3), the first factor that demands self-regulation is the increase in probability associated with the negative consequence of lying, which may lead to enhanced negative emotion and cognitive loading associated with tense arousal (as found in other studies in Chapter IV - Paper 2). The second factor that demands self-regulation is the self-monitoring intervention that facilitates self-focus (Carver & Scheier, 1978; Geller & Shaver, 1976) and the third is the deceiving task (e.g., Langleben et al., 2006; Walczyk et al., 2003). The finding in relation to the deception cue (hand(s)) in pocket(s)) of the last study confirms the prediction specifically under the condition when self-regulation is demanded, which indicates that ego-depletion leading to self-regulation failure may elicit behavioural leakages of deception. Notably, one self-regulation demanding factor that was not considered in the experimental manipulation, as discussed above, is that the crowded public environment seemed to place great demands on self-regulation for all the participants. This might have led to the finding showing the predicted pattern of hand(s) in pocket(s) leakage but without a statistically significant effect of the manipulation of self-regulation. In addition to the last study, in Study 4 in Paper 2 (Chapter IV), while there is induced probability of being detected, the impression cue in relation to enhanced overcontrol of behaviour is found to have greater presence with the duplex-task deceivers as compared with those performing only a single deception task. This finding is possibly due to the multiple factors including the high probability of detection as well as the duplex deception tasks together placing higher demands on ego resources for self-regulation than the situation where only a single deception task was introduced together with the high probability of detection. This might have led to impaired or depleted self-regulation resources in duplex-task

deceivers, which subsequently resulted in failure of their proper control of behaviours exhibited as inappropriate overcontrolled impression. Such an explanation should be reexamined in future studies assessing different factors demanding self-regulation.

Although the above findings regarding deception leakages only provide partial support for the role of ego-depletion and self-regulation failure on the behavioural leakages of deception, other findings (discussed above) in this research as well as the literature introduced in Chapter II Section 2 suggest that deceptive behaviour (from forming of intentions to the exhibition of nonverbal cues) is highly dependent on self-regulation, which has a key feature of regulation failure caused by ego-depletion (Baumeister et al., 1998). Therefore, it still can be inferred from the above findings that the failure of self-regulation may occur in deceivers' behaviour and lead to unintentional deception cues. Deception researchers (Zuckerman et al., 1981; Vrij, 2008) propose that enhanced psychological processes of deception (i.e. emotion, cognitive effort, and attempted behavioural control) lead to deception cues and leakages. Based on the findings of the present research, I propose that the behavioural leakages of deception are likely to be elicited by the enhanced psychological processes of deception via self-regulation failure. I therefore contend that self-regulation failure caused by ego-depletion is the missing part of the cognitive mechanism that underpins behavioural leakages of deception. This perspective is the first time that ego-depletion of self-regulation has been considered to be a bridge that links origin of deception leakages and the three psychological processes of deception that demands self-regulation resources, which consequently provided a comprehensive explanation of the mechanism underpinning behavioural leakages of deception. Based on the previous propositions regarding deception leakages and self-regulation failure (DePaulo et al., 2003), it contributes to the literature a more comprehensive understanding of the cognitive mechanism of deception

cues. The role of ego-depletion and self-regulation failure on behavioural leakages proposed here may inspire a new topic of deception research exploring their effects in eliciting deception cues.

In addition, the introduction of self-regulation demands solves the common problem of deception research (DePaulo, 1992) that factors in relation to the negative outcomes of deceiving, such as the probability of detection or the stakes of deception, can lead to similar behaviour in both deceivers and truth-tellers. Following the demands on self-regulation (introduced by the public environment and the manipulation enhancing self-focus), the nonverbal cue found in the last study could be used to discriminate deceivers from truth-tellers, by comparing their behavioural change patterns across probability levels (see details of this finding in Chapter V).

Future studies.

Future studies could investigate self-regulation failure by manipulating factors other than the self-focus of this research, given the finding indicating that the manipulation of such a factor is likely to be easily overwhelmed by the environmental factors that demand self-regulation. To resolve this issue, researchers may also want to conduct controlled experiments in a laboratory, which would enable them to examine the effect of self-regulation failure caused by ego-depletion in purified settings that eliminate the impact of the environment (Kantowitz, et al., 2009). Researchers, who are interested in discriminating deceivers from truth-tellers by magnifying deception cues, may also consider inducing high demand of self-regulation during conversations (e.g., interviews) with the former. As emotion and cognitive control are both key components of self-regulation (Brown, 2006; Hofmann et al., 2011) and deception (Vrij, 2008; Zuckerman et al., 1981), introducing situational factors enhancing these two processes may lead to depletion of ego resources and further help researchers to find magnified behavioural leakages. Regarding

this, Vrij et al. (2008) found comparative stable verbal cues to deception by enhancing cognitive load during interviews. The role of self-regulation failure proposed here provides further explanation for why this approach works in eliciting deception cues. Notably, ego-depletion and self-regulation failure may be facilitated by multiple tasks. In understanding this characteristic, researchers who want to induce ego-depletion are not restricted to using single tasks that place high demands on self-regulation (e.g., exhaustive interview). Instead, they could use multiple tasks when appropriate, which eventually result in the depletion of psychological resources on the deceiver (Baumeister et al., 1984). In short, the proposition of the role of ego-depletion and self-regulation failure in behavioural leakages of deception needs more empirical examination, and this could become a new avenue in research assessing deceptive behaviour and deception detection.

2.5. Deceptive behaviour in different contexts

Theoretical implications.

As with other human behaviour, deception is influenced by situational factors in different contexts (Lewin, 1935/1951). In terms of deceptive intentions, although only workplace deception between service providers and customers was assessed in this research, the effect of issue-related factors, such as moral intensity (Jones, 1991), indicates that deceptive intentions are influenced by diverse contexts involving different degrees of moral intensity. In terms of deceptive cues, the present findings support the view that no universal cues can be found to appear in all kinds of contexts (DePaulo et al., 2003; Vrij, 2008, and in Table VI-1). In fact, such a general finding suggests that behavioural cues to deception were sometimes different across the different contexts assessed in each study. This could be due to diverse contexts involving different situational factors, which may alter deceptive behaviour variously (DePaulo & Bond

2012; Vrij, 2008). This finding thus implies that the knowledge of deceptive behaviour could be enriched by exploring deception cues in several different settings.

Future studies.

Given the sensitivity of deceptive behaviour to contexts and situational factors found in this research and in the literature, future work could involve conducting deception studies in a broader range of contexts so as to explore the differences in deceptive intentions and behavioural indicators across diverse settings. A further step might be identifying the most robust cues appearing in a cluster of similar settings and using them in lie detection studies only in similar kinds of contexts, which may improve lie detection accuracy. In addition to examine deception in laboratory settings, it is worthwhile extending the present experiments to different real life settings. A good example is the last study of the present research, where the public space introduced demands for self-regulation that are unlikely to happen in laboratory settings. Field studies would help researchers to identify such potential confounding factors and then take their effects into account in later research or in practice. The deceptive intentions for this research were assessed by online experimental surveys. Future research may seek to replicate similar contexts or introduce improved research design in real life workplace settings or other types of deception outside of the workplace, so as to examine the consistency of the effects of the situational factors found in this research.

