(IN)CONSISTENCIES AS CUES TO DECEPTION

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ABSTRACT

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The aim of this thesis was to examine statement consistency types (*between-statement consistency*, *within-statement consistency*, *within-group consistency*, and *statement-evidence consistency*) within various contexts of deception. In **Study I** (N = 150), *between-statement consistency* was examined when *question format was changed* across two interviews. Participants provided free recall accounts of two events in the first interview. In the second, they either freely recalled the events again or responded to specific questions sequentially (one event at a time) or non-sequentially (both events together). Liars uttered fewer repetitions across interviews (less *between-statement consistency*) than truth tellers, particularly when questions were non-sequential, but they unexpectedly showed more *within-statement consistency* than truth tellers. In **Study II** (N = 98), the *Devil's Advocate* approach was used to investigate *within-group consistency* for opinions. Pairs of participants who shared strong opinions about a controversial topic were matched and permitted to prepare for individual interviews about their true/false opinions. They were asked an 'opinion-eliciting question' for arguments supporting those opinions followed by a 'devil's advocate question' for opposing arguments. Prepared truth telling pairs were more consistent with each other on the opinion-eliciting question than on the devil's advocate question. As predicted, deceptive pairs were equally consistent in response to both questions. In **Study III** (N =144), the effects of *counter-interrogation strategies* and *familiarity with the alibi* on *statement-evidence consistency* and *between-statement consistency* were examined. All participants visited a restaurant for 10 minutes (high familiarity) or 30 seconds (low familiarity) to use it as an alibi in two interviews involving visuospatial tasks. Liars who knew about the interview technique prior to committing a mock crime provided significantly more non-salient (particularly if they were highly familiar with the alibi) and salient details than truth tellers and liars who did not possess this knowledge, but they did not differ on statement consistency types. In **Study IV** (N = 71), police officers were surveyed about their perceptions of suspects' statement (in)consistency types. Officers were most likely to look for *statement-evidence inconsistency* and least likely to look for *within-statement inconsistency*. This finding was explained by their belief that liars attempt to eliminate within-statement inconsistency more than other types of inconsistency unless incriminating evidence is strategically disclosed during the interview. The results of this thesis extend previous findings demonstrating that liars attempt to maintain statement consistency types unless specific interview techniques are used to increase differences between liars and truth tellers. Critically, familiarity with the reported event seems to help both liars and truth tellers to provide consistent statements, whereas counter-interrogation strategies may fail or may succeed at the expense of one or more consistency type(s). Practitioners need to be aware of these effects and to consider all consistency types simultaneously rather than separately to detect deception.

Keywords: deception, consistency, cues to deception, investigative interview, legal decision-making

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SWEDISH SUMMARY

Att upptäcka lögner är en svår uppgift för både lekmän och yrkespersoner. I rättsliga sammanhang är det särskilt viktigt och kan ha avgörande konsekvenser för den misstänkte. Ett felaktigt beslut om den misstänktes trovärdighet kan leda till att den som utför förhöret utgår ifrån att den misstänkte är skyldig vilket kan resultera i felaktig dom. Forskare har börjat utveckla intervjutekniker som kan implementeras för att öka skillnaderna mellan lögnares och sanningssägare utsagor och därmed öka möjligheten att avslöja lögner. Dessa tekniker har fokuserat på att få fram verbala snarare än icke-verbala ledtrådar till lögn eftersom det är empiriskt fastställt att icke-verbala ledtrådar inte är giltiga tecken på lögn.

Det första målet för denna avhandling var att undersöka intervjutekniker som kan implementeras för att kunna använda den verbala ledtråden överensstämmelse i utsagor. Det andra syftet med avhandlingen var att undersöka effekterna av dels bakgrundskännedom om den rapporterade händelsen, dels de strategier som används av de som ljuger i förhör på överensstämmelsen i de givna utsagorna. Slutligen, eftersom yrkesmän vanligtvis i stor utsträckning letar efter överensstämmelse i misstänktas vittnesmål, var det tredje målet för avhandlingen att förstå hur poliser uppfattar och använder sig av överensstämmelse i utsagor för att avslöja lögner.

Överensstämmelse är ett mångfacetterat begrepp som inkluderar olika typer. *Överensstämmelse inom utsagor* avser samstämmighet mellan de uppgifter som ges av en misstänkt inom en och samma intervju. *Överensstämmelse mellan utsagor* avser samstämmighet mellan uppgifter från en misstänkt över upprepade utsagor. *Överensstämmelse inom grupp* avser samstämmigheten mellan detaljer som tillhandahålls av olika misstänkta i ett fall där flera är misstänkta. Slutligen, i de fall där det finns ett eller flera bevis, jämförs den misstänktes utsaga med bevisen, för *utsagans överensstämmelse med bevis*. Dessa typer av överensstämmelse undersöktes i denna avhandling i separata studier med olika experimentella upplägg. De lögner som berättades speglade olika rättsliga sammanhang eftersom misstänkta kan ljuga för praktiker av olika anledningar. Dessa sammanhang involverade informanter som ljög beträffande avgörande information som de hade, våldsamma extremister som ljög angående sina åsikter och kriminella som använde sig av falska alibin till brott.

I **Studie I** undersöktes effekten av att *ändra frågeformat* mellan två intervjuer för att undersöka *överensstämmelse mellan utsagor*. Deltagarna talade antingen sanning om två händelser eller ljög om en av händelserna. I en första intervju gav alla deltagare en fri återgivning av de två händelserna. I den andra intervjun gav deltagarna antingen ytterligare

en fri återgivning eller svarade på specifika frågor som presenterades kronologiskt (om en händelse i taget) eller icke-kronologiskt (om båda händelserna samtidigt). Lögnarnas berättelser innehöll färre upprepningar mellan intervjuerna än sanningssägarnas berättelser för båda händelserna, särskilt när frågorna presenterades i icke-kronologisk ordning. Ett intressant fynd var att lögnare var mer samstämmiga än sanningssägare i sina svar om de två händelserna *(överensstämmelse inom utsagor).*

I **Studie II**, undersöktes *överensstämmelse inom grupper* med hjälp av s.k. djävulens advokat-taktik. Par matchades ihop baserat på deras starka åsikter om ett kontroversiellt ämne och fördelades slumpvis till att antingen vara sanningsenliga eller ljuga. Paren gavs möjlighet att förbereda sig för intervjun. Majoriteten av både lögnarna och sanningssägarna valde att förbereda sig. Därefter intervjuades varje deltagare separat med djävulens advokat-taktik. De fick frågor som tog fram åsikter som stödde deras sanna/falska utsagor, följt av en fråga enligt djävulens advokat-taktik för motsatta argument. Argumenten hos de sanningssägande paren som hade förberett sig var mer samstämmiga i svar som gällde att ta fram åsikter än till djävulens-advokatfrågan, medan de par som ljög var lika samstämmiga när de svarade på båda frågorna.

I **Studie III**, undersöktes effekterna av *kontraförhörsstrategier och kunskap om alibiplatsen* på *utsagans överensstämmelse med bevis* och *överensstämmelse mellan utsagor.* Deltagarna besökte en restaurang för att köpa en smörgås (sanningssägare) eller för att använda den som alibi efter att ha begått ett fingerat brott (lögnare). Hälften av lögnarna informerades om att de skulle kunna bli tillfrågade om att göra en ritning av den plats de angav som alibi ifall de intervjuades (informerade lögnare). Deltagarna tillbringade antingen 10 minuter (hög grad av kunskap) eller 30 sekunder (låg grad av kunskap) i restaurangen. Alla deltagare intervjuades två gånger med olika visuospatiala uppgifter. Förutom att mäta överensstämmelse, beräknades utsagornas antal *framträdande (centrala*) och *icke-framträdande (icke-centrala) detaljer*. Informerade lögnare gav betydligt fler framträdande och icke-framträdande detaljer än icke-informerade lögnare och sanningssägare, men de skilde sig inte i överensstämmelse mellan utsaga och bevis, eller i överensstämmelse mellan utsagor. Skillnaden för icke-framträdande detaljer var mer uttalad i fallen med hög kunskap än i fallen med låg kunskap. Icke-informerade lögnare och sanningssägare skilde sig inte åt i sina utsagor. Alltså misslyckades lögnarna med att efterlikna sanningssägarna visuospatiala utsagor då de gav överdrivet detaljerade utsagor. Ändå kunde de inte ge särskilt samstämmiga utsagor, vilket antyder att överensstämmelse kan vara en verbal ledtråd som är svår för lögnare att kontrollera.

I **Studie IV** tillfrågades poliser i Australien, Kanada och Storbritannien om sina uppfattningar om misstänktas utsagor i fråga om typer av överensstämmelse. Ungefär hälften av poliserna rapporterade att de letade efter självmotsägelser i utsagorna för att upptäcka lögner. De ansåg att utsagor som innehöll självmotsägelser och utelämnanden (icke-rapporterad information) indikerade lögn, medan utsagor som innehöll upprepningar och tillägg (ytterligare information från misstänkta som inte redovisats i tidigare utsagor) indikerade sanning. Poliserna var mer benägna att leta efter utsagors överensstämmelse med bevis och minst benägna att leta efter självmotsägelser inom utsagor. Detta förklarade med deras övertygelse om att skyldiga misstänkta försöker eliminera självmotsägelser inom utsagan under intervjuer mer än någon annan typ av överensstämmelse, såvida inte kompromitterande bevis avslöjas strategiskt under intervjun. Dessutom ansågs att de misstänktas kriminella förflutna, intelligens och personlighet var viktiga prediktorer för hur väl de misstänkta lyckas med att eliminera självmotsägelser i sina utsagor.

Dessa resultat ligger i linje med tidigare studier som visar att lögnare försöker upprätthålla överensstämmelse i utsagetyper under intervjuer. Lögnare verkar vara särskilt angelägna om att bibehålla samstämmighet inom utsagor vilket var i linje med vad polisernas rapporterade. Tre faktorer bidrog till lögnarnas försök att upprätthålla överensstämmelse: kontraförhörsstrategier, kunskap om platsen för alibit och sättet som förhören gick till. Medan lögnarnas kontraförhörsstrategier inte ökade överensstämmelsen i utsagor, förbättrade förekomst av bakgrundskunskap lögnarnas och sanningssägarnas överensstämmelse. När det gäller intervjuteknik var ändrat frågeformat mellan intervjuer – icke-kronologiska frågor när mer än en händelse rapporteras, och genomförande av djävulens advokat-taktik för att bedöma trovärdighet i åsikter – effektiva för att öka skillnaderna mellan lögnares och sanningssägares överensstämmelse. Sammanfattningsvis föreslås det att praktiker inser vikten av dessa faktorer och tittar på alla typer överensstämmelse samtidigt, snarare än separat, när de vill kunna upptäcka lögner i rättsliga sammanhang.

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TABLES AND FIGURES

PREFACE

This thesis consists of a summary and the following four papers, referred to in the text by their Roman numerals:

I. Deeb, H., Vrij, A., Hope, L., Mann, S., Granhag, P. A., & Lancaster, G. L. J. (2017). Suspects' consistency in statements concerning two events when different question formats are used. *Journal of Investigative Psychology and Offender Profiling, 14,* 74-87. doi: 10.1002/jip.1464

II. Deeb, H., Vrij, A., Hope, L., Mann, S., Leal, S., Granhag, P. A., & Strömwall, L. A. (in press). The Devil's Advocate approach: An interview technique for assessing consistency among deceptive and truth telling pairs of suspects. *Legal and Criminological Psychology*.

III. Deeb, H., Granhag, P. A., Vrij, A., Strömwall, L. A., Hope, L., & Mann, S. (2017). Visuospatial counter-interrogation strategies by liars familiar with the alibi setting. Manuscript submitted for publication.

IV. Deeb, H., Vrij, A., Hope, L., Mann, S., Granhag, P. A., & Strömwall, L. A. (2017). Police officers' perceptions of statement inconsistency. Manuscript submitted for publication.

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INTRODUCTION

"We must look for consistency. Where there is a want of it, we must suspect deception."

Arthur Conan Doyle

The manual of the Irish Republican Army, *The Green Book*, advises members, should they be apprehended, to say nothing during interrogation (Conflict Archive on the INternet, 2016). The manual describes interrogation techniques used by investigators and explains that investigators use these techniques to obtain missing information. Intercepted members should not disclose any information at all and should remain silent, or investigators will compare their statements with available evidence and challenge apprehended members to explain any contradictions, which may lead them to make self-incriminating statements. They are warned that their statements will be recorded and used as evidence against them, eventually leading to their conviction.

These instructions reflect actual investigative processes and interviews. Investigators seek to obtain information from suspects, and they analyse reported information for cues to deception and for contradictory statements that may incriminate suspects (Granhag, Vrij, & Verschuere, 2015b). Guilty suspects, however, employ counter-interrogation strategies, increasing the difficulty of detecting deception and gathering information. The consequences of inaccurately detecting deception may be critical. In numerous cases, honest and innocent suspects judged by investigators to be lying have complied with the investigators' beliefs and falsely confessed to crimes, resulting in wrongful convictions (Evans, Meissner, Brandon, Russano, & Kleinman, 2010; Kassin, 2015; Scheck, Neufeld, & Dwyer, 2000).

People are generally poor at detecting deception, with a success rate of only 54%, equivalent to guessing the flip of a coin (Bond & DePaulo, 2006; Gongola, Scurich, & Quas, 2017). This low detection rate may be the result of people's reliance on cues that are not indicative of deception. Most people believe that gaze aversion, nervousness, body movement, and inconsistency are valid indicators of deception (Global Deception Research Team, 2006). However, research reviews and meta-analyses have repeatedly demonstrated there is no single cue to deception (DePaulo et al., 2003; Sporer & Schwandt, 2006, 2007; Vrij, 2008). Like laypeople, investigative practitioners hold inaccurate beliefs about cues

to deception that affect their decisions about suspects' veracity and guilt (Aamodt & Custer, 2006; Akehurst, Köhnken, Vrij, & Bull, 1996; Mann, Vrij, & Bull, 2004). Survey studies have demonstrated erroneous beliefs about cues to deception among police officers, judges, prosecutors, prison personnel, and immigration officers (Granhag, Andersson, Strömwall, & Hartwig, 2004; Granhag, Strömwall, & Hartwig, 2005; Strömwall & Granhag, 2003).

People with a record of criminal history tend to have more insight into cues to deception than laypeople and practitioners (Granhag et al., 2004; Hartwig, Granhag, Strömwall, & Andersson, 2004; Vrij & Semin, 1996). They do not relate stereotypical cues to deception with deceptive behaviour, and they are more likely to distinguish between deceptive and honest cues. Their contact with investigative practitioners and experience with interviews give them opportunities to gain feedback about their behaviour and their attempts to deceive the investigator (Vrij, 2008; Vrij, Granhag, & Porter, 2010a). Guilty suspects may behave in line with stereotypical beliefs about truthful behaviour. If they succeed in convincing the officer, they are likely to repeat their behaviour in subsequent interviews. Laypeople and practitioners do not usually receive such feedback, so they do not have the opportunity to learn and to improve their judgement about cues to deception.

Statement consistency is one of the verbal cues to deception that laypeople and practitioners, but not people with a criminal history, consider valid (Hartwig et al., 2004). It is commonly believed that consistent statements indicate truthfulness whereas inconsistent statements indicate deception in what is referred to as the *consistency heuristic* (Granhag & Strömwall, 1999; Vrij et al., 2010a). Recent research, however, demonstrates that liars are at least as consistent as truth tellers (Granhag & Ströwall, 2002). Liars are more deliberate than truth tellers and put more effort into maintaining statement consistency (Granhag, Mac Giolla, Strömwall, & Rangmar, 2013a), so it is unsurprising that while they maintain consistency across interviews themselves, they believe it is more likely to indicate deception than truthfulness (Granhag et al., 2004; Hartwig et al., 2004).

Given liars' awareness of stereotypical views about consistency and investigative practitioners' extensive use of the consistency heuristic, it is important to examine interview techniques that affect liars' attempts to maintain consistency. This thesis is aimed generally to extend the literature on statement consistency as a cue to deception, to present different types of statement consistency, and to test each type in different experimental contexts. The studies reported here examined interview techniques that may increase differences in various statement consistency types between liars and truth tellers, the effects on statement consistency of suspects' familiarity with the reported event and liars' counter-

interrogation strategies, and police officers' perceptions of different types of statement consistency.

The aim of Study I was to examine between-statement consistency among liars and truth tellers when the question format was changed across two interviews. In Study II, within-group statement consistency was assessed among pairs of liars and truth tellers asked about their opinions. Study III examined differences between truth tellers and liars (using or not using a counter-interrogation strategy) for between-statement consistency across two interviews and consistency with the alibi. In Study IV, police officers were surveyed about their perceptions and their use of types of consistency as cues to deception.

The thesis opens with definitions of key terms, followed by an overview of the literature on deception detection. In the first section of the literature review, I discuss the investigative contexts relevant to the experimental studies and to suspects' motives for lying in these contexts. The second section of the review describes characteristics generally found in liars. Unexamined in previous studies, the effects (and officers' perceptions of the effects) of these characteristics on the (in)consistency of suspect's statements as elicited in the survey study are discussed in light of liars' general characteristics. The third section introduces commonly held beliefs about cues to deception, including statement consistency. Two commonly used interview styles (accusatory and information-gathering) are then presented, and the information-gathering approach used in the experimental studies is justified. The next section discusses suspects' use of counter-interrogation strategies in light of a theoretical framework for statement consistency presented in the section that follows. That section provides an overview of novel interview techniques that have yielded promising results in eliciting verbal cues to deception. Finally, the studies comprising this thesis are summarised and implications of their findings are discussed.

Statement Consistency: Key Terms and Definitions

Consistency is defined by the Cambridge Dictionary (2017) as 'the quality of always behaving or performing in a similar way'. Applied to forensic contexts, consistency refers to coherent and logically structured statements provided by one or more suspects (Granhag et al., 2015b; Vrij, 2005). Researchers have examined four types of consistency (Vredeveldt, van Koppen, & Granhag, 2014). In a single interview, consistency refers to agreement between details provided at different points (i.e., *within-statement consistency*). In repeated interviews, *between-statement consistency* refers to agreement between details

provided by the suspect across interviews. In cases involving multiple suspects, *within-group consistency* may be assessed based on agreement between suspects' statements. Finally, where the investigator possesses one or more piece(s) of evidence, *statement-evidence consistency* refers to agreement between the suspect's statement and the evidence (Vredeveldt et al., 2014).

Consistency may be measured subjectively by rating the suspect's entire statement on a scale between 'inconsistent' and 'consistent' (Granhag, Strömwall, Willén, & Hartwig, 2013b; Leins, Fisher, Vrij, Leal, & Mann, 2011; Vredeveldt et al., 2014). Consistency may also be measured objectively by counting consistent and inconsistent details in statements. Objective measures of consistency include *repetitions* (details provided by a suspect that match the evidence or details provided in another statement by the same or different suspect), *omissions* (details that are not reported about the event, or details that the suspect reported in a statement but failed to report in subsequent statements), *reminiscences* (additional details provided in subsequent statements), and *contradictions* (details that do not correspond with the evidence, with another statement, or within the same statement). Consistent statements tend to feature repeated details (repetitions) typically associated with truthfulness. Inconsistent statements feature omissions, reminiscences, and/or contradictions commonly associated with deception (Fisher, Brewer, & Mitchell, 2009; Granhag & Strömwall, 2002). A statement may be both consistent (including many repetitions) and inconsistent (including many reminiscences). Hence, consistency and inconsistency are measured through different criteria and are not exactly opposites.

In this thesis, suspects are referred to as *liars* (equated with guilty suspects) or *truth tellers* (equated with innocent suspects). Liars in the studies were assigned to be guilty of a mock crime or to have guilty knowledge and were expected to use deception to conceal their knowledge.

Lies by suspects may be *outright* or *embedded* (Vrij, 2008; Vrij et al., 2010a). Outright lies involve denial of the truth and fabrication of a cover story or alibi. Outright lies might also be told about opinions, as when people suspected of violent extremism lie about their values and affiliations (Study II). Embedded lies are truths combined with partial fabrications designed to mislead the investigator. Liars telling embedded lies tell some truth, but omit relevant information. Embedded lies may be told to law enforcement or other official agencies by confidential sources such as drug dealers or relatives of violent extremists (Innes, 2000; U.S. Department of Justice, 2006). Investigators expect informants to offer multiple pieces of information about one or more events. Informants, however, may opt to relay information relevant to a past or future criminal event while at the same time fabricating information to please the investigators (Study I). Guilty suspects

may also tell an embedded lie by using an alibi that they are familiar with, but that was not true for them at the time of the crime in question (Study III).

Relevant Investigative Contexts: Suspects' Motives for Deception

Deception is common in everyday social interactions, and people tend to lie at least once every day (DePaulo, Kashy, Kirkendol, Wyer, & Epstein, 1996). Reasons for lying include escaping an unpleasant situation, making a positive impression on others, or gaining a material or psychological advantage (DePaulo et al., 2003; Kashy & DePaulo, 1996; Vrij, 2008). These lies may be selfish (self-oriented) or altruistic (other-oriented). People tend not to plan these social lies, which are often spontaneous and have no serious implications (DePaulo et al., 1996). In forensic settings, however, the stakes are high and lies have consequences.