In addition to the contexts, individual differences also seem to have different influences on the findings (see details in each paper) and these could be further investigated in future studies. For example, participants from the present research were mainly from western countries, so researchers interested in the cultural differences of human behaviour may wish to conduct similar studies in populations from a broader range of cultural backgrounds.

3. Practical Implications

3.1. Deception prevention and control

The findings in relation to intentions of undertaking deception could help human resource practitioners in organisations to understand workplace deception and unethical behaviours better. Moreover, such knowledge could be used by practitioners when developing employee development programmes, and approaches aimed at building and maintaining a good ethical climate in an organisation. It is also important for ethics policy makers in organisations to consider factors in relation to the stakes of not to deceive/undertake unethical action as such factors may “force” employees to deceive. In addition, the interactive effect between the deceiver- and victim-relevant factors indicates that individuals are likely to conduct deception, although not of a significantly harmful nature, when they perceive strong negative consequences of not doing so. This suggests the importance of developing counseling services/other support services to help employees under economic stress. In addition, the findings of this research suggest that increasing the probability of receiving negative consequences of deceiving, such as establishing monitoring and reporting systems targeting unethical behaviour is likely to reduce deceptive intentions. The present findings regarding deceptive intentions may also inspire deception prevention and control in contexts outside of the workplace, as the situational factors assessed in the present research influence deceptive intentions via fundamental psychological processes that are universal to all deception settings.

3.2. Deception detection

Observable nonverbal cues.

The observable nonverbal body movements and impressions found in this research may help lie detection practitioners to spot suspicious individuals in public spaces. Although there are

techniques for analysing verbal/vocal cues or micro facial expressions of deceivers, practitioners, such as security staff, may not have access to such techniques or may not be trained to use them. In addition, when practitioners want to spot a suspect in a public space, they may not have the chance to talk to the individual or have only a couple of minutes to converse. The information that can be captured during a brief chat is limited to the level of detail, and only the cues observable by the human eyes can be detected. Hence, the observable nonverbal cues assessed in this research targeting such situations would help practitioners to understand deceptive behaviour better. Nevertheless, understanding the cues does not mean they will be used successfully (Vrij, 1994; Vrij et al., 2006b). The researcher thus proposes interventions be developed that may magnify the differences in behaviour presented by deceivers and truth-tellers, as discussed below.

Interventions for improving deception detection.

Taking the findings about deception cues together, lie detection practitioners could develop interventions manipulating the probability associated with deception detection together with the demand for self-regulation so as to elicit behavioural cues or patterns that can only be observed in deceivers (such as the finding in the experiment presented in Chapter V). Taking security arrangements in the public space as an example, the intervention of probability of detection may involve individuals serving different roles, such as a receptionist and security staff. The former does not check the credibility of individuals and therefore implies a lower probability of detection (similar to the confederate playing a student role in Chapters IV & V), whereas the latter performs security checks which leads to a higher probability of detection (similar to the confederate playing a security role in these studies). The demands of self-regulation can be enhanced by using interventions that facilitate self-focus (e.g., Carver & Scheier, 1978), such as

the manipulation employed in the experiment presented in Chapter V. Such digital mirror intervention may be placed in a public space as a kind of furnishing, which can serve to facilitate self-focus without introducing too many artificial features. However, the concern is raised regarding the extent of demands on self-regulation that can be introduced by such intervention as found in this research. Further studies and tests are therefore required to select or develop effective interventions or sets of multiple ones that significantly enhance self-regulation demands.

Influential factors that need to be taken into account.

This research has also highlighted situational factors that should not be neglected in lie detection. For instance, deceivers' behaviour may appear to be similar to that of honest people when both of them are undergoing a security check. In addition, cues presented in different contexts may be different, and practitioners need to bear in mind not to rely on stereotype of deception cues in lie detection (Hartwig & Bond, 2011; Vrij et al., 2001; Vrij, 2008). Further, it is unlikely that deceivers would present salient different behaviours compared to truth-tellers based on the present findings. Instead, in many cases the difference between deceivers and truth-tellers concerns the change in the pattern of the same behaviour presented by both, such as different extents/frequencies of this behaviour.

Taken as a whole, research targeting deceptive behaviours and intentions in relation to deception can benefit practitioners who want to prevent and detect such harmful actions in the real world. Researchers in this field recognise the complexity and difficulty of implementing their research findings in practice (DePaulo & Bond, 2012; Hartwig & Bond, 2011). However, scientific investigation is a necessary step towards the goal of preventing the negative impacts of harmful deception in such real world settings.

4. Conclusion

With the aim of preventing negative impact from harmful interpersonal deception on individuals and groups, the present research investigates deceptive behaviour from the early stage of the forming of intentions, to the late stage of exhibition of behavioural indicators. The research has a solid theoretical basis and the general conclusion is drawn that deceptive behaviour can be influenced by different situational factors in relation to the deceivers, the victims of deception, or both of these. In addition, a proposition has been raised, concerning the key role of self-regulation failure caused by ego-depletion in the cognitive mechanism behind leakages of behavioural cues of deception.

The findings from six empirical studies support or at least partially support the predictions of this research, which has several theoretical implications regarding: (1) the essential role of self-regulation throughout the early and late stages of deceptive behaviour; (2) the involvement of the psychological processes of deception (i.e. emotion, cognitive effort, and attempted behavioural control) throughout the stages implied by the findings regarding behavioural cues in relation to deception; (3) the effect of situational factors (suggested by theories from the psychological and ethics literature) in relation to the negative outcomes for deceivers, such as the stakes of not to deceive and those for the victim of deception, such as the moral intensity, on deceptive intentions; (4) the effect of situational factors (suggested by theories in the psychological literature) in relation to the negative outcomes for deceivers, such as the probability of detection, on nonverbal deceptive behaviours; (5) the key role of self-regulation failure caused by ego-depletion contributing to the cognitive mechanism behind behavioural leakages of deception; and (6) the effects of different contexts on deception and a contribution to knowledge about the trend of deceptive intention as well as the observable deception cues in

these contexts.

The research also has various practical implications given its findings about manageable situational factors and their effects on deceptive behaviour. That is, practitioners in the workplace or outside of it could benefit from the understanding of the effects of these situational factors on deceptive behaviour and further, develop interventions to prevent, detect, or to control harmful deception based on this knowledge. The data regarding intentions and cues to deception may also enrich the practitioners' knowledge about deceptive behaviour, which might be used to improve their lie detection accuracy.

In sum, deception is a complicated human behaviour (Vrij, 2008), and this four-year research may have only touched upon the tip of the iceberg of interpersonal deception. However, it is an essential step towards the ultimate goals of preventing, detecting, and controlling deception that results in negative impacts. Given the complexity of deceptive behaviour and the great number of situational factors that may potentially influence such behaviour, more investigations similar to the present research are demanded. As with other deception researchers, I believe our continuing efforts for exploring deceptive behaviour are not only meaningful in terms of giving scientific explanations about it, but also will contribute to building a better world by protecting human beings, organisations, etc. from its harmful impact.

CRITICAL REVIEW OF CHAPTER IV - PAPER 2

from

A Discussant's Perspective

Critical Review: Deceptive Behaviour and Situational Factors

The second paper (Chapter IV) of this collected thesis is my rewritten work based on one of my publications (specified in Declaration), which underwent quite a few drafts prior being published. Since the co-authors made inputs concerning structure and the wording for an early draft of the publication, the review committee of my PhD progress advised me to submit this additional document to present my view together with suggestions for improving the studies contained in Chapter IV - Paper 2 from a discussant's perspective. In this brief critical review, I take the opportunity to discuss this paper in terms of the methodology adopted in the four studies presented, as well as the situational factors, tasks, and research contexts assessed in the studies. Following the identification of areas that could be improved, I make suggestions in terms of refining the design so as to improve the studies.

1. Contributions from Chapter IV - Paper 2

Pursuing the goal of detecting deceptive behaviour, researchers in the deception field endeavour to seek out those manageable factors that can magnify the difference in behaviours presented by deceivers and truth-tellers (e.g., Clemens et al., 2011; Vrij et al., 2006a). This research follows this approach by manipulating situational factors in relation to the negative outcomes for the deceiver (i.e., the probability of detection), and the complexity of deceiving tasks (i.e., duplex vs. single deception), in four behavioural studies. Subsequently, Paper 2 contributed some interesting points to the existing knowledge concerning deceptive behaviour research: (1) It focuses on manageable situational factors including the probability of being detected deceiving, as well as task complexity of deceptive behaviour. Understanding such factors not only helps us to understand deceptive behaviour, but also benefits lie detection

practitioners since these factors can be easily managed in practice. (2) While most research conducted in the area of deceptive behaviour addresses deception involving conversations (e.g., Caso et al., 2006; Warmelink et al., 2013; Warren et al., 2009), this paper presents a study (Study 3) that assesses pure nonverbal concealment tasks without interaction with a lie receiver. This enriches the deception literature by providing data regarding such elusive forms of deception, being difficult to detect, but easy to carry out (Ekman, 1992; Vrij, 2008). (3) Study 4 presented in this paper assessed the effect of complexity of deception tasks while the probability of detection is enhanced. The increase in manipulated behavioural impression in duplex deception tasks rather than in a single deception task suggests that the attempted behavioural control process can be enhanced by tasks that introduce cognitive loading. This further indicates that cognitive loading and high probability of detection can lead to attempted behavioural control that results in overcontrolled behavioural cues in deceivers. (4) The methodology of within-subjects design employed in Study 2 also adds useful empirical data that are able to exclude the impact of individual differences in deceptive behaviour.

However, people may have different opinions regarding the quantitative experimental methodology employed in these studies by considering that qualitative methods may have strength in understanding human behaviour in depth (Guba & Lincoln, 1994). In addition, the studies could be improved by adjusting the methods or the variables and tasks investigated in each study, or the investigations could be conducted in other contexts instead of in class and security settings. The following sections discuss these points of criticism together with suggestions for improving the design for these studies.

2. Methodology of the studies

Why quantitative experiments?

Complex human beings, who respond to environmental stimuli based on their own perceptions and experience (Lewin, 1951), are considered to behave differently in different cases (Buller & Burgoon, 1996). Consequently, although quantitative methods are widely used in social psychology including deception research (see reviews in Bond & DePaulo, 2006; Vrij, 2008), people may have reservations concerning the extent to which numbers can tell us about ourselves. Indeed, qualitative researchers carrying out deep investigation into specific cases may be able to collect in depth information regarding how and why deceivers behave in a certain way (Creswell, 2013). Their qualitative methods may explain deceptive behaviour better than the quantitative ones, in terms of underpinning motivations and the rationale for selecting specific tactics, etc (e.g., Ekman, 1992). However, the choice of a research methodology is based on the purpose and nature of the studies, and has to achieve a balance between the advantages and disadvantages that it offers.

Specifically, the studies presented in this paper have the goal of understanding the difference between deceivers and truth-tellers' specific behaviours, as well as the effect of specific situational factors. This research goal can be addressed most effectively through quantitative experimental methods, instead of qualitative approaches, for two main reasons: (1) the difference in nonverbal behaviours between deceivers and truth-tellers, as targeted in this paper, is unlikely to be noticed easily without careful analysis of the frequency and length of specific behaviours. According to a meta-analysis study of deception cues and reviews of deception studies (DePaulo et al., 2003), the difference between deceivers and truth-tellers is usually presented as the difference in numbers (e.g. times a particular behaviour is performed) of the same behaviour presented by both deceivers and truth-tellers, instead of a salient unique behaviour associated with only deceivers or only truth-tellers. In addition, researchers need a

great amount of empirical data across a variety of contexts to identify the most occurring deception cues. In line with these, quantitative methods that usually using numerical analysis and a larger sample size than that deployed in qualitative research (VanderStoep & Johnson, 2008) is more suited for obtaining the objectives for the present research. That is, the features of deceptive behaviour research determine that a quantitative method needs to be adopted in studies conducted in this area. (2) Amongst quantitative methods, experimental design is the most appropriate way to establish the causal relationship between the independent variables manipulated (i.e. situational factors in this paper) and dependent variables observed (i.e. nonverbal behaviours) in a study. Other non-experimental approaches, such as passive observations or correlational studies, are considered to be less powerful in providing proof of such causal relationships, as many variables can be responsible for the results being observed (Brown, 2006; Elmes et al., 2003; Goodwin, 2010).

Areas for improvement.

Although a quantitative experimental design is considered to be an appropriate methodology for these studies, there is an issue in terms of the methodology used in this paper. The laboratory experimental design used in the second study may not be perceived as suitable for such a practice-oriented study. The benefits offered by laboratory experiments are the high-level control of confounding variables/factors and the purified environment (Kantowitz, et al., 2009), which lead to high internal validity for the experimental design. However, this approach is considered to have low ecological validity as findings regarding human behaviours emerging in these particular purified settings do not necessarily reflect behaviours exhibited in real life settings that involve diverse confounding variables/factors (Brown, 2006). Therefore, researchers using laboratory experiments usually focus on cognitive processes and manipulate factors that

are directly linked to these processes (Elmes et al., 2003). This is because the cognitive processes underneath the behaviours are likely to exist in any context, without being severely altered by peripheral factors present in different settings, and thus laboratory experiments are ideal for basic psychology research focusing on specific cognitive processes (Mook, 1983). Taking this into account, the purpose of the second study may not fit very well with the advantages of the laboratory design. As a study targeting the effects of situational factors that are manageable in practice in real life settings, the laboratory environment assessed in Study 2 may have disadvantages given its low ecological validity and low external validity, particularly regarding generalizing the findings to less controlled settings, i.e. real life settings (Neisser, 1976). Moreover, a laboratory setting is considered to be more artificial than real life settings, for the manufactured environment may influence participants' perception of the factors being manipulated (Vrij, 2008). For example, participants who interacted with a role-playing confederate security officer in a laboratory study may feel there is a lower probability of getting caught, compared with that experienced in real life security checks. In keeping with this, I suggest two directions for this particular study for improving its design.