The experimental studies in this thesis were designed to address different investigative contexts including informant handling, violent extremism, and criminality. These contexts are presented below, along with liars' motives to deceive in these contexts.

Informant Handling

It is generally assumed that guilty suspects lie to avoid incarceration, as in the case of *informants*. However, informants may also lie to gain rewards. They may provide inaccurate information or fabricate information to obtain money, acquire legal status, or seek revenge on a competitor (Harfield, 2012; McGarrell, Freilich, & Chermak, 2007). In cases involving national security, informants may lie about the details of a planned attack or a violent extremist's identity to protect their own network or to avoid being deported away from their families (Greer, 1995; Stabile, 2014). They may also act as double agents or plant evidence to incriminate the investigators' target (Miller, 2011). In one study, police informants reported that their role was shameful and a betrayal of their network. Therefore, when they had to play that role, they revealed information investigators already knew but withheld more critical information (Rosenfeld, Jacobs, & Wright, 2003). Even though informants are perceived as unreliable sources of information, investigators continue to use them as a cost-effective approach to solving difficult cases (Innes, 2000; Maguire & John, 1995). Therefore, it is important that investigators have access to interview techniques to enable them to discriminate between truthful and deceptive information. Because informants are repeatedly interviewed, it may be useful to develop an interview technique

that not only examines within-statement consistency about the reported event(s), but also consistency across repeated interviews. Study I suggested such an interview technique.

Screening of Violent Extremists

Suspects may lie about their extreme and violent *opinions* to avoid incarceration, execute an intended attack, and/or protect their network (Leal, Vrij, Mann, & Fisher, 2010; Soufan, 2011; Stabile, 2014). Extremists who want to enter a country to launch an attack will usually hide and/or deny any links to the extremist group with which they are affiliated and report instead that they wish to enter the country for tourism. Extremist organisations' manuals such as al Qaeda's *Manchester Manual* (U.S. Department of Justice, 2002) encourage members to be deceptive and to rehearse responses to possible questions that will distance them from their affiliated network.

Recent attacks, such as the Paris attacks in 2016 ("Paris Attacks: Who Were the Attackers?," 2016) and the San Bernardino shootings in 2015 ("San Bernardino Shooting: Who Were the Attackers?," 2015), were committed by groups of violent extremists rather than by single individuals. There is evidence that the Paris attackers posed as refugees when entering Europe, and when the San Bernardino shooters got married in the United States, the wife applied for a permanent residence card, which required that they both be interviewed by investigative practitioners. Despite their contact with authorities, none of these attackers were intercepted before their crimes. It is therefore critical that immigration and security officers have a screening tool to assist them to distinguish people who hold extreme views from those who do not. A tool to address within-group consistency could be effective in comparing the consistency of statements between group members. Study II examined an interview technique to assess the consistency of false (versus true) opinions in groups of two.

Interviews in Criminal Settings

Criminal suspects who have committed a crime will usually want to cover up for it. One way to cover a crime is to fabricate an *alibi* (purported evidence of being elsewhere) for when the crime occurred. A believable alibi may clear a person from charges, but an alibi perceived to be deceptive may strengthen the case against the suspect (Sakrisvold, Granhag, & Mac Giolla, 2017).In any case, it is difficult to distinguish truthful from deceptive alibis (Culhane et al., 2013). Suspects, whether innocent or guilty, are generally inconsistent in reporting alibis (Strange, Dysart, & Loftus, 2014), which tend to include errors (incorrectly recalled information) and to depend on evidence typically considered weak (Olson & Charman, 2012). However, the accuracy of an alibi may be enhanced when

the stakes are high, when there is a short delay between the crime and the interview, when location or activity rather than specific timing is requested, and when the event is schema-consistent (Dysart & Strange, 2012; Leins & Charman, 2016; Nieuwkamp, Horselenberg, & van Koppen, 2016; Olson & Charman, 2012). Alibis are especially difficult to believe when they are not corroborated by evidence or when they are not obtained from an unmotivated stranger (Dahl & Price 2012; Dysart & Strange, 2012; Olson & Wells, 2012). Even though suspects can generally find an alibi witness for a given time, the witness is often a motivated witness such as a friend or a family member (Culhane, Hosch, & Kehn, 2008).

To make their story more believable, liars may use a *familiar alibi* to be able to include richer details in their stories, because richness of details is associated with truthfulness (DePaulo et al., 2003; Greuel, 1992; Strömwall & Granhag, 2003; Volbert & Steller, 2014). In one study, participants were instructed to draw imagined (liars) or true (truth tellers) alibis (Vrij et al., 2010b). Results showed that liars did not differ from truth tellers on the number of details, because liars seemed to use a familiar setting in their drawing and were therefore able to include many details. These results are in line with findings in spatial cognition literature that the longer individuals are exposed to a setting, the more familiar they become with it, which eventually enhances their memory representation of it and their performance and accuracy on relevant visuospatial tasks (Acredolo, 1982; Gale, Golledge, Halperin, & Couclelis, 1990; Prestopnik & Roskos-Ewoldsen, 2000).

Other studies examining familiarity in the context of deception have focused on cover stories rather than alibis. Children aged 9-12 who reported an event they were familiar with scored higher on CBCA, indicating more truthfulness, than those who were unfamiliar with the reported event (Blandon-Gitlin, Pezdek, Rogers, & Brodie, 2005). These differences remained whether the children were lying or telling the truth. Similar results were obtained in a study examining deception in mock job interviews with undergraduate students (Warmelink, Vrij, Mann, Leal, & Poletiek, 2013). Liars who were familiar with the job could not be distinguished from truth tellers, and liars who were unfamiliar with the job were rated as lowest in truthfulness. Finally, a study to discern true and false intentions among undergraduate students who fabricated a story or told the truth about an activity they intended to execute in a familiar or unfamiliar setting found that truth tellers had a more vivid mental image of the activity and setting than liars (Knieps, Granhag, & Vrij, 2014). Although familiarity did not moderate these results, those who were familiar with the physical setting could describe it in more detail than unfamiliar participants. Liars who had not experienced the setting did not have a vivid memory of it, so they found it difficult to include spatial, sensory, and other details in their statements.

Familiarity with the reported event helps liars to provide statements resembling those of truth tellers and so enhances the believability of their story. It will therefore be interesting to examine the extent to which liars differ from truth tellers in their accuracy on repeated visuospatial tasks depending on how familiar they are with the alibi setting. Study III examined the effect of familiarity with the alibi (in addition to liars' counter-interrogation strategies) on differences between liars and truth tellers in statement-evidence consistency and between-statement consistency.

Distinguishing Characteristics of Liars

Previous studies have examined individual differences between liars and truth tellers, but to my knowledge only one study investigated these differences with respect to consistency (Ewens, Vrij, Mann, & Leal, 2015). That study examined the effects of veracity and language proficiency on repetitions and reminiscences when native and non-native English speakers honestly or deceptively reported an event in chronological order and then in reverse order. Deceptive non-native speakers, who spoke in their native language in the presence of an interpreter, were equally consistent (their statements featured similar repetitions) but less inconsistent (fewer reminiscences) than their truth telling counterparts. However, when non-native speakers spoke in a second language, they were equally consistent whether they were lying or telling the truth. To address the paucity of research, police officers recruited for Study IV were asked exploratory questions about their perceptions of possible characteristics that might influence suspects' statement consistency. These characteristics were derived from the available literature on deception as discussed below.

A meta-analysis has shown that the *credibility* of the liar needs to be considered as some people are better liars than others, and some are always judged either honest or deceptive regardless of whether or not they tell the truth (Bond & DePaulo, 2008). *Personality* also plays a role in shaping deceptive behaviour. Individuals scoring high on measures of psychopathy and Machiavellianism use deception consistently to exploit others and to reach their goals (DePaulo & Rosenthal, 1979; Vrij, 2008). They are highly intelligent and generally good at deceiving others. They know when to lie and are talented and relaxed when they deceive others, so their targets are rarely suspicious of them (Cherulnik, Way, Ames, & Hutto, 1981). In contrast, shy people feel anxious about being accused of lying (Vrij, Mann, & Fisher, 2006c). They feel pressured and cognitively loaded, which may make them look deceptive when they are not. In a study examining lying behaviour in

different personalities, college students and community members were asked to keep a diary for a week in which they noted their social interactions and the lies they told during those interactions (Kashy & DePaulo, 1996). Manipulative personalities (including those who scored high on Machiavellianism), sociable personalities for whom lying was frequent and habitual, and self-conscious personalities concerned about the impressions they make on others were especially prone to deception and their lies were self-centred rather than other-oriented. In contrast, more conscientious and responsible personalities were less prone to deceiving others. In general, extroverts and manipulative personalities were more likely to lie than introverts and conscientious personalities, and they seemed to be more skilled at lying, making their deceptive behaviour more difficult to detect.

DePaulo and colleagues (1996) examined the effect of gender differences on deceptive behaviour and asked participants to write a diary of their social interactions and lies over one week. They found that while males and females did not differ in the frequency of their lies, females were generally more likely to tell other-oriented lies, males to tell self-oriented lies, and both males and females to tell other-oriented lies when the target was female. Another study examining gender differences in an economic context paired two strangers, giving one the choice to tell the truth or to lie to the other to obtain a monetary gain (Dreber & Johannesson, 2008). More males than females lied to obtain monetary benefits. Regardless of the context, males seem more likely to lie for self-serving purposes than females.

Studies on the effect of age on deceptive behaviour found that children as young as three years can be effective liars regardless of the lie content (Ceci & DeSimone Leichtman, 1992) and that as children age, they become more skilled at lying and their lies become more difficult to detect (Gongola et al., 2017; Volbert & Steller, 2014). In one study, 3-year-old children were each acquainted with a confederate for several days until the confederate was recognised as a 'loved one' (Ceci & DeSimone Leichtman, 1992). Then, during the experimental session, the confederate performed unlawful activities (breaking a toy and stealing a watch). When questioned about these activities, children lied to protect the confederate. Other studies have shown that deceptive children can be as or more consistent than truthful children (Blandon-Gitlin et al., 2005; Roos af Hjelmsäter, Öhman, Granhag, & Vrij, 2014; Strömwall & Granhag, 2005). Children can also control their behaviour (Vrij, Akehurst, Soukara, & Bull, 2004a), even though practitioners—including those who work with children, such as teachers and social workers—believe that younger children and adolescents are poor at behavioural control (Vrij, Akehurst, & Knight, 2006a).

These studies indicate that personality is a better predictor of deceptive behaviour than other factors, but it is difficult to detect deceptive behaviour in manipulative and

psychopathic personalities. Officers therefore need to elicit and recognise differences between liars and truth tellers. As argued later, interview style and technique are critical factors for eliciting these differences.

Beliefs about Cues to Deception

A survey across 75 countries revealed that laypeople worldwide believe that gaze aversion, nervousness, statement incoherency, body movements, and inconsistency are indicative of deception (Global Deception Research Team, 2006). This implies that people fail to consider that liars are deliberate (and experienced) and better able to control their behaviour than truth tellers (Granhag et al., 2015b; Vrij, Edward, & Bull, 2001). Liars are aware of stereotypical beliefs about deceptive behaviours such as gaze aversion and smiling, so they attempt to refrain from exhibiting them (Vrij et al., 2001). Truth tellers typically do not try to control their behaviour and may therefore unintentionally exhibit behaviours associated with deception such as nervousness and body movements (Sporer & Schwandt, 2007; Vrij, Mann, & Fisher, 2006b). Innocent people are more likely to show nervous behaviour when the stakes are high, such as in forensic interviews and especially if they fear investigators might not believe them (Vrij et al., 2006b). Failure to consider this tendency of nervous truth tellers may lead investigators to make inaccurate judgements. Unfortunately, some interview techniques such as the polygraph examination and the Behaviour Analysis Interview (BAI) encourage these incorrect beliefs about deceptive behaviours (Honts, Devitt, Winbush, & Kircher, 1996; Vrij et al., 2006b).

People also mistakenly tend to look more for *non-verbal cues* (body language) than for *verbal cues* (statement content). When surveyed about verbal and non-verbal cues to deception, laypeople and practitioners both reported relying more on non-verbal cues such as gaze aversion and nervousness than on verbal cues such as statement coherency and consistency, although in some studies practitioners were more likely than laypeople to rely on verbal cues (Bogaard, Meijer, Vrij, & Merckelbach, 2016; Global Deception Research Team, 2006; Greuel, 1992; Lakhani & Taylor, 2003; Masip & Herrero, 2015; Vrij et al., 2006a). Research has demonstrated a robust superiority of verbal cues over non-verbal cues to deception (DePaulo et al., 2003; Hartwig, Granhag, Strömwall, & Doering, 2010; Volbert & Steller, 2014; Vrij, 2008). Statement plausibility, forthcomingness, immediacy, and unusual details seem to be more valid cues for detecting deception than non-verbal cues.

When investigative practitioners rely on verbal cues to deception, they mention details and consistency as the two most useful (Bogaard et al., 2016; Greuel, 1992). This is problematic given that empirical evidence demonstrates that (in)consistency is not diagnostic of deception (Granhag, & Strömwall, 2000; Vredeveldt et al., 2014). Practitioners who use the consistency heuristic to detect deception (by associating consistency with truthfulness and inconsistency with deception) generally fail to consider the efforts liars undertake to prepare for the interview and maintain consistency.

Reliance on inaccurate cues to deception makes laypeople and practitioners poorer at detecting lies than their self-reports would indicate (Granhag et al., 2004; Vrij & Semin, 1996). This misconception may be explained by '*confirmation bias*', the inclination of people to seek evidence that supports, rather than opposes, their preconceptions (Nickerson, 1998). For example, if a confirmed liar is seen to avert their gaze, people may generalise gaze aversion to deceptive behaviour. People also tend to deem opposing evidence weaker than evidence supporting their own beliefs (Edwards & Smith, 1996; Felton, Garcia-Mila, & Gilabert, 2009; Mercier & Sperber, 2011). They selectively search for and remember evidence that supports their views, which helps them reduce any cognitive dissonance between conflicting evidence. Unfortunately, this supports a persistent search for stereotypical cues to deception that leads to inaccurate judgements.

Investigative Interview Styles

False beliefs induced by confirmation bias lead to a truth-bias among laypeople (Levine, 2014). That is, laypeople who believe that deception will 'leak' or make itself apparent will not be suspicious of a well-prepared and experienced liar, but will perceive the suspect as innocent, and this perception of innocence will ultimately increase their 'truth' judgements (Granhag & Strömwall, 2000; Vrij, 2008). In contrast, investigative practitioners tend to assume suspects are guilty (Meissner & Kassin, 2002) and their interview style is a major factor contributor to confirming this guilt-bias (Moston & Engelberg, 1992; Vrij et al., 2006c). In this section, two major interview styles (accusatory and information-gathering interview) are introduced along with their components. The implementation of an information-gathering approach in the experimental studies described later is justified by the comparison of the two interview styles presented here.

Accusatory Interview Style

A major goal of criminal investigative interviews in many countries (e.g., United States) is to obtain a confession from the suspect (Evans et al., 2010), and these confessions may be obtained through an accusatory or non-accusatory interview style. Several manuals guide investigators on how to obtain a confession. *The Reid Manual* (Inbau, Reid, Buckley, & Jayne, 2013), widely used in the United States, is among the most prominent manuals for conducting criminal investigations using an accusatory style (Kassin, 2015). According to the manual, the investigation should start with a factual analysis of the facts in evidence about the crime and the suspect, followed by a Behaviour Analysis Interview (BAI). This interview then progresses to non-accusatory questions expected to elicit behavioural cues to deception from guilty (but not innocent) suspects, who are assumed to be more anxious about the questions than innocent suspects. The interview ends with a decision about the innocence or guilt of the suspect. The BAI is followed by a 9-step interrogation in which the suspect is confronted and accused of guilt, and various tactics are used to break the suspect's resistance and eventually obtain a confession. These tactics include asking accusatory and (mis)leading questions that are not based on the suspect's statements, interrupting the suspect, manipulating the suspect psychologically and emotionally, and offering false promises and fabricated evidence. Suspects are led to believe that their admission will not carry any penalties, that denial is futile, and the only viable option for them is to confess to the crime.

Reid techniques are not based on sound research (Kassin, 2015). Rather, investigators are guided by their biases and intuitions. Investigators are encouraged to look for and analyse verbal and non-verbal cues despite research demonstrating that there is no single cue to deception (DePaulo et al., 2003). Furthermore, differences in psychological processes between truth tellers and liars (e.g., truth tellers are as anxious as liars when being accused of lying) are mentioned only in passing in the manual, with more weight given to the assumption that liars are more anxious than truth tellers.

These coercive and persuasive techniques exacerbate the imbalance in power that already exists between investigators and suspects (Hartwig, Luke, & Skerker, 2016), are not perceived as ethical, and have not received empirical support (Eastwood, 2011; Vrij, 2008; Vrij et al., 2006b, 2006c). Empirical findings and actual cases reveal that the accusatory interview style (Gudjonsson, 2003; Innocence Project, 2016; Kassin, 2015) and the use of false evidence increase the likelihood of false confessions as suspects comply with the investigators' accusations or come to believe they actually committed the crime. In fact, where evidence exists, investigators tend to intensify their accusations, ultimately increasing false confessions (Moston & Stephenson, 1992; Roberts, 2012).

The accusatory interrogation and its outcomes suggest a cycle of confirmation bias. Investigators tend to form first impressions about the suspect's guilt. If the suspect has a criminal record, investigators are more likely to believe the suspect is guilty (Moston & Stephenson, 1992). New information during the interview (and throughout the investigation) may be missed or ignored. Investigators will also formulate leading questions in line with their biases, putting the suspect on the defensive and strengthening the investigators' perception of the suspect's guilt (Kassin, 2015; Meissner & Kassin, 2002). Any confirmatory evidence (e.g., nervousness, associated with deceptive behaviour) may boost investigators' beliefs in the guilt of the suspect and the accuracy of their own judgement, enhancing the investigators' confidence in their ability to detect lies (Elaad, 2003). Investigators' reliance on incorrect verbal and non-verbal cues to deception only aggravates their biases. This cycle not only strengthens investigators' biases, but exacerbates suspects' psychological defences, leading in turn to increased chances of false confessions.

Information-Gathering Interview Style

Following multiple cases of miscarriages of justice and false confessions in which an accusatory interview style played a critical part (Innocence Project, 2016; Scheck et al., 2000), new legislation was enacted in several countries including England and Wales, Australia, New Zealand, and Norway (Oxburgh, Walsh, & Milne, 2011). Canada, which officially uses the Reid Technique, is also gradually moving towards eliminating accusatory techniques (Quan, 2015; Royal Canadian Mounted Police, 2016; Williamson, Milne, & Savage, 2009). The new focus of these legislative actions is to search for the truth (gather information) rather than to obtain a confession (Hartwig et al., 2016). That is, the goal of the investigator should be to discover what actually happened rather than to focus on the presumed suspect's guilt (Kelly, Miller, Redlich, & Kleinman, 2013).

Building rapport with the suspect through the entire course of interview, rather than only the beginning, is considered critical for accuracy in an information-gathering interview (Evans et al., 2010; Kelly et al., 2013). The interview is perceived as a productive relationship involving trust, respect, appreciation of cultural and racial differences, and avoidance of stereotypes. The suspect's resistance is overcome legitimately through cooperation and negotiation rather than through power and manipulation (Evans et al., 2010). The effectiveness of the rapport inherent in these interviews has been established repeatedly in research. Rapport was found to reduce suspects' resistance, enhance cooperation and admissions, increase openness on the part of the suspect and the investigator, and assist investigators in understanding the suspect's interests and

motivations (Goodman-Delahunty, Martschuk, & Dhami, 2014; Kelly et al., 2013; Redlich, Kelly, & Miller, 2014).

The investigator who follows this approach is responsible for studying the case, planning well for the interview, collecting accurate and reliable information, formulating open-ended questions appropriate to the suspect's statement and comprehension level, clarifying any discrepancies in the suspect's account, and ending the interview in a friendly manner (Cooper, Griesel, & Ternes, 2013; Walsh, Oxburgh, Redlich, & Myklebust, 2015; Williamson et al., 2009). Asking leading questions, interrupting the suspect, and engaging in manipulative behaviour are not permitted. Even when the suspect confesses, more information is solicited to ensure the veracity of the suspect's guilt. These techniques serve to diminish confirmation bias.

Unlike the accusatory interview, the information-gathering interview is grounded in theory and is effective in enhancing deception detection (Hartwig et al., 2016; Kassin, 2015; Vrij et al., 2006c). In comparing the information-gathering interview style with the accusatory interview style, Vrij and colleagues (2006c) found that the information-gathering interview produced lengthier responses, which enhanced the interviewer's ability to detect cues to deception. Mock suspects (liars and truth tellers) allocated to the accusatory interview style perceived the interviewer as less willing to listen to their accounts and more likely to assume their guilt. Those assigned to the information-gathering interview style found the interview easier overall, but more cognitively demanding than those assigned to the accusatory condition. The information-gathering approach was perceived positively by both interviewers and mock suspects.