First, the researcher may continue with laboratory experiments, but the independent variables assessed should have a direct link to the psychological processes of deception, instead of the indirect link as appearing in this study (i.e. the high probability of detection indirectly elicits fear emotions). This can be implemented, for example, by introducing difficult tasks that can enhance cognitive load significantly (e.g., Vrij et al., 2006a), or by introducing ego-depleting tasks (e.g., Muraven et al., 1998) that can directly lead to over demanding of self-regulation of behaviours. This kind of laboratory study may also contribute to the literature with respect to nonverbal deception cues directly associated with the three psychological processes (i.e.

emotions, cognitive effort, and attempted behavioural control) and self-regulation process of deception.

Alternatively, if the researcher wishes to focus on the manageable situational factors and their role in altering nonverbal cues to deception, the study needs to be conducted in a real life setting, as in the other three studies in this paper. That is, the role of situational factors needs to be assessed without the bias caused by purified environments, as these factors are usually involved in real life settings that are surrounded by diverse confounding factors (Neisser, 1976). Although field experiments may have lower internal validity when compared with laboratory ones, they have better external validity in terms of allowing for generalising of the findings through the investigation of a variety context and thus eliciting common features across them (Brown, 2006). Further, experiments carried out in the field are more realistic for participants, compared with those in a laboratory that are trying to create similar situations artificially (Elmes et al., 2003). Considering the goal and the research scope, the latter option might be a better fit for this paper.

3. Situational factors leading to overlap between deceivers and truth-tellers

Another issue with the studies in this paper concerns the investigation of a single situational factor in each study. As shown in the literature (e.g., DePaulo et al., 2003; Vrij, 2008), situational factors, such as the stakes of deception (i.e. consequences of deceiving), that enhance common psychological processes in both deceivers and truth-tellers (e.g. fear, Ekman, 1985), may lead to similar magnified behaviours between them. Indeed, this paper provides evidence supporting this view, and demonstrates that the probability of detection is also a factor that can lead to such similarity emerging. As a result, this paper fails to find an effective way to magnify the difference between deceivers and truth-tellers' behaviour by manipulating the corresponding

situational factors. This problem may be avoided by manipulating multiple factors that can enhance the psychological processes of deception. According to the ego-depletion proposition of self-regulatory behaviour as discussed in Chapter II (Baumeister et al., 2007), enhanced demands on self-regulation led by multiple tasks may result in the failure of self-regulation. By manipulating multiple factors so as to demanding self-regulation, the researcher may find an effective combination of these for eliciting or magnifying the differences between deceivers and truth-tellers. This idea was further tested in the third paper, so the researcher has recognized and addressed this issue pertaining to this study.

4. Task complexity

Another area where the study design may be improved concerns task complexity. The researcher discussed the lack of task complexity and the short length of task, which might have resulted in the lack of behavioural data observable from Study 3. These issues can be resolved by enhancing the difficulty and complexity of tasks assessed in each study, as task complexity did show a significant effect on deceivers' behaviour in Study 4. In addition, the absence of findings in relation to deception in Study 3 suggests that pure behavioural concealment is likely to be too simple to show any cues revealing deception. As the researcher has already discussed, future studies may need to consider introducing more complex pure nonverbal tasks, or assess the combined effects of multiple factors (as suggested in Chapter V), as this may have stronger influences on human behaviour in terms of eliciting deception cues.

5. Research contexts

One of the strengths of studies presented in this paper is that they have assessed more contexts as compared with most other deception research (e.g., Burgoon et al., 2008; Olekalns & Smith, 2007). The findings emerging from these contexts enrich the literature regarding

deception cues found in specific environments and may also help practitioners to detect deception in similar contexts. Although these studies have advantages compared with other deception studies conducted in laboratories, the contexts visited here are limited to university environments. In addition, the main population of these studies, unfortunately, is restricted to university students. These issues are not specifically problematic in this paper, in fact, most behavioural psychological research suffers from them (e.g., Jap et al., 2011; Poortvliet et al., 2012). These problems are difficult to overcome, for reasons such as the safety considerations, which restrict researchers from running complex behavioural tasks in open public spaces, or the difficulty in recruiting the required population of participants from outside of the university, etc. Such issues appear to be the most difficult to address in behavioural experiments, given the difficulty for recruiting participants from diverse backgrounds effectively. Nonetheless, it is recommended that the researcher broadens the research contexts from deception in classrooms and security checks, to other assessable contexts, such as different kinds of deception made in everyday social interaction situations, as this represent some of the most pervasive deceptions, as reported in previous studies (DePaulo et al., 1996).

Another point regarding the research contexts in this paper is that the effect of diverse contexts on nonverbal behaviours assessed here is not analyzed. The variance between the studies, such as the different behavioural tasks investigated in the four experiments, makes it difficult to perform analysis to compare the deception cues found across the four studies. This aspect may not be the focus of this paper, but the researcher could make a stronger claim regarding the effect of context, if it were taken into account. Although deception researchers are aware of the effect of context (Blair, et al., 2010; Kihlstrom, 2013; Vrij, 2008), there are few empirical studies that have examined this effect, and, indeed, context is not a variable that can be

manipulated easily. By keeping consistency of the behaviour tasks used in the different contexts, the researcher also needs to pay careful attention to experimental manipulation, such as using the same instructions, tasks, and confederates throughout all the studies. Nonetheless, in future studies it is worth testing how contexts influence deceptive behaviour, as well as how the effect of environments interacts with the other situational factors, such as the probability of deception detection.

6. Other suggestions regarding minor issues

The probability of being detected deceiving, associated with the negative consequences of deceiving is the key independent variable for Study 1. However, situational factors in relation to the negative outcome for the deceiver not only include the probability, but also the extent of the stakes (i.e. positive or negative consequences) of deceiving (Bond & DePaulo, 2006; Ekman, 2001). Although the stakes are not the focus of Study 1, it is likely that they are considered in the decision-making process of deceiving and hence may influence the effect of the probability associated with it (Koller, 2005; also as found in Paper 1). Regarding the stake of deceiving in this study, whereby the participants' group may be lower-ranked than others in their final results regarding successful deception, this is fairly low in comparison to many everyday lies (e.g., DePaulo et al., 2004; Ekman, 1992). It is a recognized issue in the literature that the stakes of deception assessed in laboratories are never high enough (e.g. Porter & ten Brinke, 2010; Vrij, 2008). Such an issue might be due to ethical considerations, such that participants should not experience punishment if they fail their tasks. However, the stake in the present study may be enhanced by simply introducing identity-relevant punishment, such as that group members get to know who failed the task, instead of being anonymous, as in Study 1. This is based on the consideration of self-presentation theory (DePaulo, 1992), which suggests that people endeavour

to convey a favourable impression to others. In line with this, to be known as the person who failed the group becomes a stronger stake than that introduced in the present study.

A final minor suggestion for this paper is the selection of individual differences. The author sought to measure several variables in relation to individual differences, such as personality and demographic information. Although not all the variables showed a significant effect, it is still useful to control the potential effect of individual differences. I would also recommend measuring emotional intelligence, as it may relate to the ability to control the emotional process (i.e. fear, guilt, and delight) involved in deception (Mayer & Salovy, 1995). However, measurements of emotional intelligence are usually time-consuming (30 to 45 minutes, e.g. MSCEIT 2.0; Mayer et al., 2003). Given the finding that some covariates measured in this study were not influential (e.g. personality, self-awareness), future research may replace these covariates with the emotional intelligence measurement.

In conclusion, it is difficult to achieve perfect studies and researchers usually try their best to balance the limitation of resources, available techniques, advantages and disadvantages of research methods, against their goal of investigating deceptive behaviour. Some of the issues and suggestions stated above are addressed in the subsequent study presented in Paper 3, whereas others are recommended for consideration in future research when examining similar questions.

APPENDIX 1

for

CHAPTER III – PAPER 1

Scenarios for all conditions

Condition 1

Higher stakes of not to deceive & Higher probability of receiving negative consequence of deceiving.

Dentist (High Moral Intensity)

You are a dentist and 5 familiar patients have booked with you to have a dental crown fitted.

You have the chance to deceive the patients by covertly using inferior quality crowns to replace high quality ones, and telling them that the high quality crown is placed as agreed. By doing this you can charge the same price as the high quality ones, and gain about \$2,000 from each patient (in all about \$10,000).

You fully understand that in about 1 year, there is a 90% chance that the crowns will fail, requiring another \$3,000 for a replacement. You know from the records that such a cost will exceed the 5 patients' annual maximum dental insurance coverage (\$1,000). This means that if they need a replacement, \$2,000 would need to come out of their own pocket. This is not a widely accepted practice in the industry in question.

For personal reasons, during these few months, you have been under serious economic pressure that you have never experienced before. You have exhausted all possible solutions and your salary is not enough to cover the deficit now. If there is still no further income this month, you will not be able to afford any living costs for your family, and you could be in a danger of

bankruptcy. You therefore know that deceiving the patients by covertly replacing the high quality dental crowns and charging the agreed price is the last chance to improve your bad situation.

You understand that if you choose to do this and only if the problem with the crowns occurs (which is likely to happen), you have a great chance (about 90%) of losing professional reputation, leading to a loss of about 25% of patients. But if you gained money from deceiving the patients, your economic problem should have been resolved before the dental crowns fail.

Mechanic (Low Moral Intensity)

You are a mechanic and 20 unknown people have booked with you to service their car engines.

You have the chance to deceive them by covertly using a couple of cheaper components to replace the more expensive ones that are supposed to be used on their cars, and telling them all services were carried out as agreed. By doing this you can charge the same price as the expensive components, and gain about \$100 from each customer (in all, about \$2,000).

You fully understand that the cheaper components can last about 5 years. There is almost no chance that the components will fail. The components are not very important parts of the engine, and thus almost no harm will occur. Such a practice seems to be accepted in the industry.

For personal reasons, during these few months, you have been under serious economic pressure that you have never experienced before. You have exhausted all possible solutions and your salary is not enough to cover the deficit now. If there is still no further income this month, you will not be able to afford any living costs for your family, and you could be in a danger of bankruptcy. You therefore know that deceiving the customers by covertly replacing the components and charging the agreed price is the last chance to improve your bad situation.

You understand that if you choose to do this and only if there is a problem with the components occurs (which is unlikely to happen), you have a great chance (about 90%) of losing professional reputation, leading to a loss of about 25% of customers. But if you gained money from deceiving the customers, your economic problem should have been resolved before the engine components fail.

Condition 2

Higher stakes of not to deceive & Lower probability of receiving negative consequence of deceiving.

Dentist (High Moral Intensity)

You are a dentist and 5 familiar patients have booked with you to have a dental crown fitted.

You have the chance to deceive the patients by covertly using inferior quality crowns to replace high quality ones, and telling them that the high quality crown is placed as agreed. By doing this you can charge the same price as the high quality ones, and gain about \$2,000 from each patient (in all about \$10,000).

You fully understand that in about 1 year, there is a 90% chance that the crowns will fail, requiring another \$3,000 for a replacement. You know from the records that such a cost will exceed the 5 patients' annual maximum dental insurance coverage (\$1,000). This means that if they need a replacement, \$2,000 would need to come out of their own pocket. This is not a widely accepted practice in the industry in question.

For personal reasons, during these few months, you have been under serious economic pressure that you have never experienced before. You have exhausted all possible solutions and your salary is not enough to cover the deficit now. If there is still no further income this month, you will not be able to afford any living costs for your family, and you could be in a danger of bankruptcy. You therefore know that deceiving the patients by covertly replacing the high quality dental crowns and charging the agreed price is the last chance to improve your bad situation.

You understand that if you choose to do this and if the problem with the crowns occurs (which is likely to happen), the crowns should have passed the guarantee period by then. Therefore, there

is a very low chance (about 10%) that you will receive negative consequences of deceiving the patients (loss of professional reputation, leading to a loss of about 25% of patients). If you gained money from deceiving the patients, your economic problem should have been resolved before the dental crowns fail.

Mechanic (Low Moral Intensity)

You are a mechanic and 20 unknown people have booked with you to service their car engines. You have the chance to deceive them by covertly using a couple of cheaper components to replace the more expensive ones that are supposed to be used on their cars, and telling them all services were carried out as agreed. By doing this you can charge the same price as the expensive components, and gain about \$100 from each customer (in all, about \$2,000).

You fully understand that the cheaper components can last about 5 years. There is almost no chance that the components will fail. The components are not very important parts of the engine, and thus almost no harm will occur. Such a practice seems to be accepted in the industry.

For personal reasons, during these few months, you have been under serious economic pressure that you have never experienced before. You have exhausted all possible solutions and your salary is not enough to cover the deficit now. If there is still no further income this month, you will not be able to afford any living costs for your family, and you could be in a danger of bankruptcy. You therefore know that deceiving the customers by covertly replacing the components and charging the agreed price is the last chance to improve your bad situation.

You understand that if you choose to do this and only if there is a problem with the components (which is unlikely to happen), there is a very low chance (about 10%) that you will receive negative consequences of deceiving the customers (loss of professional reputation, leading to a

loss of about 25% of patients). If you gained money from deceiving the patients, your economic problem should have been resolved before the engine components fail.