Different interview techniques have been developed based on the information-gathering approach. A prominent example is the *Cognitive Interview* implemented in several countries including the United Kingdom (UK) and New Zealand (Paulo, Albuquerque, & Bull, 2013). The Cognitive Interview is a structured interview that includes theory-driven mnemonics to enhance suspect memory (Fisher, Milne, & Bull, 2011). These mnemonics are based on the multicomponent view of memory trace (Tulving, 1991) in which memory is perceived as a network of associations, and the amount of coded information in storage is believed to be much higher than people can usually recall because individuals have limited cognitive processing resources. Hence, retrieval is enhanced by accessing memory through different pathways and mnemonics. Mnemonic components of the Cognitive Interview include context reinstatement (mentally recreating the to-be-recalled event physiologically, cognitively, and emotionally), changing perspective (recalling the event from different perspectives to increase memory for non-salient details), and non-chronological order narration (recalling the event in reverse order). Rapport building is

another critical component of the Cognitive Interview, and the suspect is encouraged to report everything without interruptions (Evans et al., 2010; Fisher et al., 2011).

A recently suggested addition to the Cognitive Interview is the *visuospatial statement* (e.g., drawing the crime scene or alibi event), which may also be considered part of the context reinstatement mnemonic component (Dando, Wilcock, Milne, & Henry, 2009b). Visuospatial statements are increasingly used in investigative interviews having been included in investigators' interview training and accepted as evidence in courts (Geiselman 2012; Marlow & Hilbourne, 2011). One study found that novice investigators used drawings in interviews without being instructed to do so (Dando, Wilcock, & Milne, 2009a). Nonetheless, there are no extensive or structured guidelines on the use of visuospatial statements in interviews (Marlow & Hilbourne, 2011).

The main advantages of visuospatial statements are that they allow innocent suspects to provide a clearer and more comprehensive narration (e.g., enhance memory for peripheral details) and to reduce memory errors that may occur in verbal statements (Dando et al., 2009a; Marlow & Hilbourne, 2011). They can be used as a complementary interviewing tool and may be compared with suspects' verbal statements. Such a pictorial representation of the event also helps investigators to understand what suspects mean to communicate and to incorporate the visuospatial statements in planning further questioning and assessments. Visuospatial statements are both cost and time effective and easy to implement, requiring little input from the investigator. Moreover, they eliminate social influences and memory contamination from the investigator and can be used with suspects who are not fluent in the investigator's language (Vrij et al., 2010b).

Suspects, particularly liars, who are asked for a visuospatial statement find this more unanticipated and difficult to respond to than verbal statements (Vrij et al., 2009). When reporting verbally, liars can omit information and provide vague statements (Hartwig et al., 2011), but when responding visuospatially, they have to be detailed and consistent in reporting spatial information (i.e., locate objects in their correct location) in a way they have not practiced. This is risky for liars who fabricate their story. One study compared differences in visuospatial (drawings) and verbal statements in a sample of police officers who were asked to tell the truth or to fabricate details about their alibi (Vrij et al., 2010b). Police officers differed in their visuospatial (but not in their verbal) statements, and the deceptive visuospatial statements were less plausible than the truthful ones. Another study that used a within-subjects design also compared verbal and visuospatial statements in the context of job interviews (Vrij, Mann, Leal, & Fisher, 2012b). Visuospatial statements, but not verbal statements, distinguished liars and truth tellers. More specifically, visuospatial statements by liars were significantly less detailed and plausible than those of truth tellers.

Hence, the unanticipated nature of visuospatial statements makes them more difficult for liars than for truth tellers, which in turn highlights liars' performance difficulty and enhances deception detection.

Suspects' Counter-Interrogation Strategies

Whatever the interview style, liars employ counter-interrogation strategies to evade suspicion. These strategies are outlined in detail below and are examined in the studies with respect to statement consistency.

Making an Honest Impression on the Interviewer

Both liars and truth tellers try to convince interviewers of their honesty by changing their behaviour. However, their strategies are not the same. According to the self-presentation perspective, truth tellers who change their behaviour to express honesty to the interviewer do so within the boundaries of honesty (DePaulo et al., 2003). Liars, however, change their behaviour to mislead the interviewer. Liars invest more effort than truth tellers in presenting themselves positively because, unlike truth tellers, they are not emotionally involved in their lie. That is, they deliberate more and think harder than truth tellers about how to deliver their statements. This reduces liars' mental resources, which is translated into compromised performance and less regular and spontaneous behaviour (Volbert & Steller, 2014). Therefore, liars provide statements that are less compelling, pleasant, intense, and forthcoming than those of truth tellers (DePaulo et al., 2003).

However, liars employ a variety of counter-interrogation strategies to make an honest impression on the interviewer and to make their lie easier (Hartwig, Granhag, & Strömwall, 2007). Liars are more likely than truth tellers to report having a strategy prior to the interview. One commonly used counter-interrogation strategy is 'preparation'. Liars think of questions that may be asked during the interview and rehearse responses to them. Previous studies have shown that deceptive individuals or groups report preparing responses for the interview as a critical counter-interrogation strategy (Clemens, Granhag, & Strömwall, 2013; Vrij, Mann, Leal, & Granhag, 2010c). This allows them to repeat their responses and to be consistent during interviews without needing to think of spontaneous lies, and this eventually decreases the difficulty of lying.

Manuals by violent extremist groups such as al Qaeda's *Manchester Manual* emphasise the importance of preparation in case the member is intercepted and interviewed (U.S.

Department of Justice, 2002). Sample questions asked at airports or immigration checkpoints are provided in the manual, and members are encouraged to rehearse responses to them with their unit commander. They are also instructed to discuss information they might provide in case they are apprehended. Even though they are urged to remain silent during the interview, it is acknowledged in the manual that this may not be possible due to pressure (and torture) in the interview. Therefore, members are instructed to provide only known information and to refrain from providing any other unrehearsed information. If the pressure of the interview induces them to confess, apprehended members are counselled to deny their confession at a later stage.

Liars sometimes acquaint themselves with known interview techniques to counter the difficulty of the interview and to appear honest. One well-known interview technique is the polygraph examination, a non-verbal 'lie detection' tool that measures physiological activity. Biting one's tongue and counting backwards are strategies that may be employed to produce diminished physiological reactions and counter the polygraph examination (Honts et al., 1996). Similarly, to provide responses that appear honest, liars may acquaint themselves with the 19 criteria of Criteria-Based Content Analysis (CBCA) that characterise truthful statements and tailor their responses accordingly (Vrij, Akehurst, Soukara, & Bull, 2004b; Vrij, Kneller, & Mann, 2000).

Research into the effectiveness of counter-interrogation strategies has revealed that liars do not always succeed in appearing honest to the interviewer. One study showed that liars explicitly told that deception is associated with reduced non-verbal behaviour could not increase their non-verbal behaviour due to the other cognitive demands during the interview (Vrij, Semin, & Bull, 1996). Studies on the verifiability approach have also shown that liars fail to provide as many checkable details as truth tellers after being told that that the interviewer may verify the information in their statements (Harvey, Vrij, Nahari, & Ludwig, 2017c; Nahari, Vrij, & Fisher, 2014b). Liars would not want to provide verifiable information, because this information could uncover their lies. In sum, liars usually employ several strategies to appear credible, but they do not always succeed.

Providing Statements that are Close to the Truth

Liars often report that they try to stay as close as possible to the truth during interviews (Strömwall & Willén, 2011). Hence, they use embedded lies and report about familiar events (Culhane et al., 2008; Leins Fisher, & Ross, 2013). This strategy enables them to reduce the amount of information they need to fabricate and remember and to be more consistent and forthcoming. Research has shown that liars who were as familiar as truth tellers with a reported event were equally detailed and consistent (Blandon-Gitlin et al.,

2005; Warmelink et al., 2013). This, however, cannot be attributed to liars' understanding of truth tellers' metacognitive processes, because liars do not necessarily provide statements that are similar to truth tellers' (Harvey, 2013). Instead, their primary focus is to appear honest. Liars who were interviewed immediately after an event provided significantly fewer details than truth tellers, but this difference diminished when there was a delay between the reported event and the interview (Harvey, Vrij, Leal, Hope, & Mann, 2017a; Vrij et al., 2009). That is, liars failed to consider that truth tellers may be prone to forgetting and memory decay, and hence they provided consistently detailed statements, regardless of the delay. Similarly, liars were more likely than truth tellers to maintain consistency across interviews, indicating that liars do not account for the reconstructive nature of memory (Granhag & Strömwall, 2002).

Even when liars use embedded lies, they do not seem to provide statements similar to those of truth tellers. Harvey (2013) asked participants to recall an autobiographical event and to either tell the truth or partially lie about it to an interviewer. Participants were asked three open-ended questions and one unanticipated question. Truth tellers were more precise in their responses and provided more reminiscences than liars. Hence, liars failed to consider the effects of different question types on truth tellers' responses.

It seems, therefore, that liars may attempt to stay close to the truth, but they do not necessarily succeed in providing statements similar to those of truth tellers because they are prone to metacognitive errors and are more concerned about making an honest impression on the interviewer.

Evading Incriminating Statements

As indicated previously, the *Manchester Manual* encourages al Qaeda members to remain silent during interviews and, if they do confess, to deny their confession later (U.S. Department of Justice, 2002). The 'remain silent' strategy is also emphasised by the Irish Republican Army's *Green Book* (Conflict Archive on the INternet, 2016). This strategy is considered critical because it enables suspects to avoid disclosing significant information about the group and to avoid incriminating themselves. Moreover, the less suspects say, the less likely their lies will be uncovered (Vrij et al., 2006c).

Alison and colleagues (2014) conducted the only study to date to analyse the counter-interrogation strategies of violent extremist suspects. The researchers examined the strategies of international (e.g., al Qaeda), paramilitary (e.g., Irish Republican Army), and right-wing (e.g., neo-Nazi) suspects from audiotaped and videotaped interviews. They found that paramilitary groups were most likely to adopt a 'no comment' strategy, remain

silent, refuse to look at the interviewer, report well-known information, talk about unrelated topics, and provide scripted accounts. They were as likely as right-wing extremists to use monosyllabic responses such 'yes' and 'no' and to indicate they lacked memory regarding the event under investigation. International extremists, on the other hand, were most likely to employ a retraction strategy. These extremists generally withheld information and when they decided to say anything, they either provided well-known or rehearsed information or provided information that they retracted at a later stage. Accordingly, al Qaeda suspects seemed to follow the *Manchester Manual*, while the Irish Republican Army paramilitary suspects seemed to employ a variety of counter-interrogation strategies including the 'remain silent' strategy recommended in the *Green Book* combined with other strategies to avoid providing incriminating information.

Ordinary criminals employ similar strategies, and the 'remain silent' strategy is widely exercised during interviews (Granhag, Clemens, & Strömwall, 2009; Moston & Stephenson, 1992). The more experienced criminals are at interviewing, the more likely they are to employ this strategy. Granhag and colleagues (2009) compared the forthcoming behaviour of university students who had no experience in investigative interviewing with former convicts acting as mock suspects. Results showed that students were more likely to be forthcoming than former convicts, who chose to employ a withholding strategy. These results have been replicated in another study by Strömwall and Willén (2011) in which a sample of prisoners were interviewed and also employed withholding strategies.

Overall, deceptive suspects seem to employ a variety of counter-interrogation strategies to make an honest impression on the interviewer, to provide statements that are close to the truth, and to avoid incriminating themselves. Those who are experienced in interviewing or who have violent extremist views seem generally to employ a withholding strategy. However, where possible, they also attempt to provide rehearsed and/or non-incriminating information.

Statement Consistency: Theoretical Framework

The Self-Regulation Theory

The self-regulation theory explains liars' and truth tellers' motivations and behaviours to convince the interviewer they are telling the truth in terms of people controlling their behaviour through natural, automatic tendencies to achieve long-term goals (Bauer & Baumeister, 2011). If a discrepancy emerges between the current and the desired state,

people attempt to end the discrepancy by altering their behaviour. They either use an avoidance strategy to flee the threat altogether (Baumeister & Alquist, 2009) or attempt to escape by terminating the threat. In forensic contexts, liars and truth tellers view the interview as a threat: liars fear unknown information the interviewer may hold against them, while truth tellers fear the officer will not know or believe the truthful information they hold (Granhag & Hartwig, 2008). The common goal of liars and truth tellers is to exercise self-regulation by controlling their behaviour. They attempt to appear convincing and truthful to the interviewer to ultimately overcome the threat implied by the interview (DePaulo et al., 2003), but they differ in their strategies.

Avoidance is not possible in forensic interviews because suspects cannot ignore the questions asked nor can they be vague in their responses, since that will be linked with deception and information concealment (Granhag et al., 2015b; Granhag & Hartwig, 2008). Hence, liars and truth tellers need to exercise escape strategies. A truth tellers' escape strategy may be to volunteer information to appear forthcoming (Granhag et al., 2013a). Liars, however, cannot be forthcoming because they possess incriminating information that they want to conceal; instead, they implement counter-interrogation strategies to escape the situation. Liars start employing counter-interrogation strategies prior to the interview by formulating hypotheses and predicting how much, and what, information the interviewer holds against them. Ultimately, their perceptions affect the strategies they will employ during the interview (Granhag et al., 2015b). If liars believe the interviewer holds no information that may incriminate them, they may decide to employ a withholding strategy; if they believe the interviewer might hold incriminating evidence against them, they are more likely to be forthcoming (Luke, Dawson, Hartwig, & Granhag, 2014). If they decide to be forthcoming at all, they must plan how much and what information to reveal, deny, and/or fabricate while avoiding lying as much as possible (Clemens et al., 2013; Hartwig et al., 2007). That is, liars exercise information management by striking a balance between the amount of information they need to reveal and withhold so that they can appear convincing without incriminating themselves (Hartwig et al., 2010).

Therefore, when possible, liars exercise a withholding strategy as an escape strategy. To avoid incriminating themselves, they provide statements including only a few details (Alison et al., 2014) or, if they decide to talk, non-incriminating information that is either well known or rehearsed enough to help them maintain consistency. They also try to keep their stories simple to make the lie easier and to limit any possible inconsistencies in their statements (Granhag et al., 2013a; Vrij, 2008). However, if during the interview they believe the interviewer holds more incriminating information against them than they first thought, they may change their strategy and become more forthcoming (Granhag et al., 2013b; Oleszkiewicz, Granhag, & Kleinman, 2014).

Liars may also choose to relate an experienced event or familiar alibi, allowing them to provide statements that are close to the truth (Hartwig et al., 2007; Leins et al., 2013; Nahari & Vrij, 2015; Strömwall & Willén, 2011). By preparing extensively for the interview and trying to remember all the details of the event or alibi, they can more easily conceal incriminating information, reveal and repeat as many details as possible about the alibi, and seem as forthcoming and as consistent as truth tellers.

The self-regulation theory posits that both liars and truth tellers try to make an honest impression on the interviewer, but liars are more concerned than truth tellers about which information to withhold or reveal and about the consistency of their statement. Hence, they prepare their statements, repeat rehearsed information, and attempt to avoid inconsistencies and to provide non-incriminating information—about events they have actually experienced—whenever possible.

The (Active) Cognitive Approach

Like self-regulation theory, the cognitive approach proposes that lying is a more deliberate act than truth telling (Granhag et al., 2015b; Vrij, 2008). Lying is cognitively demanding, because it requires the liar to fabricate and rehearse the lie, suppress the truth, develop justifications for the lie, remember what was said earlier, monitor and control their verbal and non-verbal behaviour, remember to act and role play, convince the interviewer of their veracity, assess the interviewer's reactions and suspicion, and maintain statement consistency (Volbert & Steller, 2014; Vrij, Granhag, Mann, & Leal, 2011). In contrast, truth tellers recall information from their autobiographical (episodic) memory, take their credibility for granted, and assume that their innocence is transparent and others will believe them, so the interview is not as cognitively demanding for them as it is for liars (Gnisci, Caso, & Vrij, 2010; Vrij et al., 1996). Although truth tellers also try to make a positive impression on the interviewer, they are less concerned about controlling their behaviour and maintaining statement consistency (DePaulo et al., 2003; Granhag & Hartwig, 2008).

Several studies have corroborated the assumption that lying is more cognitively demanding than truth telling (Mann, Vrij, & Bull, 2002; Vrij et al., 2001; Vrij et al., 2006b). Mann and colleagues (2002) compared deceptive and truthful behaviour in 16 police suspects. When lying, suspects paused longer and blinked and moved their hands and arms less often than when telling the truth. These signs indicated their high cognitive load while lying (Sporer & Schwandt, 2007). Although lying seems to be more cognitively demanding than truth telling, such cognitive load might be reduced when liars are motivated, well-prepared, and/or have a good memory of or experience with the reported event (Chan & Bull, 2014;

Granhag et al., 2015b; Vrij et al., 2009, 2010a; Warmelink et al., 2013). When liars are highly motivated and prepared, they are able to provide statements similar to those of truth tellers, so simply observing their behaviour may not yield accurate judgements about their deception (DePaulo et al., 2003; Granhag & Strömwall, 2002).

Introducing an active component to the cognitive approach to enhance deception detection, Vrij, Fisher, Mann, and Leal (2008) developed novel interview techniques to exacerbate liars' cognitive load, disrupt counter-interrogation strategies such as preparation, and ultimately increase differences between liars' and truth tellers' statements. An important assumption of this active approach is that if the interview technique increases the difficulty of the interview questions for truth tellers, the cognitive demands on truth tellers might exceed those of liars.

These active techniques include asking unanticipated questions, increasing cognitive load, and eliciting information, and their efficacy in enhancing deception detection has been corroborated (Vrij, Fisher, & Blank, 2017). Studies examining unanticipated questions are discussed later in the thesis, but one example of a study that imposed cognitive load was conducted by Vrij, Leal, Mann, and Fisher (2012a). Police officers who participated in the study were asked to provide deceptive and truthful accounts, first in chronological order and then again in reverse order (considered a difficult task). Officers were more inconsistent in their statements and provided fewer details when they lied than when they told the truth, but this effect was more pronounced in the reverse order account. In another study (Ewens et al., 2015) using the reverse order technique, speaking one's own language in the presence of an interpreter reduced cognitive load and enhanced consistency for liars more than for truth tellers (liars repeated the same number of details, but reminisced significantly fewer details). However, speaking in a second language eliminated any differences in consistency between truthful and deceptive participants because of the cognitive load imposed by the second language.

Differences between liars and truth tellers may also emerge if they are asked to provide more information. Reading them a model statement that is not related to the target event to illustrate the amount of detail required prompts truth tellers, but not liars, to provide more information (Leal, Vrij, Warmelink, Vernham, & Fisher, 2015). The model statement serves as a guidance for truth tellers on the expected amount of information, but this is not the case for liars who would refrain from providing additional information because that would increase the difficulty of the lie and might inadvertently incriminate them. Eliciting differences between liars and truth tellers can also be achieved by asking for verifiable information. According to the verifiability approach (Nahari, Vrij, & Fisher, 2014a, 2014b), giving instructions that some or all aspects of a statement will be verified by an

interviewer prompts truth tellers to provide more verifiable information to showcase their innocence. Liars, however, believe that providing checkable details incriminates them, so they only provide unverifiable information (Nahari & Vrij, 2014; Nahari, et al., 2014a, 2014b). Using this verifiability approach in combination with the model statement has been found to significantly enhance deception detection accuracy yielding perfect accuracy for detecting liars (Harvey, Vrij, Leal, Lafferty, & Nahari, 2017b). Lastly, when evidence is available, information may be elicited to detect deception using the Strategic Use of Evidence technique which is discussed later in the thesis.

Active cognitive techniques magnified differences between liars and truth tellers, reduced liars' consistency, and enhanced deception detection when they increased cognitive demands for liars more than for truth tellers (Leins, Fisher, & Vrij, 2012; Vrij et al., 2017; Vrij et al., 2009). These findings explain the conclusion of a review of statement consistency literature that inconsistency is diagnostic of lying, but only when the interview is made more difficult for liars than for truth tellers (Vredeveldt et al., 2014).

The Repeat versus Reconstruct Hypothesis

The *repeat versus reconstruct* hypothesis was developed by Granhag and Strömwall (1999, 2002) to explain the low diagnostic value of consistency (i.e., liars are as consistent as, and sometimes more consistent than, truth tellers) and to negate the consistency heuristic. The hypothesis assumes that liars, but not truth tellers, plan their responses prior to the interview.

Deceptive suspects use counter-interrogation strategies during the interview by anticipating the questions that may be asked, rehearsing their responses, and repeating those responses during or across interviews (Granhag & Strömwall, 1999). In contrast, truth telling suspects do not deliberate over their answers; instead, they recall the truth from memory as it happened. However, truth tellers cannot accurately remember all the information, because they are prone to forgetting, particularly if the event was encoded poorly and/or if there is a long delay between the event and the interview or between the interviews (Cohen, 2001; Tulving & Thomson, 1973). People incorporate schematically consistent, well encoded information in their schema base, but tend to disregard schema inconsistent, poorly encoded information unless it is particularly distinctive or unusual (Brewer & Treyens, 1981). Hence, people reconstruct an event from their experience and knowledge every time they report it, which subsequently reduces their statement consistency across interviews (Cooper et al., 2013; Tulving & Thomson, 1973). Because truth tellers *reconstruct* their statements while liars *rehearse* them, through repetition, liars' statements become equally, if not more, consistent than truth tellers' across interviews.

A series of studies by Granhag and colleagues corroborated the assumptions of the repeat versus reconstruct hypothesis. Deceptive and truthful mock suspects who were interviewed three times over 11 days provided equal amounts of repetitions and omissions across interviews (Granhag & Strömwall, 2002). Truth tellers, however, included more reminiscences than liars. No contradictions emerged in either liars' or truth tellers' statements, which corroborated claims by other researchers that contradictions rarely exist in suspects' statements (Fisher et al., 2009). Another study with deceptive and truth telling pairs replicated these findings, with deceptive pairs equally consistent with each other and across interviews as their truthful counterparts (Strömwall, Granhag, & Jonsson, 2003).

Granhag and colleagues found that consistency was one of the most frequently cited cues to deception (Granhag & Strömwall, 2001b; Granhag, Strömwall, & Jonsson, 2003). Consistency between pairs (within-group consistency) was used more than consistency across interviews (between-statement consistency) to detect deception (Strömwall et al., 2003). However, between-statement consistency was used more than within-statement consistency (Granhag & Strömwall, 2001a). Nonetheless, evaluators did not agree about which statements were consistent and which statements were inconsistent, which further reduced the diagnostic value of consistency (Granhag & Strömwall, 2000).

Novel Investigative Interview Techniques to Detect Deception

Novel interview techniques have used a cognitive or strategic approach to enhance deception detection and also to increase differences in statement consistency between liars and truth tellers. Some of those techniques that are relevant to this thesis are presented below.

Change of Question Format across Interviews

Research on eyewitness testimony reveals that when asked questions in a different format within or across interviews (e.g., free recall of the event followed by specific questions about it), eyewitnesses not only repeat their statements, but also add to them (Fisher et al., 2009). Witnesses asked similar questions about the event may assume that their first account was unsatisfactory and may try to rectify this by supplying more and different details (Lamb, La Rooy, Malloy, & Katz, 2011; Odinot, Memon, La Rooy, & Millen, 2013). Hence, they may adopt a different perspective to recall the event, particularly if the report is provided to a different interviewer or for a different purpose (Cohen, 2001; Odinot et al., 2013). If they are asked to provide another free recall or to answer open-ended

questions, they are more likely to provide consistent, albeit more accurate and less detailed, information than if they are asked more specific questions (Koriat & Goldsmith, 1994; Memon & Vartoukian, 1996). On the other hand, specific questions—if they are not misleading—can act as a recall cue to trigger witnesses' previously unrecalled memories. That is, the more different questions asked in subsequent interviews, the more eyewitnesses are likely to add to and expand on their previous statement (Cooper et al., 2013). Therefore, specific cued questions enhance reminiscences, which may make eyewitnesses' statements appear inconsistent. It is important to note that in eyewitness reports, reminiscences are infrequent, repetitions are more probable, and contradictions are rarely found (Fisher et al., 2009). In the context of lie detection, asking for a free recall allows truth tellers to be more forthcoming and liars more likely to be vague, restrictive, and consistent (Hartwig et al., 2011). In contrast, specific questions are more incriminating and difficult for liars than for truth tellers, because they require specific responses and prevent liars from repeating rehearsed responses (Hartwig et al., 2011; Vrij et al., 2009). These differences suggest that asking for a free recall account in a first interview and specific questions in a subsequent interview, reduces liars' statement consistency with the first free recall account or with the evidence.

Leins and colleagues (2012) examined the effect of changing question format (from verbal to visuospatial) on between-statement consistency. Participants were interviewed twice about activities they fabricated (liars) or had performed (truth tellers). They either answered verbal (general and spatial) questions about their activities or provided a self-generated drawing of the setting where they completed the claimed activities (visuospatial statement). Participants were asked to provide either verbal or visuospatial statements across the two interviews, or a verbal statement in one interview and a visuospatial statement in the other (the question format order was counterbalanced across participants). The results supported the repeat versus reconstruct hypothesis when the question format was the same across interviews as liars were equally consistent as truth tellers. This finding is in line with liars' self-reports which suggested that they were significantly more likely to use statement consistency (88%) than truth tellers (42%). However, when the question format was changed, liars were no longer able to be consistent, and they provided significantly fewer repetitions than truth tellers. Another study examined the effect of changing interviewers across interviews when mock suspects reported an event in chronological order and then in reverse order (Shaw, Vrij, Leal, & Mann, 2014). Again, liars provided significantly fewer repetitions (and fewer reminiscences overall) than truth tellers, but only when the interviewer was changed in the second interview.

It appears that liars do not have enough cognitive resources to provide a spontaneous and coherent lie because of the extra cognitive load imposed by lying. When the question

format is changed and liars need to provide unprepared and specific responses, they may fail to be as consistent as truth tellers. Truth tellers, on the other hand, find it easy to respond to a change of question format because they experienced the relevant event and encoded it along several dimensions. They are therefore more cognitively flexible than liars, and it is less likely that inconsistencies will emerge in their responses to questions asked in different formats.

Study I addressed the effect of asking questions in different formats (general versus specific) on between-statement consistency when statements concerned two events. It was expected that having to report about two events would be cognitively demanding, particularly for liars who invest their cognitive resources in fabricating their lies.

The Devil's Advocate Approach

Deception research on false opinions is scarce; only one study examined an interview technique (the Devil's Advocate approach) that differentiates between true and false opinions (Leal et al., 2010). Participants were first asked about their opinions on a topic, then they were asked to provide arguments to support their opinion (opinion-eliciting question). The interview ended by asking participants to take the devil's advocate position and to provide arguments opposed to their true opinions (devil's advocate question). Truth tellers provided their truly held opinions to the opinion-eliciting question, and liars provided their truly held opinions to the devil's advocate question. Leal and colleagues (2010) found that truth tellers produced more words and their latency time was shorter in response to the opinion-eliciting question than to the devil's advocate question but no differences emerged between liars' responses to the two questions. Truth tellers were also judged as more talkative, immediate, emotional, and plausible in their responses to the opinion-eliciting question than to the devil's advocate question, whereas liars' responses to both questions were judged as equally immediate, emotional, and plausible.

These findings may be explained by confirmation bias and attitude formation (Ajzen, 2001; Nickerson, 1998; Petty, Wegener, & Fabrigar, 1997). Attitudes are formed following involvement and experience, and they are sustained because people look for evidence that supports their views and ignore evidence that negates their views (Edwards & Smith, 1996; Felton et al., 2009; Mercier & Sperber, 2011). People find supporting arguments more accessible than opposing arguments, as was evident in the devil's advocate study above, in which truth tellers and liars, respectively, were better able to provide arguments for the opinion-eliciting question and the devil's advocate question.

Preparation for the interview may also explain the results. Liars may have anticipated being asked about their false opinions, so they may have rehearsed responses to support those false opinions (increasing their access to arguments for the opinion-eliciting question). Hence, liars' arguments were equally available for the both questions. Previous deception detection studies have indicated that truth tellers provided with the option to prepare for an interview rarely took advantage of the opportunity (Hartwig et al., 2007; Vrij et al., 2009). In those studies, however, truth tellers engaged in an event that they were asked to recall later in an interview. Because they had experienced the event, they may have believed they did not need to prepare for the interview. This is different from recalling opinions, which is more abstract than recalling a single event (Tulving, 1984). In the context of the Devil's Advocate approach, truth tellers may want to prepare arguments for their opinions to enhance the impression they make during the interview (DePaulo et al., 2003; Vernham, Granhag, & Mac Giolla, 2016). They may also prepare arguments in response to the opinion-eliciting question that they anticipate, and hence provide more arguments for the anticipated question than for the unexpected devil's advocate question.

Liars have more access to arguments than truth tellers in the context of the Devil's Advocate approach, because they prepare for interview questions that do not support their views. Even though the devil's advocate question may not be expected by either liars or truth tellers, this question is more difficult for truth tellers who, unlike liars, do not have access to views that counter their opinions. Hence, in line with Leal and colleagues' findings (2010) that truth tellers' responses (but not liars') differed between the opinion-eliciting and devil's advocate questions, liars seem to be more consistent than truth tellers when the devil's advocate approach is used. Accordingly, it seems that statement consistency is a valid indicator of deception in the context of the Devil's Advocate approach. Because this technique is very relevant to group attacks by extremists, Study II aimed to examine differences in statement consistency among pairs using the Devil's Advocate approach.

Asking Unanticipated Questions

Asking unanticipated questions is a promising interview technique to counter liars' prepared interview responses (Vrij et al., 2009, 2011). In the context of false intentions, for example, an unanticipated question is one about the *planning* phase for the falsely claimed intention. If the suspect is an extremist seeking entry to a country with the concealed (criminal) intention of launching an attack in that country, their cover story may be their desire to enter the country for tourism purposes (Granhag, 2010). If intercepted, they would provide information about the false intention rather than the actual criminal intention, but the question about the planning phase 'How did you plan for your trip?' may be more

difficult and unanticipated for liars than the general question 'Why do you want to enter the country?' because they did not actually plan for the tourist trip (false intention) and would not have a vivid memory of appropriate preparatory activities (Granhag & Knieps, 2011; Granhag & Mac Giolla, 2014). In contrast, truth tellers would have prepared for the intended activity, would likely have a vivid mental image of the planning phase, and would hence be able to describe the activity more specifically and clearly than liars, with specific *spatial* and *temporal details* (Sooniste, Granhag, Knieps, & Vrij, 2013).

One study examined the effect of questions about planning versus general intention on the specificity of details provided by liars and truth tellers (Warmelink, Vrij, Mann, Jundi, & Granhag, 2012). Passengers at an airport who volunteered to participate in the study were asked to lie or tell the truth about their forthcoming trip. Results corroborated the approach of asking unanticipated questions as liars provided significantly fewer spatial and temporal details than truth tellers when asked unanticipated questions about the planning phase, but not when asked anticipated questions about the purpose of the trip. Another study examined the effect of unanticipated questions on triads' statement consistency with each other and across three interviews (Mac Giolla & Granhag, 2015). Deceptive triads provided fewer details and were less consistent with each other than truthful triads; this effect was particularly pronounced when unanticipated questions were asked. Results from a follow-up study with pairs and quartets were similar, with the effect being more pronounced in pairs (Sooniste, Granhag, Strömwall, & Vrij, 2016). Liars did not differ from truth tellers on between-statement consistency, however, whether or not the question was anticipated (Granhag, Mac Giolla, Sooniste, Strömwall & Liu-Jonsson, 2016; Mac Giolla & Granhag, 2015). Absence of differences may be explained by the repeat versus reconstruct hypothesis since similar questions were asked across the interviews. Liars may have been able to rehearse responses for the second interview, eventually increasing their consistency even on unanticipated questions.

Vrij and colleagues (2009) examined the effects of anticipated (general) and unanticipated (temporal and spatial) questions about an alibi on the number of details and within-group consistency in liars' and truth tellers' statements. Truth telling pairs visited a restaurant and deceptive pairs committed a mock crime. Participants were then interviewed individually, with liars fabricating the restaurant visit to use as an alibi while truth tellers told the truth. Participants answered anticipated and unanticipated verbal questions and provided a self-generated drawing (visuospatial statement) of the alibi setting (restaurant). Anticipated questions about the alibi yielded no differences in details or consistency between liars and truth tellers. However, liars were significantly less detailed and less consistent with each other than truth tellers in response to unanticipated questions. Visuospatial statements were the least expected by all participants, but particularly liars. Visuospatial statements showed

the most profound differences between liars and truth tellers for within-group consistency, with a classification accuracy rate of 78% (accuracy for verbal spatial questions was 70%). Verbal spatial questions were very effective in eliciting differences in the number of details with a classification accuracy rate of 72%.

Salience is an important aspect of an event that liars would not anticipate being asked about (Masip, Blandón-Gitlin, Martínez, Herrero, & Ibabe, 2016). Any event includes *salient* (central and most noticeable) and *non-salient* (peripheral) details. People are more likely to focus on the salient details of an event because they attract attention (Heath & Erickson, 1998; Herlihy, Scragg, & Turner, 2002; Ibabe & Sporer, 2004; Wright & Stroud, 1998). Salient details are therefore well encoded in memory and easily retrieved. In contrast, non-salient details attract little attention, so people differ in how many non-salient details they encode and retrieve (Sakrisvold et al., 2017). Non-Salient details are also easily disregarded, forgotten, and/or distorted. Therefore, people tend to remember and report salient details of an event more correctly and consistently than non-salient details.

Roos af Hjelmsäter and colleagues (2014) examined within-group consistency in verbal and visuospatial statements about saliency. Adolescent mock suspects were divided into groups of three and asked either to perform an activity at a specific location (truth tellers) or to fabricate a similar activity and location (liars). They were then interviewed about the event individually. Deceptive triads were as consistent with each other as their truth telling counterparts when they responded verbally to open-ended questions about the event. However, deceptive triads were less consistent with each other than truth telling triads on visuospatial statements. Importantly, deceptive triads were less consistent than truth telling triads about salient details in their visuospatial statements, but no differences emerged for non-salient details. Similar results were obtained in a study examining the effect of cognitive load on between-statement consistency for salient and non-salient details (Masip et al., 2016). Participants reporting a true (truth tellers) or fabricated (liars) alibi were asked to respond quickly with yes/no responses to closed-ended questions about salient and non-salient details across two interviews. The difference between liars and truth tellers was larger for salient than for non-salient details, with truth tellers scoring higher than liars on consistency about salient details. Sakrisvold and colleagues (2017) also examined consistency about salient and non-salient details in the verbal statements of deceptive and truth telling pairs. They did not use an active interview technique; instead, participants were asked open-ended questions about their alibi. Results revealed that liars were more consistent with each other than truth tellers about both salient and non-salient details.

These findings demonstrate that, in line with the self-regulation theory, liars seem to provide the same 'prepared' information regardless of saliency (Sakrisvold et al., 2017).

When asked unanticipated question about non-salient details, liars did not add information and were restrictive and evasive in their responses, which enhanced their consistency for non-salient details in some cases (Sakrisvold et al., 2017). Truth tellers, who may have wanted to be forthcoming, reported both salient and non-salient details having experienced the event. Given that recall of non-salient detail is prone to error, truth tellers' consistency was higher for salient than for non-salient details. The use of active interview techniques appeared to increase the difficulty of the interview for liars, which elicited differences between liars and truth tellers in reporting salient details.

Unanticipated questions enhanced within-group consistency and between-statement consistency for lie detection, but between-statement consistency did not distinguish true from false intentions when relatively similar unanticipated questions were asked across interviews. Further research is needed on statement-evidence consistency for unanticipated questions as addressed in Study III.

Strategic Use of Evidence

One of the most useful tools in solving a criminal case is evidence (Park, Levine, McCornack, Morrison, & Ferrara, 2002; Williamson et al., 2009). However, it is important to exhaust all possible explanations for the available evidence to confirm whether it incriminates the suspect (Granhag et al., 2015b). It is critical for investigators to know when and how to disclose evidence to the suspect. The Reid Manual advises investigators to disclose some, if not all, of the evidence early in the interrogation (Inbau et al., 2013), but should not ask suspects to comment on it, as that could provoke a fight or flight response. The only purpose of disclosing the evidence is to show suspects that they are better off confessing, but research has shown that presenting evidence early also provides the suspect an opportunity to develop an explanatory story for it (Granhag et al., 2013b; Hartwig, Granhag, Strömwall, & Vrij, 2005). This method does not effectively discriminate liars and truth tellers as both are likely to demonstrate high within-statement consistency as well as high statement-evidence consistency.

If the investigator exhausts all explanations for the evidence before disclosing any of it to the suspect, liars' statements are less likely to be consistent with it. The Strategic Use of Evidence technique (SUE), developed to address when and how to disclose available evidence (Granhag et al., 2013b; Hartwig et al., 2005), is increasingly employed by police officers in field interviews (Tekin, Granhag, Strömwall, & Vrij, 2017). One of the main assumptions of this technique, based on the self-regulation theory, is that liars do not know how much information the investigator holds and will use an escape strategy during the interview (denial of information and restrictiveness). When asked for a free recall account,

liars will be vague and evasive and omit incriminating information (Hartwig et al., 2011). However, if asked specific questions, liars will need to provide specific responses that will show statement-evidence inconsistency if they are unaware of the available evidence.

When the investigator discloses evidence after exhausting all explanations, liars may continue to deny incriminating information, but when they believe that the investigator holds more information than they first thought, they may attempt to be more forthcoming. To do this, they need to change elements in their story to fit the evidence, and this may increase their within-statement inconsistency. The investigator may then point out both the within-statement inconsistency and the statement-evidence inconsistency, making liars even more wary and possibly inducing them to be more cooperative. Consequently, the investigator may introduce a new theme for which no information is known. Liars, believing the investigator already has information on the new theme, may attempt to appear forthcoming and provide new information about this theme. The SUE technique not only enhances deception detection, but also assists investigators in obtaining admissions about information they do not possess (Granhag et al., 2015b; Tekin, Granhag, Strömwall, & Vrij, 2016).

Evidence may be presented late in the interview (*SUE-Basic*) or gradually throughout the interview (*SUE-Incremental*; Granhag et al., 2013b). When only one piece of evidence is available, investigators may frame it gradually, moving from the most indirect reference to the most direct, based on the strength of the source of the evidence and its precision. A weak evidence with low specificity might be framed as 'We have information that you were at a luggage store', while framing for a strong and highly specific evidence might be: 'We have CCTV footage showing that you bought a suitcase'. Disclosing the same piece of evidence with increasing strength and precision (incrementally) impacts the liar's perception of the amount of information the investigator holds.

To test these SUE techniques, Granhag, Rangmar, and Strömwall (2015a) compared the early disclosure of evidence, SUE-Basic, and SUE-Incremental techniques for statement-evidence inconsistency, within-group inconsistency, and within-statement inconsistency. Deceptive triads were asked to commit a mock theft, and truth tellers were asked to complete a non-criminal activity at the same location. Triads were then interviewed individually using early disclosure of evidence, SUE-Basic, or SUE-Incremental techniques. Early disclosure of evidence did not elicit any differences between liars and truth tellers for any inconsistency type. SUE-Basic showed differences between liars and truth tellers for within-group inconsistency only, but liars in the SUE-Incremental condition showed more statement-evidence inconsistency, within-group inconsistency, and within-statement inconsistency than truth tellers in the same condition. Using SUE-Basic

and SUE-Incremental accurately discriminated liars from truth tellers 78.6% of the time compared with 64% when evidence was disclosed early. Critically, none of the truth tellers showed any type of inconsistency, and liars changed their statement (within-statement inconsistency) in fewer than 20% of the cases (participants in the SUE-Incremental were the most likely to change their statement). Similar findings were obtained in other studies testing the SUE technique (Granhag et al., 2013b; Hartwig et al., 2005). Therefore, if some degree of statement inconsistency exists, particularly, within-statement inconsistency, when the SUE technique is used, the statement is more likely to be deceptive than truthful.

Using the SUE technique ensures that liars will be inconsistent about at least one aspect of their statement, and disclosing evidence incrementally is the most effective researched technique for eliciting inconsistencies. Therefore, it may be important to simultaneously assess different types of consistency in suspects' statements (Granhag et al., 2015a). Study IV explored the perceptions of police officers who employ an information-gathering approach to interviewing about different consistency types when using the SUE technique.

SUMMARY OF THE EMPIRICAL STUDIES

General and Specific Aims of the Thesis

Statement consistency is one of the most reported verbal cues to deception (Granhag et al., 2004; Masip & Herrero, 2015). Practitioners often rely on it to detect deception in investigative (Greuel, 1992; Tekin et al., 2017), forensic (Hartwig et al., 2004), judicial (Strömwall & Granhag, 2003), and immigration settings (Granhag et al., 2005), among others. Unfortunately, the consistency heuristic, which is not empirically supported, is also widely employed (Hartwig et al., 2004; Strömwall & Granhag, 2003; Strömwall et al., 2003). Given the extensive use of the consistency heuristic by practitioners and criminals' awareness of stereotypical views about consistency, it is important to conduct research to inform practitioners about this cue and about appropriate methods to use it to assess suspect credibility.

Previous studies that tested the effects of active and strategic interview techniques have shown promising results for enhancing deception detection by increasing differences between liars' and truth tellers' statement consistency. To this end, the current thesis aims to extend the literature on statement consistency by examining (a) different types of consistency in different contexts, (b) interview techniques that aim to increase differences between liars' and truth tellers' statement consistency, (c) the effects of familiarity with the reported event and counter-interrogation strategies on consistency types in a cognitively demanding interview, and (d) police officers' perceptions of the application and utility of consistency types for detecting deception.