Condition 3

Lower stakes of not to deceive & Higher probability of receiving negative consequence of deceiving.

Dentist (High Moral Intensity)

You are a dentist and 5 familiar patients have booked with you to have a dental crown fitted.

You have the chance to deceive the patients by covertly using inferior quality crowns to replace high quality ones, and telling them that the high quality crown is placed as agreed. By doing this you can charge the same price as the high quality ones, and gain about \$2,000 from each patient (in all about \$10,000). You fully understand that in about 1 year, there is a 90% chance that the crowns might fail, requiring another \$3,000 for a replacement. You know from the records that such a cost will exceed the 5 patients' annual maximum dental insurance coverage (\$1,000). This means that if they need a replacement, \$2,000 would need to come out of their own pocket. This is not a widely accepted practice in the industry in question.

The economic situation for you is OK, and your life can be maintained at normal quality if you do not deceive the patients (by covertly replacing the high quality dental crowns and charging the agreed price).

You understand that if you choose to do this and only if the problem with the crowns occurs (which is likely to happen), you have a great chance (about 90%) of losing professional reputation, leading to a loss of about 25% of patients.

Mechanic (Low Moral Intensity)

You are a mechanic and 20 unknown people have booked with you to service their car engines.

You have the chance to deceive them by covertly using a couple of cheaper components to replace the more expensive ones that are supposed to be used on their cars, and telling them all

services were carried out as agreed. By doing this you can charge the same price as the expensive components, and gain about \$100 from each customer (in all, about \$2,000).

You fully understand that the cheaper components can last about 5 years. There is almost no chance that the components will fail. The components are not very important parts of the engine, and thus almost no harm will occur. Such a practice seems to be accepted in the industry.

The economic situation for you is OK, and your life can be maintained at normal quality if you do not deceive the customers (by covertly replacing the engine components and charging the agreed price).

You understand that if you choose to do this and only if there is a problem with the components occurs (which is unlikely to happen), you have a great chance (about 90%) of losing professional reputation, leading to a loss of about 25% of customers.

Condition 4

Lower stakes of not to deceive & Lower probability of receiving negative consequence of deceiving.

Dentist (High Moral Intensity)

You are a dentist and 5 familiar patients have booked with you to have a dental crown fitted.

You have the chance to deceive the patients by covertly using inferior quality crowns to replace high quality ones, and telling them that the high quality crown is placed as agreed. By doing this you can charge the same price as the high quality ones, and gain about \$2,000 from each patient (in all about \$10,000).

You fully understand that in about 1 year, there is a 90% chance that the crowns might fail, requiring another \$3,000 for a replacement. You know from the records that such a cost will exceed the 5 patients' annual maximum dental insurance coverage (\$1,000). This means that if they need a replacement, \$2,000 would need to come out of their own pocket. This is not a widely accepted practice in the industry in question.

The economic situation for you is OK, and your life can be maintained at normal quality if you do not deceive the patients (by covertly replacing the high quality dental crowns and charging the agreed price).

You understand that if you choose to do this and if the problem with the crowns occurs (which is likely to happen), the crowns should have passed the guarantee period by then. Therefore, there is a very low chance (about 10%) that you will receive negative consequences of deceiving the patients (loss of professional reputation, leading to a loss of about 25% of patients).

Mechanic (Low Moral Intensity)

You are a mechanic and 20 unknown people have booked with you to service their car engines.

You have the chance to deceive them by covertly using a couple of cheaper components to replace the more expensive ones that are supposed to be used on their cars, and telling them all services were carried out as agreed. By doing this you can charge the same price as the expensive components, and gain about \$100 from each customer (in all, about \$2,000).

You fully understand that the cheaper components can last about 5 years. There is almost no chance that the components will fail. The components are not very important parts of the engine, and thus almost no harm will occur. Such a practice seems to be accepted in the industry.

The economic situation for you is OK, and your life can be maintained at normal quality if you do not deceive the customers (by covertly replacing the engine components and charging the agreed price).

You understand that if you choose to do this and only if there is a problem with the components (which is unlikely to happen), there is a very low chance (about 10%) that you will receive negative consequences of deceiving the customers (loss of professional reputation, leading to a loss of about 25% of patients).

APPENDIX 2

for

CHAPTER III – PAPER 1

Information of Survey Questions

(Questions are identical for the four experimental groups)

Scenario-relevant Questions

Moral Intensity

The overall harm (if any) done as a result of deceiving the patients/customers would be small.

(R¹⁶)

Most people would agree that deceiving the patients/customers is wrong.

There is a small likelihood that the action of deceiving the patients/customers will actually cause any harm. (R)

The action of deceiving the patients/customers will not cause any harm in the immediate future.

(R)

You are familiar with the patients/customers who might be harmed.

The action of deceiving the patients/customers will harm very few people, if any.

Moral Judgements

In general, the action of deceiving the patients/customers is

(The rating is based on a 7-point, e.g., 1=Unjust, 7=Just)

Unjust/Just

¹⁶ R = Reversely coded.

Unfair/Fair

Not Morally Right/Morally Right

Unacceptable to my family/Acceptable to my family

Intention to deceive

Dentist scenario:

It is likely that I would undertake the deceptive action as proposed in the above scenario.

I would deceive the patients.

I would NOT deceive the patients. (R)

Mechanic scenario:

It is likely that I would undertake the deceptive action as proposed in the above scenario.

I would deceive the customers.

I would NOT deceive the customers. (R)

Decision to deceive

Dentist scenario:

I decide to deceive the patients.

I decide NOT TO deceive the patients. (R)

I decide to undertake the deceptive action as proposed in the scenario.

Mechanic scenario:

I decide to deceive the customers.

I decide NOT TO deceive the customers. (R)

I decide to undertake the deceptive action as proposed in the scenario.

Manipulation check questions

1- Degrees of negative consequence of abstaining from unethical actions:

If you choose NOT to take the proposed deceptive action, you will experience significant negative consequence (unaffordable economic problem).

2- Perception of the degree of possible negative consequence of deceiving (control variable):

If the crown fails, the situation suggests that there is a small likelihood that you will finally receive the negative consequence of deceiving the patients.

3- Degree of positive consequence of deceiving:

You will gain great monetary benefits by deceiving the patients/customers.

4- Probability of receiving negative consequence of deceiving:

If the components fail, the situation suggests that there is a small likelihood that you will finally receive the negative consequence of deceiving the customers.

Validation Check questions

Dentist scenario:

The above scenario talked about ... [choose two correct descriptions]

- If the inferior dental crown to be used on the 5 patients fails, they may need to pay additional money for a replacement. (Correct answer)
- If the inferior dental crown to be used on the 5 patients fails, they do not need to pay additional money for a replacement.
- There is a high possibility that the inferior dental crown (if used on the 5 patients) may fail. (Correct answer)

- There is a low possibility that the inferior dental crown (if used on the 5 patients) may fail.

Mechanic scenario:

The above scenario talked about ... [choose two correct descriptions]

- There will be serious problem with the cheaper components occurring, if you use them to replace the more expensive ones.
- There will not be serious problem with the cheaper components occurring if you use them to replace the more expensive ones. (Correct answer)
- There is a high possibility that the cheaper components (if used on the cars) may fail.
- There is a low possibility that the cheaper components (if used on the cars) may fail. (Correct answer)

Scenario-independent Questions

Ethical Ideology (idealism & relativism)

A person should make certain that their actions never intentionally harm another even to a small degree.

Risks to another should never be tolerated, irrespective of how small the risks might be.

The existence of potential harm to others is always wrong, irrespective of the benefits to be gained.

One should never psychologically or physically harm another person.

One should not perform an action which might in any way threaten the dignity and welfare of another individual.

If an action could harm an innocent other, then it should not be done.

Deciding whether or not to perform an act by balancing the positive consequences of the act against the negative consequences of the act is immoral.

The dignity and welfare of people should be the most important concern in any society.

It is never necessary to sacrifice the welfare of others.

Moral actions are those which closely match ideals of the most "perfect" action.

There are no ethical principles that are so important that they should be a part of any code of ethics.

What is ethical varies from one situation and society to another.

Moral standards should be seen as being individualistic; what one person considers to be moral may be judged to be immoral by another person.

Different types of moralities cannot be compared as to "rightness."

Questions of what is ethical for everyone can never be resolved since what is moral or immoral is up to the individual.

Moral standards are simply personal rules which indicate how a person should behave, and are not to be applied in making judgments of others.

Ethical considerations in interpersonal relations are so complex that individuals should be allowed to formulate their own individual codes.

Rigidly codifying an ethical position that prevents certain types of actions could stand in the way of better human relations and adjustment.

No rule concerning lying can be formulated: whether a lie is permissible or not permissible totally depends upon the situation.

Whether a lie is judged to be moral or immoral depends upon the circumstances surrounding the action.

Social Desirability-Short Form (rating True or False)

I'm always willing to admit it when I make a mistake.

I always try to practice what I preach.

I never resent being asked to return a favor.

I have never been irked when people expressed ideas very different from my own.

I have never deliberately said something that hurt someone's feelings.

I like to gossip at times. (R)

There have been occasions when I took advantage of someone. (R)

I sometimes try to get even rather than forgive and forget. (R)

At times I have really insisted on having things my own way. (R)

There have been occasions when I felt like smashing things. (R)

Short form Personality Inventory

Here are a number of personality traits that may or may not apply to you. Please rate your agreement regarding each statement, to indicate the extent to which you agree or disagree. You should rate the extent to which the pair of traits applies to you, even if one characteristic applies more strongly than the other.

I see myself as: Extraverted, enthusiastic.

I see myself as: Critical, quarrelsome. (R)

I see myself as: Dependable, self-disciplined.

I see myself as: Anxious, easily upset. (R)

I see myself as: Open to new experiences, complex.

I see myself as: Reserved, quiet. (R)

I see myself as: Sympathetic, warm.

I see myself as: Disorganized, careless. (R)

I see myself as: Calm, emotionally stable.

I see myself as: Conventional, uncreative. (R)

APPENDIX 3

for

CHAPTERS IV-V – PAPERS 2-3

Mean and Standard Deviation Values for All the Dependent Variables

Table A-1

Mean & Standard Deviation for Dependent Variables – Paper 2 Study 1

	Deception				Level of Probability					
	<i>Deceptive</i>		<i>Honest</i>		<i>Higher</i>		<i>Lower</i>			
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Paper 2 Study 1										
Body movements										
Eye/eyebrow	0.25	0.88	0.69	0.87	0.53	0.85	0.41	0.85		
Indirect orientation	1.50	2.37	1.44	2.36	1.29	2.30	1.65	2.31		
Hand & arm	3.08	4.75	5.01	4.73	2.19	4.61	5.90	4.62		
Hand holding	4.74	4.07	1.36	4.05	4.20	3.95	1.91	3.96		
Impressions										
Positive affect	2.77	0.70	2.26	0.70	2.44	0.68	2.59	0.68		
Negative affect	1.37	0.31	1.20	0.31	1.39	0.30	1.18	0.30		
Tension	2.68	0.87	2.54	0.86	2.75	0.84	2.47	0.84		
Thinking hard	2.92	1.09	2.11	1.08	2.42	1.06	2.60	1.06		
Attempted control	2.67	0.77	2.22	0.77	2.60	0.75	2.30	0.75		

Note. This table displays Mean (*M*) and Standard Deviation (*SD*) for dependent variables analysed in Paper 2 Study 1.

Table A-2

Mean & Standard Deviation for Dependent Variables – Paper 2 Study 2

	Deception				Level of Probability						
	<i>Deceptive</i>		<i>Honest</i>		<i>Lower</i>		<i>Moderate</i>		<i>Higher</i>		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Paper 2 Study 2											
Body movements											
Eye/eyebrow	0.22	0.37	0.39	0.71	0.05	0.15	0.42	0.83	0.45	0.91	
Position shift	0.69	0.62	0.56	0.54	0.72	0.68	0.69	0.79	0.45	0.62	
Hand & arm	2.94	1.66	2.54	1.52	1.29	1.59	4.29	2.56	2.63	1.80	
Hand holding	5.30	2.91	5.93	2.63	3.66	1.54	5.93	4.01	7.23	4.06	
Impressions											
Positive affect	2.12	0.48	2.17	0.37	1.62	0.37	2.71	0.61	2.10	0.51	
Negative affect	1.89	0.45	1.82	0.40	1.70	0.42	1.82	0.44	2.03	0.52	
Tension	2.89	0.44	2.79	0.40	2.56	0.35	2.78	0.54	3.18	0.35	
Thinking hard ^a	2.65	0.61	2.76	0.59			2.67	0.55	2.74	0.62	
Attempted control ^b	2.45	0.54	2.32	0.50			2.27	0.45	2.50	0.50	

Note. ^{ab}These two variables were coded based on behaviours during conversations thus they only contain information in the moderate and higher levels of probability conditions that involved interactions. This table displays Mean (*M*) and Standard Deviation (*SD*) for dependent variables analysed in Paper 2 Study 2.

Table A-3

Mean & Standard Deviation for Dependent Variables – Paper 2 Study 3

	Deception				Level of Probability			
	<i>Deceptive</i>		<i>Honest</i>		<i>Higher</i>		<i>Lower</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Paper 2 Study 3								
Body movements								
Eye/eyebrow	1.95	0.95	1.60	0.96	1.85	0.94	1.70	0.95
Hand & arm	1.13	1.97	0.77	1.97	0.84	1.95	1.06	1.95
Impressions								
Positive affect	2.17	1.10	2.16	1.09	2.01	1.09	2.32	1.09
Negative affect	1.20	0.41	1.13	0.42	1.17	0.41	1.17	0.41
Tension	3.13	1.12	3.34	1.12	3.27	1.11	3.20	1.11
Attempted control	2.77	0.84	2.59	0.84	2.78	0.83	2.58	0.83

Note. This table displays Mean (*M*) and Standard Deviation (*SD*) for dependent variables analysed in Paper 2 Study 3.