The general aim of the first three studies was to investigate the effects of interview techniques on consistency types. These studies were experimental and conducted in the controlled environment of the laboratory to prevent any factors (other than the manipulated test factors) that might influence participants' consistency and behaviour (Levine & Parkinson, 2014). Experimental studies are important for establishing ground truths (Granhag, 2010). This is critical in research on deception detection, because knowing the ground truth ensures the participant suspect's behaviour reflects that of an actual liar or truth teller.

The methodology differed in each of the experimental studies to test different types of consistency. However, the same coding scheme was implemented throughout. As

mentioned in the first section of the thesis, consistency types may be measured subjectively or objectively. Subjective coding involves coders rating the consistency of a suspect's entire statement on one scale (Granhag et al., 2013b; Leins et al., 2011). Objective coding, the scheme used in the current thesis, involves counting (in)consistent details (repetitions, reminiscences, omissions, and/or contradictions) in one or more statement(s) and reporting the frequency of their occurrences (Leins et al., 2012; Masip et al., 2016; Shaw et al., 2014). In addition to statement consistency, responses to open-ended questions were also coded and categorised. These questions were asked in post-interview questionnaires aimed to examine participants' strategies (to convince interviewers of their veracity, to prepare for the interview, etc.) and in a field questionnaire with police officers in Study IV (Some closed-ended questions in Study IV were followed by open-ended questions to allow officers to elaborate on their responses). In all studies, open-ended responses were categorised by one coder. These categories were data-driven (not predetermined), and the frequency of their mention by participants was noted. To examine inter-rater reliability, all studies involved a second coder who coded consistency for 20% to 25% of the data and allocated open-ended responses for all data to the categories created by the first coder. Discrepancies between the two coders were discussed and resolved.

The specific aim of **Study I** was to examine *between-statement consistency* when *question format was changed* from a free recall to more specific questioning in two interviews, both about the same two events. Specific questions were asked either sequentially (about the two events separately) or non-sequentially (about the two events simultaneously). This scenario reflects investigative interviews that involve informants who usually have information about more than one event. Between-Statement consistency was assessed on repeated, omitted, reminisced, and contradictory details across interviews for each participant.

In **Study II**, *within-group consistency* was examined in the context of *false opinions* by employing the *Devil's Advocate approach* with pairs. This scenario reflects the case of suspected militant extremists held for questioning about their possible support of violent organisations (e.g., al Qaeda). Within-Group consistency was measured by counting consistent information units (arguments) between pair members separately for each interview question (opinion-eliciting and devil's advocate questions).

The aim of **Study III** was to investigate *statement-evidence consistency* and *between-statement consistency*, with a focus on *counter-interrogation strategies* and *familiarity with the alibi setting* in criminal cases. The two consistency types were measured by comparing two visuospatial statements for consistent details (between-statement consistency) and by counting details in the visuospatial statements that accurately matched the alibi setting

(statement-evidence consistency). In addition to consistency, the frequencies of *salient* and *non-salient details* in the visuospatial statements were also calculated.

Study IV was a survey study aimed to understand *perceptions of inconsistency types* among *police officers* in Australia, Canada, and the UK and to compare empirical findings for inconsistency types with actual practice. The term 'inconsistency' was used in the questionnaire (and hence in this study) because investigative practitioners are more likely to look for inconsistency than consistency to assess credibility (Fisher et al., 2009; Granhag et al., 2005; Masip & Herrero, 2015). It was speculated that officers would find it easier to respond to questions about inconsistency than about consistency. Officers were asked closed- and open-ended questions about the statement inconsistency types they believed to be most useful for detecting deception, about perceived differences between liars and truth tellers in attempting to eliminate inconsistency types, and any possible factors they thought might influence statement (in)consistency.

Table 1 shows an overview of the experimental studies. The published/submitted papers for all the studies in this thesis may be found in the Appendix.

Table 1

Overview of the Experimental Studies in the Thesis

Study	Interview	Context	N	Independent Variables	Dependent Variables
I	*Change in question format* [verbal]	*False reporting of events* [informant interviews]	150	*Veracity* [liar, truth teller] *Question type* [free recall, sequential, non-sequential]	Between-Statement consistency [repetitions, reminiscences, contradictions]
II	*Devil's Advocate approach* [verbal]	*False opinions* [immigration and intelligence interviews]	100	*Veracity* [liar, truth teller] *Question type* [opinion-eliciting, devil's advocate]	Within-Group consistency Prepared argument type
III	*Visuospatial tasks* [pictorial]	*False alibi* [criminal interviews]	144	*Veracity* [instructed liar, uninstructed liar, uninstructed truth teller] *Familiarity* [low, high]	Statement-Evidence consistency Between-Statement consistency Salient details Non-Salient details

Study I

Study I examined differences between liars' and truth tellers' between-statement consistency (namely repetitions, reminiscences, and contradictions) in reports of two events when the question format was varied across two interviews. Omissions were not included as these may be deduced from the results regarding repetitions (i.e., more repetitions indicate fewer omissions).

Method

One hundred and fifty students and staff members at the University of Portsmouth (82 females, 68 males, M_{age} = 25.3 years, SD_{age} = 8.86) were recruited through online and paper advertisements. A 2 (veracity [truth-teller, liar]) × 3 (second interview question format [free recall, sequentially ordered, non-sequentially ordered]) between-subjects design was used with the number of repetitions, reminiscences, omissions, and contradictions across interviews used as dependent variables. Participants were randomly assigned to the veracity conditions (75 participants in each condition) and to the second interview question format conditions (50 participants in each condition).

Procedure

All participants viewed a 4-min Skype meeting between three assumed undercover agents who discussed a non-critical and a critical event. Participants were then informed that they would be interviewed by a friendly (truth tellers) or a hostile (liars) agent. Truth tellers were instructed to be honest in their reports about both events. Liars were instructed to tell the truth about the non-critical event but to fabricate details about the critical event. Truth tellers and liars had to convince the interviewer they were honest. All participants were given as much time as they needed to prepare for the interview.

During the interview, all participants were asked for separate free recalls of the non-critical and critical events in a first interview. The interviewer then left the room while participants completed a 10-min filler task. After returning to the room, the interviewer either asked participants for another free recall account of each event separately or posed specific questions about the non-critical and critical events—either sequentially, following the order of the two witnessed events, or non-sequentially, asking about both events simultaneously. The last step of the experimental procedure asked participants to rate their

motivation on a 7-point scale (1 = *not motivated at all* to 7 = *very motivated*) and to indicate which interview strategy they used to convince the interviewer of their credibility.

Coding

One coder counted the repetitions, reminiscences, and contradictions across statements for each participant. Every noun, verb, adjective, or adverb was considered a single detail. Details repeated in the second interview were coded as repetitions, details reported only in the first interview were coded as omissions, details reported in the second interview but not in the first were coded as reminiscences, and details in the second interview that contradicted relevant details in the first interview were coded as contradictions. A second coder coded 20% of the statements. Inter-rater reliability was high, with Intra-Class Correlation (*ICC*) coefficient for repetitions = .97, 95% CI [0.95, 0.98], for omissions = .92, 95% CI [0.87, 0.95], for reminiscences = .85, 95% CI [0.76, 0.91], and for contradictions = .57, 95% CI [0.38, 0.72]. Reminiscences and contradictions did not occur frequently enough to be analysed. Given that very few contradictions emerged, the number of omissions may be deduced from repetitions as fewer repetitions indicate more omissions. Hence, only the results for repetitions are reported.

Open-ended responses about participants' interview strategy were also categorised. Truth tellers' responses were divided into five categories (providing details, being honest, reporting in chronological order, using memory enhancement strategies, and maintaining consistency), and liars' responses into six (maintaining consistency, appearing truthful, providing details, keeping the story simple, rehearsing, and an 'other' category to include strategies not appropriate to the other categories and reported by fewer than four participants). A second coder coded all the open-ended responses. Inter-rater reliability for liars was *ICC* = .84, 95% CI [0.77, 0.89], and for truth tellers was *ICC* = .82, 95% CI [0.74, 0.88].

Hypotheses

Liars and truth tellers were not expected to differ on between-statement consistency in reports of the non-critical event because they were both asked to tell the truth about it. Hence, it was predicted that all participants would be most consistent in the free recall condition (when question format was not changed) and least consistent in the non-sequentially ordered question format condition, which represented a drastic change in question format and was more cognitively demanding than other conditions (*Hypothesis 1*).

When reporting the critical event, liars and truth tellers were not expected to differ on between-statement consistency in the free recall condition because liars could use a repeat strategy in the second interview. However, liars were expected to be significantly less consistent than truth tellers when question format was changed (i.e., to specific questions), particularly when non-sequentially ordered questions were asked (*Hypothesis 2*).

A secondary hypothesis was posited regarding within-statement consistency. It was predicted that truth tellers would be equally consistent when reporting the critical and non-critical events. However, liars were predicted to be less consistent when lying about the critical event (as lying is cognitively demanding) than when telling the truth about the non-critical event (*Hypothesis 3*).

Lastly, it was hypothesised that liars would report using consistency across interviews for both events significantly more often than truth tellers (*Hypothesis 4*).

Results

Truth tellers (M = 5.72, SD = 1.11) and liars (M = 5.40, SD = 1.34) did not differ in their motivation. When reporting about the non-critical event, liars were unexpectedly significantly less consistent than truth tellers. The means are shown in Table 2. In line with *Hypothesis 1*, participants were least consistent in the non-sequentially ordered question format condition and most consistent in the free recall condition.

For the critical event, in line with results for the non-critical event, liars were significantly less consistent than truth tellers. All participants were least consistent in the non-sequentially ordered question format condition and most consistent in the free recall condition. The non-sequentially ordered question format condition (d = 1.48) exhibited the largest effect size, which is more important in applied settings, while the free recall condition (d = 0.68) exhibited the smallest effect size, supporting *Hypothesis 2*. Table 2 shows the effect sizes in the rightmost column. Discriminant analyses revealed that 84% of liars and 72% of truth tellers were correctly classified when non-sequentially ordered questions were asked, 72% of liars and 68% of truth tellers were correctly classified by sequentially ordered questions, and 68% of liars and 48% of truth tellers were correctly classified by the free recall interviews.

Within-subjects analyses revealed that truth tellers were significantly more consistent about the critical event than the non-critical event. No significant differences were found for liars. These results did not support *Hypothesis 3*.

The most prominent strategy that liars reported using to convince the interviewer of their credibility was consistency across and within interviews (45%), followed by staying close to the truth (32%). Many liars reported that they thought it would be difficult for them to remain consistent when deceptively answering questions about the critical event, so they opted to reduce consistency in response to questions about the non-critical event. For truth tellers, the most frequently reported strategy was providing details (51%) and being honest (32%), with only 8% reporting an effort to be consistent. These results supported *Hypothesis 4*.

Table 2

Repetitions for the Non-Critical and Critical Events as a Function of Veracity and Second Interview Question Format (Study I)

	Truth		Lie				
	M	*SD*	*M*	*SD*	*F*	*p*	*d* [95% CI]
Non-Critical event							
Free recall	30.88	10.80	24.12	12.25	4.28	.044	0.59 [0.02, 1.15]
Sequential	25.64	9.66	20.20	8.17	4.63	.037	0.61 [0.04, 1.18]
Non-Sequential	24.24	8.36	18.20	6.99	7.68	.008	0.78 [0.21, 1.36]
Total	26.92	9.95	20.84	9.61	15.25	<.001	0.62 [0.29, 0.95]
Critical event							
Free recall	35.40	12.79	26.88	12.31	5.76	.020	0.68 [0.11, 1.25]
Sequential	30.12	9.32	22.96	7.52	8.94	.004	0.85 [0.27, 1.42]
Non-Sequential	30.88	9.12	18.56	7.42	27.46	<.001	1.48 [0.86, 2.11]
Total	32.13	10.66	22.80	9.85	32.85	<.001	0.91 [0.57, 1.25]

Discussion

Truth tellers were more consistent between interviews than liars when question format was changed. Asking non-sequentially ordered questions in the second interview was the most effective technique for eliciting differences between liars' and truth tellers' between-statement consistency and for enhancing deception detection accuracy up to 78%.

Liars were less consistent than truth tellers in reporting the non-critical event, even though they were honest about that event. This may be attributed to their attempt to maintain the same level of consistency between their reports of the critical and non-critical events. Liars were significantly more likely than truth tellers to use a 'consistency' strategy. It appears that liars knew they will find it difficult to respond to the critical event, so they tried to reduce their consistency when reporting about the non-critical event such that their responses about both events appear consistent. This also explains why liars were less consistent than truth tellers when questions were repeated across interviews (free recall condition). In other words, liars attempted to maintain within-statement consistency, which ultimately reduced their between-statement consistency compared with truth tellers.

Study II

The aim of Study II was to examine within-group consistency differences between pairs of liars and truth tellers using the Devil's Advocate approach. Participants' preparation strategies, prepared argument types, and convincing interview strategies were also investigated.

Method

A total of 100 students and staff members at the University of Portsmouth participated in the study (82 females, 18 males, M_{age} = 21.60 years, SD_{age} = 5.97). A 2 (veracity [truth teller, liar]) × 2 (question type [opinion-eliciting question, devil's advocate question]) mixed design was used, with veracity as the between-subjects factor, question type as the within-subjects factor, and prepared argument type and consistency between pair members as the dependent variables.

Procedure

Participants were sent the online link for a 23-item questionnaire about controversial social and political topics. They were instructed to rate how much they agreed or disagreed with each item on a 7-point Likert scale (1= *I disagree* to 7 = *I agree*). The order of questions was counterbalanced between participants. Each two participants who gave the same extreme score of 1 or 7 on one of the topics were matched and given an appointment at the same time.

Pairs were randomly allocated to the truth or lie condition. They were instructed that they would be interviewed about their opinions on the topic, and the interviews would be conducted individually by the same interviewer. Truth tellers were instructed to convince the interviewer of their genuine opinions, whereas liars had to convince the interviewer they held the opposing view. Pairs were permitted to prepare for the interview for as long as necessary, and their preparations were timed.

Pair members, interviewed individually, were first asked whether they were in favour of, or opposed to, the test topic. They were then asked the opinion-eliciting question, 'Why and what do you think led you to having this view on the topic? Please try to be as detailed as possible in your response', followed by the devil's advocate question, 'Try to play devil's advocate and imagine that you do not have this view at all. That is, imagine that you (dis)agree with the statement. What can you say in favour of this opposing view? Please be as detailed as possible in your response'. Participants who did not provide at least three arguments for each of the questions were asked to do that. Previous research has found that participants can typically generate at least three arguments in such tasks (Ajzen, 2001, Haddock, Rothman, & Schwarz, 1996; Wänke, Bless, & Biller, 1996). Obtaining at least three arguments also allows a more accurate measurement of consistency.

Following the interview, participants completed a computerised questionnaire in which they rated their motivation to convince the interviewer of their views (1 = *not motivated at all* and 7 = *very motivated*) and the perceived difficulty of the questions (1 = *extremely easy* and 7 = *extremely difficult*). They were also asked (a) whether they had prepared for the interview, (b) whether they discussed arguments that supported and/or opposed their opinions, (c) how they prepared, and (d) how they tried to convince the interviewer.

Coding

Statements were coded as information units. An information unit was either an argument or an aspect of an argument. Every information unit included at least one noun and one

verb. Information units that were reported by both pair members (by content, not verbatim) for each of the opinion-eliciting question and the devil's advocate question were considered consistent. A second coder coded 25% of the total interviews. Inter-rater reliability was *ICC* =.68, 95% CI [0.20, 0.90], for the opinion-eliciting question and .84, 95% CI [0.54, 0.95], for the devil's advocate question.

Responses to the open-ended question on *preparation strategies for the interview* yielded three categories for liars (Discussing arguments, preparing convincing techniques, and 'other' strategies) as well as for truth tellers (Discussing arguments, discussing arguments only briefly, and 'other' strategies). Other strategies employed by liars and truth tellers included writing down arguments and offering personal experience. Two coders who categorised all the responses achieved very high inter-rater reliability, *ICC* = .99, 95% CI [0.67, 1.00], for truth tellers and .92, 95% CI [0.22, 0.99], for liars.

Participants' *interview strategies* to convince the interviewer of the veracity of their responses are displayed in Table 3. For the opinion-eliciting question, six categories emerged for truth tellers and seven categories for liars. For the devil's advocate question, seven categories emerged for both truth tellers and liars. The categorised strategies included an 'other' category, which referred to strategies that were not mentioned frequently such as 'was finding it difficult to respond' or 'attempting to control my behaviour'. For the opinion-eliciting question, inter-rater reliability was high, *ICC* = .97, 95% CI [0.86, 0.99], for truth tellers and .86, 95% CI [0.45, 0.97], for liars. For the devil's advocate question, *ICC* =.88, 95% CI [0.46, 0.98], for truth tellers and .74, 95% CI [0.27, 0.95], for liars.

Hypotheses

It was predicted that deceptive pairs would be more likely to prepare opposing rather than supporting arguments to convince the interviewer of their responses, whereas truth tellers—if they prepared at all—would prepare supporting rather than opposing arguments to remind each other of arguments they might use during the interview (*Hypothesis 1*).

Truth telling pairs were expected to be more consistent with each other in response to the opinion-eliciting question than to the devil's advocate question, whereas deceptive pairs were expected to be consistent with each other on both questions (*Hypothesis 2*).

Results

Data screening revealed one outlier in the data (with a *z*-score > ±3.29) so it was removed, and the final sample included 50 liars and 48 truth tellers (i.e., 25 deceptive pairs and 24 truth telling pairs). Liars (M = 5.38, SD =1.52) and truth tellers (M = 5.48, SD =1.11) did not differ in their motivation. Liars found the opinion-eliciting question (M = 4.58, SD = 1.75) significantly more difficult to answer than the devil's advocate question (M = 3.84, SD = 1.75), whereas truth tellers found the devil's advocate question (M = 5.31, SD = 1.39) significantly more difficult to answer than the opinion-eliciting question (M = 2.87, SD = 1.70) which supports the idea that people's true arguments are more accessible than their counter-arguments.

Liars and truth tellers did not differ on whether they chose to prepare together before the interview. Only six pairs of liars and six pairs of truth tellers chose not to prepare at all. Among those who prepared, average preparation time was 3 min 48 s for deceptive pairs and 3 min 00 s for truth telling pairs.

Hypothesis 1 was supported, with 87.5% of truth telling pairs discussing supporting arguments and 57.1% of deceptive pairs discussing opposing arguments. A substantial number of deceptive pairs (31.4%) discussed both opposing and supporting arguments. Open-ended responses about preparation strategies revealed that both truth telling (53%) and deceptive (50%) pairs discussed arguments in general, with 25% of truth tellers discussing arguments only briefly. Among liars, 39% reported preparing convincing techniques.

The categories and corresponding frequencies of the reported interview strategies are shown in Table 3. When responding to the opinion-eliciting question, more truth tellers than liars were honest, provided details, and attempted to seem passionate about the target topic, but more liars than truth tellers tried to keep their responses simple and used standardised (commonly held) arguments to appear logical. In response to the devil's advocate question, truth tellers were more detailed than liars, but liars tried more than truth tellers to appear honest, included more standardised arguments, disengaged from their actual opinions, kept their responses simple, and maintained response consistency with the opinion-eliciting question.

Table 3

Percentages of Interview Strategies Reported by Truth Tellers and Liars in Response to the Opinion-Eliciting and to Devil's Advocate Questions (Study II)

Strategy	Truth	Lie
Opinion-eliciting question (OE)		
Providing details	54%	34%
Being honest	28%	0%
Attempting to seem passionate about the topic	15%	8%
Controlling non-verbal behaviour	14%	13%
Thinking of standardised arguments/Appearing logical	4%	18%
Taking the opposing perspective/Reversing own views	0%	32%
Keeping it simple	0%	8%
Other	10%	14%
Devil's advocate question (DA)		
Taking the opposing perspective/ Reversing responses to OE	58%	20%
Providing details	17%	8%
Disengaging from my actual opinions/ Including standardised arguments	8%	28%
Being honest	6%	42%
Maintaining response consistency with OE	4%	30%
Keeping it simple	2%	10%
Other	4%	12%

Note. Percentages are calculated for truth tellers and liars separately. The total exceeds 100% for each group because each participant could contribute to more than one category.

For the consistency analysis, the total number of information units for each of the opinion-eliciting question and the devil's advocate question was included as a covariate, because consistency in information units between pair members varied with the number of information units provided. A mixed univariate analysis (ANCOVA) revealed that truth telling pairs were significantly more consistent with each other in response to the opinion-eliciting question (M = 3.17, SD = 2.26) than to the devil's advocate question (M = 1.33, SD = 1.05), whereas deceptive pairs' consistency did not differ between their responses to the opinion-eliciting question (M = 2.24, SD = 1.54) and the devil's advocate question (M = 1.56, SD = 1.16), thus supporting *Hypothesis 2*.