Table A-4

Mean & Standard Deviation for Dependent Variables – Paper 2 Study 4

	Deception				Reconnaissance				Deception Task Complexity						
	<i>Deceptive</i>		<i>Honest</i>		<i>Rec</i>		<i>No Rec</i>		<i>No Task</i>		<i>Single Task</i>		<i>Duplex Tasks</i>		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Paper 2 Study 4															
Body movements															
Eye/eyebrow	3.51	0.98	3.56	0.98	3.79	1.00	3.28	1.00	3.16	1.01	3.69	0.98	3.59	1.00	
Trunk sway	1.69	1.72	2.40	1.72	2.40	1.75	1.69	1.75	1.80	1.82	2.31	1.77	1.75	1.80	
Hand & arm	2.41	3.06	3.68	3.06	2.78	3.13	3.30	3.13	3.78	3.12	3.21	3.03	1.96	3.08	
Impressions															
Positive affect	3.01	1.08	2.45	1.09	2.66	1.11	2.80	1.11	2.59	1.13	2.66	1.09	3.03	1.12	
Negative affect	1.13	0.45	1.15	0.45	1.17	0.45	1.11	0.45	1.12	0.45	1.15	0.44	1.15	0.45	
Tension	2.94	0.77	3.11	0.77	2.87	0.78	3.17	0.78	3.25	0.78	3.03	0.76	2.78	0.77	
Thinking hard	2.13	0.73	2.07	0.73	2.03	0.75	2.17	0.75	2.30	0.75	1.93	0.73	2.23	0.74	
Attempted control	2.92	0.84	2.94	0.84	3.01	0.86	2.85	0.86	3.13	0.86	2.67	0.83	3.25	0.84	

Note. This table displays Mean (*M*) and Standard Deviation (*SD*) for dependent variables analysed in Paper 2 Study 4.

Table A-5

Mean & Standard Deviation for Dependent Variables – Paper 3 Study – Part 1

	Deception				Level of Probability				Self-regulation			
	<i>Deceptive</i>		<i>Honest</i>		<i>Higher</i>		<i>Lower</i>		<i>Increased</i>		<i>Control Group</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Paper 3 Study – Part 1												
Body movements												
Eye contact	5.36	1.06	5.39	0.99	5.23	0.62	5.51	0.61	5.57	0.61	5.17	0.61
Eyes averted	1.80	0.98	1.76	0.91	1.81	0.65	1.74	0.64	1.71	0.64	1.84	0.64
Other eye movs	0.84	1.20	0.77	0.93	1.04	0.78	0.58	0.77	0.61	0.77	1.01	0.77
Trunk sway	0.96	0.97	0.88	1.08	0.96	0.92	0.88	0.91	0.75	0.92	1.09	0.92
Hand & arm	1.58	1.09	1.46	0.94	1.37	0.79	1.66	0.78	1.57	0.78	1.47	0.78
Hands only	0.86	0.87	0.93	0.85	0.80	0.64	0.99	0.63	0.96	0.63	0.83	0.63
Fidgeting	0.86	1.18	0.82	1.27	0.88	1.11	0.80	1.09	0.70	1.09	0.97	1.10
Hand(s) & object(s)	1.81	2.58	2.53	2.72	2.27	2.24	2.07	2.20	2.12	2.21	2.22	2.21
Hand(s) in pocket(s)	3.68	3.12	3.37	2.92	3.71	2.93	3.35	2.89	3.05	2.90	4.00	2.90
Legs/feet	1.14	1.12	1.00	1.42	0.90	0.97	1.23	0.96	1.04	0.96	1.09	0.96
Impression												
Negative & controlled	2.36	0.58	2.29	0.56	2.51	0.38	2.14	0.37	2.28	0.37	2.38	0.37

Note. This table displays Mean (*M*) and Standard Deviation (*SD*) for dependent variables analysed in the study presented in Paper 3.

Table A-6

Mean & Standard Deviation for Dependent Variables – Paper 3 Study – Part 2^a

	Deception ^b	Level of Probability				Self-regulation					
		Conditions		Higher		Lower		Increased		Control Group	
		Dec/Honest	M	SD	M	SD	M	SD	M	SD	
Paper 3 Study – Part 2											
Body movements											
Eye contact	Deceptive	5.19	1.10	5.53	1.08	5.54	1.09	5.18	1.09		
	Honest	5.27	1.03	5.50	1.02	5.61	1.01	5.17	1.02		
Eyes averted	Deceptive	1.83	1.02	1.76	1.01	1.81	1.01	1.78	1.01		
	Honest	1.79	0.95	1.73	0.94	1.61	0.94	1.91	0.94		
Other eye movs	Deceptive	1.05	1.25	0.62	1.23	0.62	1.23	1.06	1.23		
	Honest	1.02	0.97	0.53	0.96	0.60	0.96	0.95	0.96		
Trunk sway	Deceptive	1.11	1.02	0.82	1.00	0.81	1.00	1.12	1.01		
	Honest	0.81	1.13	0.95	1.11	0.68	1.11	1.07	1.12		
Hand & arm	Deceptive	1.45	1.13	1.71	1.12	1.59	1.13	1.57	1.12		
	Honest	1.30	0.98	1.61	0.96	1.56	0.96	1.36	0.97		
Hands only	Deceptive	0.73	0.90	1.00	0.89	0.86	0.90	0.86	0.89		
	Honest	0.88	0.89	0.99	0.87	1.07	0.88	0.80	0.87		
Fidgeting	Deceptive	0.86	1.23	0.85	1.21	0.63	1.21	1.09	1.21		
	Honest	0.90	1.31	0.74	1.30	0.78	1.30	0.86	1.30		
Hand(s) & object(s)	Deceptive	1.98	2.68	1.64	2.83	1.74	2.64	1.88	2.80		
	Honest	2.57	2.64	2.49	2.80	2.51	2.64	2.55	2.80		
Hand(s) in pocket(s)	Deceptive	4.13	3.23	3.24	3.19	3.02	3.20	4.35	3.20		
	Honest	3.29	3.03	3.46	2.99	3.09	2.99	3.66	2.99		
Legs/feet	Deceptive	1.01	1.17	1.26	1.15	0.99	1.54	1.29	1.56		
	Honest	0.80	1.48	1.20	1.45	1.10	1.46	0.89	1.46		
Impression											
Negative & controlled	Deceptive	2.55	0.60	2.18	0.59	2.37	0.60	2.35	0.59		
	Honest	2.47	0.58	2.11	0.57	2.18	0.57	2.40	0.57		

Note. ^aThis table displays Mean (*M*) and Standard Deviation (*SD*) for the interaction between independent variables for all the dependent variables analysed in the study presented in Paper 3. ^bThis column shows the within-subject deception conditions.

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