As it is uncommon for truth tellers to prepare for interviews, pairs of truth tellers who opted to prepare were compared with pairs who did not prepare. The analysis was exploratory and cannot be generalised given that the group sizes were small and discrepant, preparation was not manipulated, and participants were not randomly allocated to group conditions. However, the analysis may prove useful for future research. A mixed ANCOVA yielded no significant main effects or question type × preparation interaction effects, which suggests that preparation had no effect on the results for truth telling pairs. To be certain of this, separate within-group comparisons were conducted for both prepared and unprepared truth tellers. These analyses revealed that prepared truth telling pairs were significantly more consistent with each other on the opinion-eliciting question (M = 3.44, SD = 2.53) than the devil's advocate question (M = 1.17, SD = 0.86). However, truth telling pairs who did not prepare were equally consistent with each other on both the opinion-eliciting question (M = 2.33, SD = 0.82) and the devil's advocate question (M = 1.83, SD = 1.47).

Discussion

Study II results demonstrate the effectiveness of the Devil's Advocate approach in discriminating between deceptive and truth telling pairs. Deceptive pairs were equally consistent with each other on the opinion-eliciting and devil's advocate questions. Truth tellers, however, were more consistent with each other on the opinion-eliciting question than the devil's advocate question, but only if they had prepared for the interview.

Deceptive pairs prepared for the interview and discussed arguments that opposed (as well as supported) their genuine opinions, which made their arguments against their true opinions more accessible. They could also provide similar arguments for the devil's advocate question, because they shared the same views, which led them to think of similar arguments (Mercier & Landemore, 2012). Liars also reported preparing convincing strategies and rehearsing arguments for their false opinions to make them seem real and

consistent. Therefore, and as Table 3 shows, consistency was a major factor in their preparation and interview strategies. In contrast, truth telling pairs prepared only briefly to refresh their memory rather than to improvise convincing strategies. They discussed supporting arguments only, so arguments for the opinion-eliciting question were more accessible to them than arguments for the devil's advocate question, and they were more consistent in their responses to the opinion-eliciting question.

The finding that truth tellers prepared for the interview contradicts previous findings. In general, truth telling pairs are less likely than deceptive pairs to prepare for an interview about a past event (Vrij et al., 2009; Vrij et al., 2010c). It seems that the abstract nature of the opinions elicited prompted truth telling pairs to prepare so that they could remember supporting arguments they expected to be asked for. Truth telling pairs who did not prepare were, like the deceptive pairs, consistent in their responses to both questions. Therefore, the Devil's Advocate approach seems to elicit differences between deceptive and truth telling pairs only when truth telling pairs can prepare for the interview. Given the limitations of the analysis and that preparation was not manipulated, more research is needed to corroborate these findings.

Study III

In Study III, the effects of counter-interrogation strategies and familiarity with the alibi setting were examined for statement-evidence consistency and between-statement consistency. Half the liars (informed liars) were asked to employ a counter-interrogation strategy and half (uninformed liars) were not. All truth tellers were blind to the counter-interrogation strategy, because in forensic contexts innocent suspects do not know they will be suspected of or interviewed about a crime, so they do not employ counter-interrogation strategies (Hartwig et al., 2007) or prepare for the interview and therefore cannot possibly display the behaviour of an informed liar. Two interviews were conducted in which participants were asked to complete two different visuospatial tasks (a recall versus recognition task).

The level of familiarity with the alibi setting was also manipulated because previous studies (e.g., Knieps et al., 2014; Warmelink et al., 2013) have not examined the effects of various levels of familiarity on statement consistency. Although all liars were familiar with the alibi setting, they differed from truth tellers about not committing the crime and about the time they were at the alibi setting. Liars therefore had to invest effort in preparing and in

convincing the interviewer, which meant their cognitive load would generally be higher than truth tellers'.

Method

A total of 144 participants were recruited through the participant pool database at the University of Gothenburg (61.5% females, M_{age} = 27.65 years, SD_{age} = 10.38). A 3 (veracity information status [informed liars, uninformed liars, uninformed truth tellers]) × 2 (familiarity [high familiarity, low familiarity]) randomised between-subjects design was conducted with salient details, non-salient details, between-statement consistency (repetitions across interviews), and statement-evidence consistency (repetitions between the statement and the alibi setting) as dependent variables. Participants were equally distributed to the conditions, with 24 participants in each cell.

Procedure

Liars were instructed to imagine there was a visitor in the department who might have violent radical views and they needed to steal her USB memory stick, which was suspected to include extremist material. Liars had to deliver the memory stick to a mail box in the building so that a member of university staff could inspect the contents. They were given a free sandwich coupon from a local restaurant so they could use the restaurant as their alibi in case they were suspected. Truth tellers did not commit the mock crime, but were given a free sandwich coupon to the restaurant. Only participants who had never visited that restaurant before were eligible to participate in the study.

Informed liars received these additional instructions before committing the mock crime:

> *"If the radical visitor or anyone else suspects you of stealing the USB memory stick, they will want you to prove you were at the restaurant, so they might ask you to draw a sketch of the restaurant to confirm that you were there. Therefore, try as much as possible to attend to the layout of the restaurant and remember as many things as you can from the setting. You need to look for the smallest details in the restaurant to be able to complete the drawing."*

Participants randomly allocated to the low familiarity condition spent 30 seconds in the restaurant picking up a sandwich previously ordered by phone by the experimenter. Participants in the high familiarity condition were instructed to spend 10 minutes in the restaurant, so they ordered their sandwich themselves when they visited the restaurant.

After returning to the department, all participants were informed that the visitor was interviewing people at the department about her lost USB memory stick. Liars were also told that the memory stick contained dangerous information, so they should not mention knowing anything about it or confess to stealing it; rather, they should use the restaurant as their alibi. Informed liars were reminded that they might be asked to draw the restaurant. Participants were given as much time as they needed to prepare for the interview.

The interviewer asked participants to draw as many details from the restaurant as possible, including decorations, tables, chairs, etc. to prove they had been there at the time of the theft. Because people have different drawing skills, spatial orientation, visual attention, and memory capacity (Huang, Mo, & Li, 2012; Skogsberg et al., 2015; Vogel & Machizawa, 2004), participants were also asked to draw the interview room to control for individual differences and to use the details and consistency of these visuospatial statements as covariates in the analysis. The order of the requests to draw the interview room and the restaurant were counterbalanced. Participants were given as much time as needed to complete the drawings.

After the first interview, the interviewer left the room and the participant engaged in a 10-min filler task. The interviewer then re-entered the room and gave the participant an A3-sized layout sketch of the restaurant on which the restaurant's door, food counter, and sofa were drawn and 37 small black-and-white photographs of items found in the restaurant. Participants were requested to place the correct items in their exact location. Again, participants completed a similar task for the interview room, and the tasks were counterbalanced. As much time as needed was allowed to complete the tasks.

Finally, participants responded to a computerised questionnaire in which they rated on a 7-point scale their motivation to complete the tasks involved in the experiment (1 = *not motivated at all* and 7 = *very motivated*), their anticipation of the visuospatial tasks (1 = *not anticipated at all* and 7 = *very anticipated*), their surprise when asked to complete the visuospatial tasks (1 = *not surprised at all* and 7 = *very surprised*), and how closely they examined the restaurant setting while they were there (1 = *did not look around at all* and 7 = *looked around very much*).

Coding

One coder coded 24% of the total statements and a second coder coded all the statements. The coders first counted the salient and non-salient details in each visuospatial statement. Inter-rater reliability was measured for the total number of details provided in the first and second interviews for the restaurant and interview room statements. For salient details, *ICC*

= .98, 95% CI [0.96, 0.99] for the restaurant statements and .92, 95% CI [0.83, 0.96], for the interview room statements. As for non-salient details, *ICC* = .97, 95% CI [0.93, 0.98], for the restaurant statements and .89, 95% CI [0.61, 0.94], for the interview room statements.

To measure between-statement consistency between the self-generated drawing in the first interview and the layout sketch in the second interview, the coders counted the number of repeated items in the restaurant or interview room statements. The *ICC*s were .94 for both the restaurant (95% CI [0.87, 0.97]) and the interview room (95% CI [0.89, 0.97]) statements.

Finally, to code statement-evidence consistency, the coders visited the restaurant and interview room and awarded one consistency point for each correctly drawn or chosen item placed in the correct location in both restaurant and interview room statements. Inter-rater reliability was measured for the combined statement-evidence consistency scores in the first and second interviews for the restaurant and interview room statements. The *ICC*s were .98, 95% CI [0.96, 0.99], for the restaurant statements and .93, 95% CI [0.86, 0.97], for the interview room statements.

Hypotheses

Participants in the high familiarity condition were expected to have stronger memories of the alibi setting and hence to score higher on the number of salient and non-salient details, statement-evidence consistency, and between-statement consistency than participants in the low familiarity condition (*Hypothesis 1*).

Uninformed liars and uninformed truth tellers who spent the same time at the alibi setting were expected to have the same memory representation of it and not to differ in their statements. However, informed liars who possessed prior knowledge about the interview technique were expected to look more closely at the alibi setting prior to the interview than other participants. Hence, and in line with the self-regulation theory, it was predicted that informed liars would score higher than uninformed liars and uninformed truth tellers on salient and non-salient details, statement-evidence consistency, and between-statement consistency (*Hypothesis 2*). This difference was expected to be more pronounced in the high familiarity than the low familiarity condition (*Hypothesis 3*).

Results

An average score was calculated for salient details in the two interviews for each of the restaurant and the interview room statements. An average score for non-salient details was similarly calculated. A proportion score was also calculated for between-statement consistency (Consistent details across interviews/total number of details in the first interview), because the number of details provided in the first interview would affect the consistency score across statements. A statement-evidence consistency proportion score was also calculated for each visuospatial statement (Number of statement-evidence consistent items/total number of details in the statement). A final statement-evidence proportion score was calculated by averaging the scores in the two interviews for each of the restaurant and the interview room statements.

Truth tellers (M = 5.56, SD = 1.24), uninformed liars (M = 6.14, SD = 1.06), and informed liars (M = 5.55, SD = 1.34) did not differ on motivation. However, participants in the high familiarity condition (M = 6.08, SD=1.00) were significantly more motivated than participants in the low familiarity condition (M = 5.34, SD = 1.38). Nonetheless, the means show that participants in both conditions were highly motivated as they all scored on the upper end of the motivation scale.

Informed liars (M = 4.23, SD = 2.20) anticipated the visuospatial task significantly more than uninformed truth tellers (M = 1.40, SD = 0.87) and uninformed liars (M = 1.33, SD = 1.11). Also, informed liars were significantly less surprised (M = 3.00, SD = 1.80) by the visuospatial tasks than uninformed truth tellers (M = 4.60, SD = 2.10) and uninformed liars (M = 5.24, SD = 1.45). Finally, informed liars (M = 4.95, SD = 1.21) reported looking closely at the restaurant setting significantly more than uninformed truth tellers (M = 3.20, SD = 1.50) and uninformed liars (M = 2.86, SD = 1.39). Hence, the experimental manipulations were successful.

A multivariate analysis (MANCOVA) including the interview room's salient details, non-salient details, statement-evidence consistency, and between-statement consistency as covariates revealed that participants in the high familiarity condition provided significantly more salient and non-salient details and were more consistent with the evidence (alibi setting) than participants in the low familiarity condition, but not more consistent across interviews. These findings partially supported *Hypothesis 1*, and Table 4 shows that between-statement consistency proportion scores were also higher in the high familiarity condition than in the low familiarity condition.

As expected, uninformed liars and uninformed truth tellers did not differ in their reports in any of the familiarity conditions. As Table 4 shows, informed liars provided significantly more salient and non-salient details than uninformed liars and truth tellers. No significant differences were found for between-statement consistency and statement-evidence consistency. Hence, *Hypothesis 2* was supported regarding veracity differences for salient and non-salient details but not for statement-evidence consistency and between-statement consistency.

Finally, the interaction effect was significant in that informed liars reported significantly more non-salient details than uninformed liars and uninformed truth tellers, and this effect was more pronounced in the high familiarity condition than in the low familiarity condition. Therefore, the predicted interaction effect (*Hypothesis 3*) was supported for non-salient details only. In conclusion, the results generally supported the hypotheses although significant effects were not found for all the suggested dependent variables.

Discussion

Informed liars, who knew prior to committing the mock crime that they might be asked to provide a visuospatial statement if interviewed, provided more detailed statements than truth tellers and liars who did not possess this knowledge. These findings imply that liars employing counter-interrogation strategies do not always succeed in producing statements that resemble those of truth tellers. In line with the self-regulation theory, informed liars used an escape strategy by denying incriminating information and revealing as much information as possible about the alibi. Their knowledge of the interview technique prompted them to pay more attention to the alibi setting than other participants, as shown in the post-interview questionnaire responses. This meticulous strategy is in contrast with truth tellers' strategy, which generally comprises only recalling the event from memory.

Participants who were highly familiar with the alibi setting provided visuospatial statements that were more detailed and consistent with the evidence than participants who were poorly familiar with the alibi setting. High familiarity with the alibi setting was particularly effective at increasing the number of non-salient details provided by informed liars. Hence, non-salient details seem to be a valid indicator of deception.

Table 4

Means and Standard Deviations of the Dependent Variables as a Function of Veracity Information Status and Familiarity (Study III)

	Salient details		Non-Salient details		Between-Statement consistency proportion		Statement-Evidence consistency proportion	
	M (SD)	95% CI	*M (SD)*	95% CI	*M (SD)*	95% CI	*M (SD)*	95% CI
Informed liars								
Low familiarity	14.58 (7.56)	[11.39, 17.77]	22.46 (9.58)	[18.41, 26.50]	.57 (.15)	[.51, .64]	.80 (.12)	[.75, .85]
High familiarity	21.42 (8.48)	[17.83, 25.00]	36.98 (10.36)	[32.60, 41.35]	.64 (.16)	[.58, .71]	.87 (.08)	[.84, .90]
Uninformed liars								
Low familiarity	10.23 (6.37)	[7.54, 12.92]	15.21 (6.05)	[12.65, 17.76]	.56 (.22)	[.47, .66]	.77 (.14)	[.71, .36]
High familiarity	14.00 (5.97)	[11.48, 16.52]	21.13 (6.47)	[18.39, 23.86]	.60 (.18)	[.52, .67]	.82 (.09)	[.79, .86]
Uninformed truth tellers								
Low familiarity	11.25 (6.27)	[8.60, 13.90]	16.65 (7.10)	[13.65, 19.64]	.50 (.14)	[.44, .56]	.79 (.10)	[.74, .83]
High familiarity	15.60 (8.02)	[12.22, 19.00]	20.98 (7.28)	[17.90, 24.05]	.56 (.18)	[.49, .64]	.80 (.15)	[.73, .86]

As expected, uninformed liars did not significantly differ from uninformed truth tellers, demonstrating that when liars and truth tellers are equally familiar with (and informed about) the alibi setting, they provide similarly detailed and consistent visuospatial statements. Hence, familiarity with the alibi is not enough to enhance liars' performance on visuospatial statements as their statements would only show that they were present at the alibi setting. It seems that, in a similar scenario to the one tested, it is liars' counter-interrogation strategies (acquaintance with the interview technique) that counterintuitively give their lies away.

Critically, statement-evidence consistency and between-statement consistency did not differ between liars and truth tellers, even when liars employed counter-interrogation strategies. Informed liars provided statements similar to those of truth tellers, because they were familiar with the event and could easily repeat their statements despite the change in question format. Table 4 shows that informed liars managed to achieve higher levels of statement-evidence consistency and between-statement consistency than uninformed truth tellers, which demonstrates that liars may have tried hard to achieve high consistency, particularly in the high familiarity condition, but they were not able to supersede the consistency scores of truth tellers. This may be attributed to informed liars' detailed statements, which made them more prone to error and hence to reduced statement-evidence consistency. Similarly, it seemed that informed liars could not enhance their between-statement consistency, perhaps because they found it difficult to repeat all the information in the second interview. In conclusion, these results show that visuospatial statements allow liars who are familiar with the alibi setting to provide detailed statements. However, liars employing counter-interrogation strategies in visuospatial statements cannot easily control statement-evidence consistency and between-statement consistency because they provide detailed statements that ultimately make these statements prone to errors and forgetting.

Study IV

Study IV explored the applied significance of inconsistency as a cue to deception. As previous studies involving field surveys have not examined police officers' perceptions of various types of inconsistency, this study filled this gap in the literature by asking police officers about their views of different types of statement inconsistency and liars' and truth tellers' attempts to eliminate these types of inconsistency.

Method

Police officers with at least three years' experience in investigative interviewing were recruited formally or informally through contacts in Australia, Canada, and the UK. The response rate in Australian officers was 10%, but it is unknown for Canadian and UK officers because an unknown number of questionnaires was circulated by the contacts.

A total of 71 officers (52 males, 19 females, M_{age} = 41.80 years, SD_{age} = 7.13) completed the questionnaire. Thirty-eight of them were from Australia (54%), 17 from the UK (24%), and 16 from Canada (22%). All were Caucasian except one who was Hispanic. Of the total sample, 46 indicated they were native English speakers (65%), 10 spoke English at an advanced level (14%), and one spoke English at the intermediate level (1%). Proficiency in English was not obtained for 14 officers in the UK (20%) because the item was added to the questionnaire after it had circulated to those officers. However, given the increasing demand for police officer candidates in the UK to be bilingual (Tonkin, 2015), as well as the requirement for non-native police candidates to have an English language qualification and to complete a training course offered in English (Metropolitan Police, 2017), UK officers would be expected to be proficient in English at least at the intermediate level.

The officers' experience in interviewing suspects ranged from 3 to 40 years (M = 16.80, SD = 7.86). Officers did not consider themselves up-to-date with the scientific literature on statement inconsistency (on a 7-point scale from 1 = *not up-to-date at all* to 7 = *extremely up-to-date*, M = 2.57, SD = 1.69), and although 27 reported being trained in using statement inconsistency to detect deception (38%), 44 reported not having received such training (62%).

The questionnaire was in English and took approximately 20 minutes to complete. Officers had the option to complete the questionnaire either online or on paper. Fifty-eight officers (82%) completed it online and 13 (18%) on paper. Officers were asked to sign a consent form and were informed that their responses would be treated confidentially. Those who completed the online version were instructed that uncompleted questionnaires would not be included in the analyses.

The questionnaire comprised eight closed and four open-ended questions. Closed items were rated on 7-point scales and some were followed by open-ended questions to allow officers to expand on their responses. The open-ended questions were exploratory. Importantly, definitions of inconsistency types (adapted from Vredeveldt et al., 2014) were provided in the questionnaire to clarify them to officers.

Two coders classified the responses to open-ended questions into categories and indicated the corresponding percentages. The overall inter-rater reliability was *ICC* = .89, 95% CI [0.61, 0.99].

Hypotheses

As officers tend often to use the consistency heuristic to detect deception, it was predicted that officers would associate repetitions with truthfulness and contradictions, reminiscences, and omissions with deception (*Hypothesis 1*). Moreover, officers were expected to look more for contradictions than repetitions, omissions, and reminiscences to detect deception (*Hypothesis 2*).

In line with findings by Granhag and Strömwall (2001a), *Hypothesis 3* posited that officers would report relying more on between-statement inconsistency than on within-statement inconsistency in the presence of different statements by a single suspect.

When officers could use all inconsistency types in a case to detect deception, they were expected to report looking for statement-evidence inconsistency more than any other type of inconsistency (*Hypothesis 4*). Accordingly, they would indicate that it would be easier to assess this inconsistency type than any other inconsistency type (*Hypothesis 5*).

Officers' experience was expected to help them notice that liars strive to eliminate within-statement inconsistency more than statement-evidence inconsistency following strategically presented evidence (*Hypothesis 6*). In line with this hypothesis, officers were expected to report that liars would eliminate within-statement inconsistency more than any other type of inconsistency (*Hypothesis 7*). Officers were not expected to report any differences in the levels of statement inconsistency types for truth tellers.

Results

Table 5 shows the means and standard deviations for the closed questions. For ease of reference, each question in the table is preceded by the hypothesis number it is meant to test. Table 6 displays the percentages of responses in each category for the exploratory open-ended questions.

A repeated measures ANOVA was conducted for each closed-ended question and a frequency analysis was made for each open-ended question.

Table 5

Means and Standard Deviations for Responses to Closed Questions (Study IV)

Closed Question	*M*	*SD*
1. To what extent do you believe the following are indicative of deceit or honesty [a]		
Contradictions	2.77	1.47
Repetitions	4.24	0.89
Reminiscences	3.77	0.80
Omissions	3.42	0.92
2. In deciding whether the suspect is lying or telling the truth, how often do you look for [b]		
Contradictions	6.00	0.86
Repetitions	4.75	1.46
Reminiscences	5.04	1.28
Omissions	4.80	1.26
3. If you have available two statements provided by a single suspect across two interviews, to what extent do you rely on [b]		
Within-Statement inconsistency	5.10	1.03
Between-Statement inconsistency	5.04	1.14
4. In a case with multiple suspects, each suspect interviewed more than once, and critical evidence available, to what extent would you look for [b]		
Within-Statement inconsistency	5.10	1.12
Between-Statement inconsistency	5.26	1.06
Statement-Evidence inconsistency	6.00	0.94
Within-Group inconsistency	5.46	1.06
5. In general, to what extent do you find it difficult to assess [c]		
Within-Statement inconsistency	3.48	1.22
Between-Statement inconsistency	3.27	1.06
Statement-Evidence inconsistency	2.61	1.24
Within-Group inconsistency	3.45	1.26
6. Imagine that you questioned a suspect exhaustively, but their statement still did not match a critical piece of evidence. When you now confront the suspect with that evidence, do you believe liars are more likely to eliminate [b]		
Within-Statement inconsistency	4.31	1.04
Statement-Evidence inconsistency	4.92	1.01
7a. To what extent do you think liars find it important to eliminate [b]		
Within-Statement inconsistency	5.34	1.00
Between-Statement inconsistency	4.99	1.11
Statement-Evidence inconsistency	4.90	1.19
Within-Group inconsistency	4.76	1.30
7b. To what extent do you think truth tellers find it important to eliminate [b]		
Within-Statement inconsistency	5.55	1.38
Between-Statement inconsistency	5.46	1.38
Statement-Evidence inconsistency	5.41	1.48
Within-Group inconsistency	5.23	1.57

[a] 7-point scale (1 = *strongly indicative of deceit* and 7 = *strongly indicative of honesty*). [b] 7-point scale (1 = *never* and 7 = *always*).
[c] 7-point scale (1 = *extremely easy* and 7 = *extremely difficult*).

Table 6

Categories and Corresponding Percentages for Responses to Open-Ended Questions (Study IV)

Open-Ended Question	Frequency
1. In general, what type(s) of verbal cues are in your opinion the most important to decide whether the suspect is lying or telling the truth?	
Amount of detail	62%
Statement inconsistency	46%
Refusal to answer/ avoiding question	39%
Fillers (e.g., honestly, um, like)	14%
Other cues (e.g., repeating questions, denial)	45%
2. Please describe how you would determine whether the suspect's statement is inconsistent when you have available a single statement from one suspect [*within-statement inconsistency*].	
Different cues such as details, plausibility, etc.	34%
Interview manipulation	34%
Contradictions	32%
Comparison of suspect statement with the evidence	31%
Confrontation of the suspect with the evidence after exhausting alternative explanation	27%
Other (e.g., suspects' refusal to answer, possible gain from lying)	10%
3. Please explain how you used inconsistency in drawings to determine whether the suspect was lying or not.	
Correspondence between drawing and verbal statement	44%
Correspondence between drawing and evidence	33%
Improbable positioning of items within the drawing	14%
Inability to draw or complete the drawing	11%
Other (e.g., drawings as an additional assessment tool, effects of delay)	14%
4. Please insert any comments you might have about why you think (any of) the characteristics might or might not influence a suspect's credibility.	
Language proficiency (e.g., suspects who are non-native speakers)	33%
Criminal history (e.g., suspect's experience with interviewing)	30%
Many factors combined to influence inconsistency	20%
Age (Young or elderly suspects more inconsistent than adults)	18%
Intelligence (Reduces inconsistency)	15%
Personality traits (e.g., narcissism, anxiousness)	13%
Officer interviewing style	13%
Suspect vulnerability	10%
Officer confirmation bias	10%
Type of offence	5%
Time factors influence inconsistency	5%
Other (e.g., miscommunication elicits inconsistency)	23%

Officers believed objective consistency measures differed significantly from each other. They associated repetitions and reminiscences with truthfulness and contradictions and omissions with deception. Hence, *Hypothesis 1* was supported for repetitions, contradictions, and omissions, but not for reminiscences. Officers were most likely to look for contradictions to detect deception, and they did not differ in how much they looked for the other consistency measures, supporting *Hypothesis 2*.

Officers reported that when they had access to more than one statement, they would be as likely to look for within-statement inconsistency as for between-statement inconsistency, which refuted *Hypothesis 3*.

In line with *Hypotheses 4* and *5*, officers believed that statement-evidence inconsistency was the most useful type for detecting deception and the least difficult to assess. Officers who responded to the follow-up open-ended questions, in which they were able to elaborate on their responses, reiterated that statement-evidence inconsistency is the most useful inconsistency type (39%). Sixteen percent believed truth tellers might be inconsistent across interviews due to time lag and forgetting, 14% reported that all inconsistency types are useful, and 8% reported that within-group inconsistency is the least useful because liars can collude and be consistent or because it is difficult to validate statements when there are multiple suspects.

Hypothesis 6 was not supported, because officers indicated that liars would eliminate statement-evidence inconsistency (rather than within-statement inconsistency) after strategically presented evidence.

Officers believed that liars in general would eliminate within-statement inconsistency more than any other inconsistency type, whereas truth tellers would not eliminate any type of inconsistency more than another (in line with *Hypothesis 7*). In the follow-up open-ended responses, officers noted that truth tellers are generally consistent (29%), maintain within-statement consistency (22%), or add information across statements (10%). Some officers considered liars to be generally consistent (22%), while others believed that liars are generally inconsistent (6%) or inconsistent across statements (14%). Twenty-nine percent believed that evidence is important for liars. Eighteen percent indicated that liars would change their statements to fit the evidence, but only 4% said that liars would maintain their statement following evidence disclosure.

The exploratory open-ended questions, shown in Table 6, revealed that statement inconsistency (46%) was one of the most frequently reported verbal cues to deception. Among officers reporting statement inconsistency, 40% specified statement-evidence

inconsistency, 36% specified within-statement inconsistency, and 24% specified between-statement inconsistency. None of the officers mentioned within-group inconsistency, most probably due to the open-ended nature of this question.

Also, 48 officers (68%) indicated that they used drawings in one or more of their interviews to detect deception. Thirty-four of them (71%) used inconsistency to detect deception, and 14 (29%) did not.

Officers were also asked whether certain suspect characteristics may or may not assist suspects to eliminate statement inconsistency. Officers believed that criminal history (65%), intelligence (59%), personality (59%), age (49%), education level (45%), and language proficiency (45%), but not social class (23%), nationality (20%), race (17%), and gender (9%) could affect statement inconsistency. Categorisations of officers' elaborations on these responses are found in Table 6.

Discussion

Officers reported that they looked for contradictions more than any other type of inconsistency measure. This is not in line with research findings indicating that suspects rarely provide contradictory statements. It was interesting to find, however, that even though officers used the consistency heuristic, they seemed to believe that reminiscences are more likely to indicate truthfulness than deception. Officers' responses to open-ended questions may explain this finding. They considered that delay (time lapse between statements) may inadvertently reduce truth tellers' consistency. In fact, the only time truth tellers were thought to be inconsistent was between interviews (between-statement inconsistency). While some officers noted the effects of delay on forgetting information, others noted that truth tellers may add information in subsequent interviews. This is in line with research demonstrating that truth tellers may provide additional information in subsequent statements as they retrieve more memories (Cohen, 2001; Ewens et al., 2015; Fisher et al., 2009; Granhag & Strömwall, 2002).

Among inconsistency types, statement-evidence was the most frequently reported cue to deception. Officers believed that any form of decision-making is best substantiated by evidence. These results replicate previous findings on investigative practitioners' perceptions of valid methods to detect deception (Greuel, 1992; Park et al., 2002). Officers were also likely to look for within-group inconsistency when multiple suspects were involved in a case. However, not all officers agreed that within-group inconsistency is a valid cue to deception. Some found it difficult to assess, because deceptive group members

might rehearse together prior to the interview, have different motivations, or recall information differently.

Officers did not differ in their reliance on between-statement inconsistency and within-statement inconsistency, because they believed these to be the least useful types of inconsistency. Time lapse between statements and memory factors were thought to jeopardise the meaningfulness of between-statement inconsistency. Also, officers had divided views on whether liars or truth tellers tend to be more consistent across statements. This division in perception may be attributed to the 'repeat' counter-interrogation strategy employed by liars (*repeat versus reconstruct hypothesis*; Granhag & Strömwall, 1999).

Within-Statement inconsistency was thought to be the least useful, because liars would attempt to eliminate this type of inconsistency more than any other type. However, officers believed that when evidence is disclosed strategically, liars are more likely to change their statement to fit the evidence, ultimately increasing within-statement inconsistency and reducing statement-evidence inconsistency. Even though liars may eventually change their statement to be consistent with the evidence, they do not necessarily do this instantly (Granhag et al., 2015b; Luke et al., 2014). In two SUE studies, fewer than 25% of liars changed their statements, and statement-evidence inconsistency was found to be a more valid indicator in distinguishing liars from truth tellers (Granhag et al., 2015a; Granhag et al., 2013b). That is, liars were more likely to stick to their story when the evidence did not incriminate them. Nonetheless, in line with officers' beliefs, where within-statement inconsistency exists, the suspect is considered more likely to be deceptive than truthful (Granhag et al., 2015a; Granhag et al., 2013b).

Officers reported using a variety of evidence-based interview techniques such as the reverse order technique, the SUE technique, etc. They also considered drawings of alibi settings to be valuable investigative tools to assess inconsistencies with verbal statements and, to a lesser degree, with the evidence. In the presence of evidence, officers may compare suspects' verbal statements with the evidence and use the SUE technique, so drawings may not be necessary. In the absence of evidence, however, drawings may be a useful tool to detect deception by showing inconsistencies with suspects' verbal statements (Roos af Hjelmsäter et al., 2014; Vrij et al., 2009).

Most officers thought that suspects' previous experience of interviews (criminal history), intelligence, and manipulative personalities could improve suspects' ability to eliminate inconsistency. These variables have been empirically demonstrated to enhance deceptive behaviour (Granhag et al., 2004; Moston & Stephenson, 1992; also see Vrij, 2008). Approximately half the police officers also thought that age, education level, and language

proficiency were influential factors. They believed that young, older, and non-native suspects were most likely to be inconsistent. Research, however, does not generally support these assertions (Ewens et al., 2015; Roos af Hjelmsäter et al., 2014; Strömwall & Granhag, 2005); hence, officers are cautioned against overlooking successful attempts at deception. Finally, officers also thought that police interviewing style can affect a suspect's statement inconsistency. They were aware of problematic issues such as confirmation bias and the formulation of open-ended questions that do not match suspects' comprehension level, and they warned against them.

GENERAL DISCUSSION

One of the most frequently reported cues to deception in forensic settings is statement consistency, the degree to which suspects' statements include details that correspond with each other and/or with the available evidence (Granhag & Strömwall, 2001b; Granhag et al., 2003; Greuel, 1992). However, research on this topic is limited. Hence, the major goal of this thesis was to extend the literature on statement consistency by (a) testing interview techniques to elicit different types of consistency, (b) examining the effects of counter-interrogation strategies and familiarity with the reported event on different types of consistency, and (c) gaining a further understanding of the applied assessment of the consistency types assessed by police officers who follow an information-gathering approach to interviewing.

Overall, the thesis findings corroborate the effectiveness of various interview techniques that aim to elicit differences between liars and truth tellers for different types of statement consistency. The findings also advance knowledge regarding liars' use of counter-interrogation strategies and suspects' familiarity with the reported event, which seem to have a major effect on both liars' and truth tellers' statement consistency. Practitioner survey findings indicate that police officers' views about types of statement consistency generally mirror empirical findings.

In the next section, an overview of the thesis findings is provided in light of a theoretical framework to examine contextual factors that influenced statement consistency. The section that follows discusses how these contextual factors interact and affect statement consistency types. The next section presents the practical implications of the findings, and is followed by methodological and ethical considerations and future directions.

Dissecting the Findings: Contextual Factors Influencing Statement Consistency

Counter-Interrogation Strategies

Liars use a variety of counter-interrogation strategies to (a) make an honest impression on the interviewer to convince them of their innocence (DePaulo et al., 2003), (b) provide statements that are close to the truth (Strömwall & Willén, 2011), and/or (c) avoid making incriminating statements (Alison et al., 2014). These strategies are discussed below in light of the thesis findings and theoretical implications.

Making an Honest Impression on the Interviewer

Suspects attempt to convince the interviewer they are honest by changing their behaviour (DePaulo et al., 2003). Truth tellers are generally forthcoming, because they have nothing to hide and report the target event as they recall it from memory (Hartwig et al., 2007). In contrast, liars have a higher sense of deliberation, and they adopt counter-interrogation strategies that allow them to provide statements that appear forthcoming and honest (Granhag et al., 2015b; Strömwall & Willén, 2011). These strategies may be explained by the self-regulation theory (Baumeister & Alquist, 2009) and the repeat versus reconstruct hypothesis (Granhag & Strömwall, 1999).

According to the self-regulation theory, both liars and truth tellers attempt to make a positive impression on the interviewer, but they implement different strategies to achieve that goal (DePaulo et al., 2003; Granhag & Hartwig, 2008). In contrast to truth tellers who recall information from memory, liars predict what information the interviewer already has, anticipate techniques or interview questions, prepare and rehearse responses for the interview, repeat rehearsed information, keep their stories simple, provide information that is already known to the interviewer, withhold incriminating information, stay calm and relaxed, and maintain consistency (Alison et al., 2014; Clemens et al., 2013; Granhag et al., 2013a; Strömwall & Willén, 2011; Vrij et al., 2010c).

The repeat versus reconstruct hypothesis expands upon the self-regulation theory by explaining pre-interview factors and interview strategies that specifically affect liars' and truth tellers' statement consistency. Truth tellers encode the event along several dimensions, so when they recall the event, they tend to reconstruct it from memory each time they report it and may add new details as they occur to them (Cooper et al., 2013;

Tulving & Thomson, 1973). In contrast, liars who have not experienced the event, do not have a memory representation of it. However, they prepare and rehearse responses prior to the interview to be able to repeat them during the interview. Eventually, their statements become as consistent as, and in some cases more consistent than, truth tellers' statements (Granhag & Strömwall, 2002; Granhag et al., 2003; Strömwall & Granhag, 2005).

Liars' responses to the post-interview questionnaires in Studies I and II were in line with the self-regulation theory and the repeat versus reconstruct hypothesis. Liars reported using various counter-interrogation strategies including embedding lies, anticipating questions, preparing responses and convincing strategies, and maintaining statement consistency within interviews.

The counter-interrogation strategy of maintaining within-statement consistency is particularly relevant to this thesis and received support in Study I. Truth tellers reported two events honestly, whereas liars fabricated details about one event and told the truth about the other. In a first interview, participants provided a free recall about the two events, but in a second interview, they were asked either to provide another free recall or to respond to specific questions sequentially (about each event separately) or non-sequentially (about both events simultaneously). Overall, liars repeated fewer details than truth tellers in the second interview (between-statement consistency). However, liars repeated the same number of details when reporting about the truthful and the deceptive events, but truth tellers differed in the number of details they provided for each event (within-statement consistency).

The finding that liars had lower between-statement consistency than truth tellers, even when the same questions were asked in repeated interviews (free recall) may seem to negate the self-regulation theory and the repeat versus reconstruct hypothesis. However, the current results suggest that when liars are questioned about two events, they know they will eventually have to lie about one of them and hence run the risk of becoming less consistent across interviews. Accordingly, irrespective of the questions asked, liars opt to repeat fewer details for the truthful event to ultimately make their truthful and deceptive accounts equally consistent (within-statement consistency), although their overall accounts across interviews are then less consistent than those of truth tellers (between-statement consistency). This finding expands upon previous research demonstrating that liars rarely change their statements because they employ a withholding strategy while also maintaining within-statement consistency (Granhag et al., 2015a; Granhag et al., 2013b). The novel finding that liars who use embedded lies also maintain within-statement consistency between truthful and deceptive details is interesting, because it shows that even liars who

incorporate truths in their statements will employ counter-interrogation strategies and provide statements that differ from those of truth tellers.

In Study III, a counter-interrogation strategy that may be applied by criminals to make an honest impression on the interviewer was examined. The strategy involved getting acquainted with the interview technique to be able to counter it (Honts et al., 1996). Prior to committing a mock crime, half of the liars (informed liars) were informed they might be asked to draw the setting of their alibi during an interview. Half of the total participants spent 10 minutes at the alibi setting (high familiarity condition) while the other half spent 30 seconds there (low familiarity condition). Participants were then interviewed twice with different visuospatial tasks.

In line with the self-regulation theory, informed liars were more detailed in their statements (particularly on non-salient details) than uninformed liars and truth tellers. Informed liars prepared for the interview by looking closely at the alibi setting, so they were able to give detailed visuospatial statements about the alibi, and to make an honest impression on the interviewer without providing incriminating information, Nonetheless, informed liars, who exhibited high between-statement consistency (between the two visuospatial statements) and statement-evidence consistency (between the statements and the alibi) proportion scores, were not able to provide statements that were more consistent than those of truth tellers. Liars may have wanted to enhance their consistency scores through the number of details, but they failed to provide statements that were more consistent than those of truth tellers. This suggests that the adoption of counter-interrogation strategies led liars to provide more detailed statements, increasing the probability of error in their statements and an inability to recall the details in subsequent interviews. This finding is promising because it implies that liars are incapable of enhancing consistency even when they try to do so.

Study IV, which involved a survey examining police officers' perceptions of the types of statement (in)consistency, showed that officers were aware of liars' counter-interrogation strategies. Police officers reported that they believed that liars (a) prepare their statements prior to interviews (alone or with other suspects), and (b) attempt to maintain different types of consistency to make an honest impression during the interview. In line with findings from Study I, they believed that liars generally attempt to eliminate within-statement inconsistency. Hence, officers were least likely to look for this type of inconsistency and most likely to look for statement-evidence inconsistency in cases where evidence was available. That officers were determined in their use of evidence to assess inconsistency adds to previous findings showing that investigators use evidence and expect to obtain further evidence even when that may be relatively difficult (Nieuwkamp et al., 2016; Park et al., 2002).

In conclusion, the present research found support for the notion that liars employ a variety of counter-interrogation strategies to make an honest impression on the interviewer, but the results suggest that these strategies often come at the cost of one or more types of statement consistency.

Providing Statements that are Close to the Truth

Liars may provide statements that are close to the truth (embedded lies) to make the lie easier to tell and remember (Leins et al., 2013; Vrij et al., 2010a). Research indicates that liars who are as familiar as truth tellers with the reported event can provide equally detailed and consistent statements (Blandon-Gitlin et al., 2005; Warmelink et al., 2013). The effect of familiarity with the reported event on enhancing the quality of liars' reports was strongly supported in this thesis, so it will be discussed separately at a later stage in this section.

Liars may stay close to the truth to provide statements that resemble those of truth tellers, but to achieve this, liars need to have a strong understanding of truth tellers' metacognitive processes. They need to consider the content of their statements, such as the number and the precision of details as well as their consistency. In repeated interviews, liars typically repeat rehearsed responses (Granhag & Strömwall, 1999, 2002), indicating that they fail to consider that truth tellers reconstruct an event from memory and are not likely to be consistent when there is an interval between interviews. Similarly, liars do not typically consider the effect of a delay between the event and the interview on memory decay and forgetting; instead, they provide detailed and consistent statements (Harvey et al., 2017a; Vrij et al., 2009). Therefore, liars' metacognitive shortcomings prohibit them from providing statements similar to those of truth tellers, and it appears that they are more concerned about making an honest impression during the interview by being detailed and consistent. In line with these findings on liars' metacognition, Study I showed that liars, in contrast to truth tellers, exhibited more within-statement consistency and less between-statement consistency in their statements. Therefore, liars failed to consider that truth tellers would not be concerned about within-statement consistency and would display higher between-statement consistency.

Similarly, in Study II, liars failed to consider the effect of the Devil's Advocate approach on truth telling pairs' consistency. Participants were asked to provide arguments in support of (opinion-eliciting question) and opposing (devil's advocate question) their strong stated opinion. Pairs of liars were equally consistent with each other on both questions, while pairs of truth tellers were more consistent with each other on arguments that supported their opinions than on opposing arguments, although that seemed true only when they had prepared together for the interview. That is, truth tellers who prepared arguments for the

anticipated opinion-eliciting question (strongly encoded arguments) could repeat those arguments during the interview and hence be consistent about them. Truth tellers, however, did not to prepare arguments in response to the devil's advocate question, hence those arguments were poorly encoded and led to reduced consistency between pair members. The differences between liars and truth tellers thus indicate that liars did not accurately consider truth tellers' responses in similar contexts (i.e., truth tellers' poor encoding of arguments in response to the devil's advocate question).

Metacognitive shortcomings in liars were also observed in Study III. Informed liars provided more details than uninformed truth tellers, which meant that even though they provided statements that presumably made an honest impression on the interviewer, they failed to reflect accurately on how truth tellers would respond. In sum, the overall empirical findings replicate previous findings, demonstrating that liars (a) do not speculate about how truth tellers might have responded in a similar situation, and (b) do not necessarily provide similar statements to truth tellers, even when they stay close to the truth. Instead, liars seem to be more concerned about making an honest impression on the interviewer.

Finally, it is noteworthy to point out that police officers recruited for the survey study in Study IV were divided in their opinions about between-statement consistency as they reported that liars/truth tellers may become less consistent across interviews because of the malleable nature of memory. Although some officers were aware of memory effects, some did not consider the metacognitive shortcomings and counter-interrogation strategies employed by liars that prohibit them from providing statements similar to those of truth tellers. However, officers in general were cautious about the use of between-statement consistency as a cue to deception which is a promising finding as officers seem to rationally assess statement (in)consistency.

Evading Incriminating Statements

Some counter-interrogation strategies employed by liars involve adopting a passive approach during the interview and withholding information of any kind, incriminating and non-incriminating (Alison et al., 2014; Granhag et al., 2015b). This allows them to conceal the truth and to reduce the chances of their deception being detected in a detailed statement. These strategies are encouraged in the manuals of violent extremist groups, which advise members that if they are intercepted, their best strategy is to remain silent (Conflict Archive on the INternet, 2016; U.S. Department of Justice, 2002). The only study to analyse extremist suspects' counter-interrogation strategies revealed that such strategies include evading any form of reporting, remaining silent, refraining from looking at the interviewer, providing only rehearsed information, giving information the interviewer already knows,

and retracting previously reported information (Alison et al., 2014). Remaining silent is also exercised by criminals, particularly if they have experience of police interviews and/or if evidence against them is weak (Granhag et al., 2009; Moston & Engelberg, 2011; Moston & Stephenson, 1992).

Although liars may often exercise the counter-interrogation strategy of withholding information, research evidence has shown that they may shift their strategy and become more forthcoming if the interviewer strategically presents incriminating evidence (Granhag et al., 2013b) or if the interviewer invests time to build rapport with them and encourage them to cooperate (Alison, Alison, Noone, Elntib, & Christiansen, 2013; Evans et al., 2010; Kelly et al., 2013). Study III extended these findings by illustrating that liars may also provide information if they think it is adequately non-criminating. That is, liars use a withholding strategy only if they believe they would incriminate themselves, but when they can be forthcoming with non-incriminating information, they will report it.

These findings explain the verbal behaviour of extremist suspects in the study conducted by Alison and colleagues (2014). Extremist suspects repeated rehearsed information, reported about well-known information, and/or provided information but retracted it later. Although extremists appeared to employ a 'silent' strategy, they seemed to provide non-incriminating information for as long as this was possible. These counter-interrogation strategies are included in the *Manchester Manual* (U.S. Department of Justice, 2002), which encourages al Qaeda members to remain silent during interrogations, if they can, or if they cannot remain silent to provide only rehearsed responses and well-known information. Interestingly, the Manual acknowledges that apprehended members may provide a confession under the pressure of the interrogation, and so members in this situation are instructed to deny their confession at a later stage—which explains the retraction strategy in Alison and colleagues' study (2014).

This thesis advanced previous research on the various counter-interrogation strategies employed by liars to maintain consistency. However, counter-interrogations strategies do not always seem to work, and even when they are successful, they often come at the cost of one or more types of consistency. For example, liars who want to make an honest impression on the interviewer by maintaining within-statement consistency (between truthful and deceptive details) may damage their between-statement consistency. Also, liars who want to provide statements that are close to the truth passively reflect on truth tellers' metacognitive processes and may hence fail to provide statements that resemble those of truth tellers. Finally, liars avoid providing incriminating information, but they are likely to adopt a forthcoming strategy when they can report truthful accounts that they

assume will enable them to provide non-incriminating, detailed, and consistent statements, and accordingly, to make an honest impression on interviewers.

Familiarity with the Reported Event

Familiarity with the reported event enables liars to provide statements like those of truth tellers in terms of details and consistency (Blandon-Gitlin et al., 2005; Warmelink et al., 2013). This was corroborated by Study III with uninformed liars and truth tellers who were equally familiar with the alibi setting. Manipulation of the level of familiarity with the reported event also showed that the more familiar liars and truth tellers were with the reported event, the more detailed and consistent their statements were with the alibi setting. That is, in the context of alibis, suspects who spend a longer time at the alibi setting are more likely to remember it (including non-salient items in the setting), and they do so more accurately (statement-evidence consistency). These results match research findings in the spatial cognition literature that the more familiar individuals are with a spatial context, the better they perform on relevant visuospatial tasks because of their stronger and more vivid memory representation of the context (Prestopnik & Roskos-Ewoldsen, 2000). Hence, familiarity seems to make the lie easier for liars, which in turn enables them to provide statements similar to those of truth tellers.

Studies I and II advanced these findings, demonstrating that familiarity may affect both liars' and truth tellers' statements, and that in some instances, liars who are more familiar with the reported event than truth tellers may provide more consistent statements. In Study I, liars were not familiar with one of the reported events and had to lie about it, which reduced their between-statement consistency compared with truth tellers. However, in Study II, deceptive pairs were more familiar with arguments for the interview questions than were truth telling pairs, and so were more consistent with each other.

Taken together, these results extend previous findings regarding familiarity, and demonstrate that this factor is critical for both liars' and truth tellers' statement consistency. For example, a truth teller who happens to be at a restaurant on one occasion may not remember the setting later during an interview. However, another liar who uses the same restaurant as an alibi but who is a frequent visitor may better remember the setting and provide more consistent statements about it. On the other hand, when liars are as familiar as truth tellers with the reported event, they have an equivalent amount of information and memory representation of it, and are therefore subject to the same forgetting processes that truth tellers undergo. Ultimately, they will provide similar reports to those of truth tellers. Familiarity also seems to determine the extent to which liars are willing to be forthcoming about the reported event. If they are unfamiliar with the event, they will not be as

forthcoming about it as they would if they were more familiar with it. Hence, the more familiar liars (versus truth tellers) are with the reported event, the more likely they are to be forthcoming and to provide statements as consistent, if not more consistent, than truth tellers', regardless of the type of consistency.

Difficulty of Interview Questions

Lying in interview settings is more cognitively demanding than truth telling (Mann et al., 2002; Vrij et al., 1996, 2011). However, and as explained by the self-regulation theory and the repeat versus reconstruct hypothesis, liars employ various counter-interrogation strategies to reduce cognitive load, which eventually increases the difficulty of detecting their lies. Novel interview approaches have been introduced to make the interview setting more cognitively demanding for liars than for truth tellers and to compensate for liars' counter-interrogation strategies (Hartwig et al., 2005; Vrij et al., 2009). The interviews in this thesis extend previous work on these (active) interview approaches to elicit differences between liars and truth tellers.

Changing the report mode, question format (from a chronological to a reverse order narration), or interviewer across interviews have all been shown to enhance deception detection based on statement consistency (Leins et al., 2012; Shaw et al., 2014). Study I extended those findings by investigating suspect statement consistency when the question format was changed from free recall to specific questions. Responding to specific questions—compared with providing a free recall—is cognitively demanding for liars because it requires more specific responses (Hartwig et al., 2011). Hence, when questions were unexpectedly changed between interviews from a free recall to specific questions, the change in format exacerbated liars' strained cognitive resources. The inability to anticipate questions was also important in depleting liars' cognitive resources. That is, specific, non-sequentially ordered questions were less anticipated by liars than sequentially ordered questions, and increased their cognitive load, reducing between-statement consistency. For truth tellers, these changes and unanticipated, specific questions produced no differences in their responses, so the overall result was a difference between liars and truth tellers in the changed condition.

The Devil's Advocate approach (Study II) and visuospatial reports (Study III) were unanticipated and difficult for both liars and truth tellers. However, liars were equally or more consistent than truth tellers in those studies. Self-reports indicated that liars, who could respond truthfully to the devil's advocate question (Study II), found this question less difficult than truth tellers, so they were better able to be consistent in their responses to this question and to the anticipated opinion-eliciting question. Also, liars found the

visuospatial statements as difficult and unanticipated as truth tellers did (Study III), so they provided statements as consistent with the evidence as the truth tellers'. In those studies, familiarity with the reported event seemed to reduce the perceived difficulty of interview questions for liars and decreased their cognitive load, even if the questions were unanticipated.

These findings advance previous research into these two interview techniques. The finding by Leal and colleagues (2010) that liars, but not truth tellers, responded similarly to the interview questions of the Devil's Advocate approach was extended to pairs of suspects. Also, the current research demonstrates that the established effectiveness of visuospatial statements to detect deception (Vrij et al., 2010b, 2012b) does not apply when liars find interview questions equally or less difficult than truth tellers, except when liars are acquainted with the interview technique, in which case they tend to provide overly detailed statements.

In practical settings, police officers using an information-gathering approach (Study IV) seem to ask questions that increase the interview difficulty for deceptive suspects. Overall, the techniques officers implement follow a cognitive approach to interviewing, which may be a result of the training they receive on empirically-based interview techniques (Griffith & Milne, 2006). These techniques include asking for reverse order narrations and for visuospatial statements, both of which have been demonstrated to be effective in enhancing deception detection (Roos af Hjelmsäter et al., 2014; Vrij et al., 2009, 2012a). However, as the thesis findings demonstrate, officers should be aware of the importance of suspects' familiarity with the reported event when incorporating these components within the interview.

The effectiveness of increasing the difficulty of interview questions to elicit differences between liars and truth tellers has been corroborated in the present thesis. If the interview questions are more difficult for liars, they will be less consistent than truth tellers. In contrast, if the interview questions are more difficult for truth tellers than for liars (e.g., because truth tellers are unfamiliar with the reported event), truth tellers will be less consistent. However, when liars find the interview questions as difficult (and are as familiar with the reported event) as truth tellers, they will provide equally consistent statements. Therefore, there is no single direction in which liars' consistency is affected. Liars may be as consistent, more consistent, or less consistent than truth tellers, depending on their familiarity with the reported event and the interview questions asked. Accordingly, the context of the interview should be considered when assessing statement consistency.

Joining the Dots: Contextual Factors and Statement Consistency Types

Taken together, the overall results presented in this thesis corroborate previous findings that liars attempt to use various counter-interrogation strategies to create a positive impression on the interviewer (Alison et al., 2014; Clemens et al., 2013; Granhag et al., 2013a; Strömwall & Willén, 2011; Vrij et al., 2010c). Based on the thesis results, Figure 1 illustrates how these counter-interrogation strategies and other contextual factors may affect the ultimate outcome of liars' statement consistency. As Figure 1 shows, liars may be as consistent, more consistent, or less consistent than truth tellers, depending on the interplay between the contextual factors.

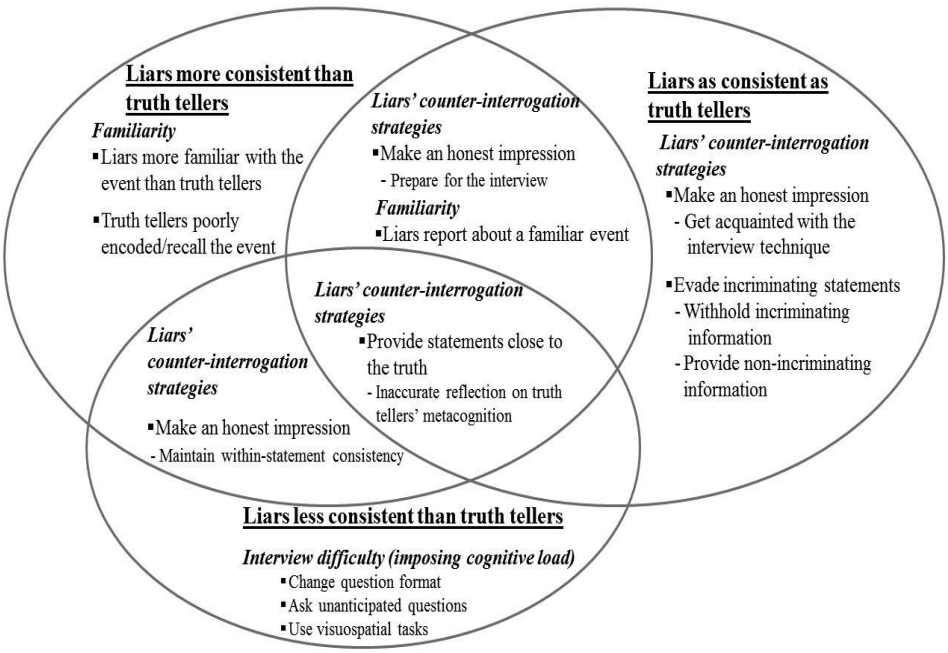

Figure 1. Factors contributing to liars' versus truth tellers' performance for all consistency types

Counter-interrogation strategies, shown in the circle on the right in Figure 1, such as obtaining information about the interview technique prior to the interview and/or providing non-incriminating information where possible, assist liars to provide statements that are as consistent as those of truth tellers. Although liars may strive to provide consistent statements, they may not achieve that if they provided a detailed statement. Also, as illustrated by the overlap between the left and right circles, liars who prepare for the interview and/or who are familiar with the reported event can provide statements that are at least as consistent as those of truth tellers.

Instances in which liars may succeed in providing overly consistent statements compared with truth tellers—as shown in the circle on the left—include situations in which truth tellers (a) are not as familiar as liars with the reported event (e.g., the Devil's Advocate approach), (b) have encoded the event poorly, or (c) have forgotten details about the event due to a long interval between the event and the interview. In other words, when liars are more familiar with the event than truth tellers and have prepared for the interview, they will be more consistent. Furthermore, liars may attempt to make an honest impression on the interviewer by maintaining within-statement consistency over any other type of consistency; thereby failing to consider that truth tellers may show low levels of within-statement consistency and higher levels of other consistency types. Maintaining within-statement consistency and inaccurately reflecting on truth-tellers' metacognitive processes, as illustrated in the overlapping part between the three circles, makes liars more consistent than truth-tellers within statements but less consistent on other consistency types. This overlapping part also demonstrates that liars who fail to consider the reconstructive nature of memory (Cooper et al., 2013; Tulving & Thomson, 1973), and rehearse and repeat details across interviews become as consistent as, but less inconsistent than, truth tellers (Granhag & Strömwall, 2002; Harvey, 2013; Harvey et al., 2017a). However, when (active) interview approaches are used with liars who report embedded or outright lies, the difficulty of the questions increases and liars' levels of at least one consistency type (other than within-statement consistency) decreases compared with truth tellers, even in cases where liars have prepared for the interview.

Figure 1 illustrates contextual factors that investigators need to look at to assess statement consistency types. The interaction of these contextual factors needs to be taken into account to make informed assessments of statement consistency. This recommendation is in line with that of Volbert and Steller (2014) to consider several contextual factors, other than cues to deception, related to the interview and to the reported event when assessing suspect veracity. The thesis results similarly invite investigators to consider contextual factors, namely, counter-interrogation strategies, familiarity with the reported event, and difficulty of interview questions to assess statement consistency types. Although these factors seem

to play a similar role in all consistency types, the effects of these factors on liars' and truth tellers' consistency types are outlined below in light of the thesis findings and previous research.

The Effects of Contextual Factors on Between-Statement Consistency

One of the most important counter-interrogation strategies relevant to the success of between-statement consistency is preparation. When liars prepare, they may repeat information and be consistent across interviews to make an honest impression on the interviewer (Granhag & Strömwall, 1999, 2002). This may not be true for truth tellers who have encoded the event poorly or if there has been a long interval between the recalled event and the interview. Hence, truth tellers' consistency may be more diminished than liars' as long as liars do not provide detailed statements that are difficult to recall in subsequent interviews.

Familiarity with the reported event is not a necessary precursor for liars to maintain between-statement consistency unless their cognitive load is increased (e.g., through changing the question format) during the interview (Leins et al., 2012). In such active approaches to interviewing, liars' between-statement consistency will suffer, because they are not cognitively flexible enough to adjust their responses to the unanticipated questions (Vrij et al., 2009, 2011). This is not a problem for truth tellers who are familiar with the reported event and hence have the cognitive resources necessary to report about it. Even if liars use embedded lies (Study I), that may not enhance their between-statement consistency if they give priority to increasing within-statement consistency and striking a balance between the truthful and the deceptive details. On the other hand, if liars are familiar with the event, they may overcome the difficulty of these questions and be as consistent as truth tellers with the event (Study III).

The Effects of Contextual Factors on Statement-Evidence Consistency

Liars need to be familiar with the evidence to be able to provide a statement that matches it. This is the only consistency type that requires liars to be familiar with the reported event or evidence to be consistent. Liars' experience of the alibi setting or possession of information about evidence the interviewer holds against them will play a pivotal role in their statement-evidence consistency (Granhag et al., 2013b). Liars will find it difficult to report about an event with which they have no experience, so if they suspect that evidence exists, they are likely to refrain from providing any information in an effort to avoid inconsistencies (Alison et al., 2014; Granhag et al., 2009). Truth tellers, however, do not

worry about the evidence as they will often have an explanation for it, and hence their statements are likely to be consistent with the evidence (Granhag et al., 2015b).

On the other hand, if liars are familiar with the reported event or evidence, this helps them to be consistent with the evidence (Granhag et al., 2013b; Hartwig et al., 2005) and to overcome cognitive demands that may be induced during the interview, as shown in Study III. When liars have prior knowledge of the interview technique, they may attempt to report salient and non-salient details in their statements to make an honest impression on the interviewer and to avoid providing incriminating information (although they fail to accurately reflect on potential deterioration in truth tellers' memories). This may lead them to make statements that include errors, albeit not more than those of truth tellers. Hence, although liars may intend to provide overly consistent statements, these errors will make it difficult for them to enhance their consistency.

The Effects of Contextual Factors on Within-Group Consistency

A key factor in maintaining within-group consistency is preparation (Granhag et al., 2003; Vrij et al., 2010c). Groups of liars have to prepare extensively for the interview to be consistent with each other; they have to anticipate interview questions and consider minute details they might need to provide during the interview. The more deceptive group members anticipate questions that will be asked, the more they will prepare and rehearse appropriate responses, and the more likely they will be consistent with each other (Chan & Bull, 2014). If they are all familiar with the reported event, that will also make the interview easier for them. Hence, as long as the interview is not difficult, deceptive group members will be consistent with each other.

This consistency entails, however, liars' failure to take truth tellers' metacognitive processes into consideration. Although truth tellers may also prepare, their strategies will differ, as shown in Study II. Truth tellers prepare less than liars, and they are not as concerned with appearing consistent (Granhag & Strömwall, 1999; 2002; Leins et al., 2012), so their consistency with the other group members may not be as high as that of groups of liars, particularly if their statements concern opinions rather than past events. Also, if truth tellers are not familiar with the reported event (Study II), they will not be able to maintain within-group consistency if they are asked cognitively demanding questions. However, if truth tellers are familiar with the reported event but liars are not, the use of difficult interview questions will reduce within-group consistency for liars more than for truth tellers (Roos af Hjelmsäter et al., 2014; Vrij et al., 2009).

The Effects of Contextual Factors on Within-Statement Consistency

Liars strive harder than truth tellers to maintain consistency within their statements and to make an honest impression during the interview (Granhag et al., 2015a, 2015b). They may reduce the amount of details in their statements to make it easier to maintain consistency (Study I). Truth tellers, however, report the event from memory and their statements are characterised by consistency unless they report about two events. Because they are not concerned about their consistency, truth tellers will not work towards maintaining it. Liars are not likely to change their within-statement consistency even if the interview is made more difficult, but that consistency often comes at the expense of another consistency type (e.g., between-statement consistency if different question formats are used, or statement-evidence consistency when the Strategic Use of Evidence technique is used; Granhag et al., 2015a).

Altogether, the cognitive flexibility of both liars and truth tellers depends on their familiarity with the reported event. When they are familiar with the event, they can demonstrate high consistency on all consistency types and overcome introduced difficulty in the interview. Truth tellers are not concerned about consistency, though, so they may not provide consistent statements. Also, when liars use counter-interrogation strategies and reflect inaccurately on truth tellers' statements, they may provide poorly or overly consistent statements that do not resemble those of truth tellers. Critically, within-statement consistency seems to be a unique consistency type, because it may negatively affect other consistency types when liars strive to maintain it.

Overall, it may be concluded that statement (in)consistency should not be associated with the act of deception. When the tasks are complex and demanding for liars, they will no longer have sufficient cognitive resources available to maintain consistency. Similarly, it might be difficult for truth tellers to provide consistent statements when they do not clearly recall the target event or when they need to report about more than one event.

Practical Implications

This thesis corroborates previous scholarly work (Granhag & Strömwall, 2002; Granhag et al., 2005; Greuel, 1992) suggesting that investigative practitioners' focus on contradictions to detect deception and their use of the consistency heuristic (the assumption

that consistency indicates truthfulness and inconsistency indicates deception) need to be adjusted. In line with previous research findings, contradictions rarely occurred, and repetitions were more useful indicators for assessing consistency (Fisher et al., 2009; Granhag & Strömwall, 2002; Leins et al., 2012; Shaw et al., 2014). These findings suggest that it is not enough for practitioners to look for inconsistency to detect deception, they may also need to look for consistency.

In Study IV, it was reiterated that police officers implementing an information-gathering approach were most likely to look for contradictions to detect deception. However, officers associated contradictions and omissions with deception, and repetitions and reminiscences with truthfulness. That means that even though officers seemed to generally use the consistency heuristic, their association of reminiscences with truthfulness mirrored empirical findings (Fisher et al., 2009; Granhag & Strömwall, 2002), and their application of cognitive approaches to interviewing indicates they did not employ this heuristic randomly. Nonetheless, it is recommended that investigators consider various contextual factors that may affect liars' and truth tellers' statement consistency. Investigators need to look at both context and possible differences between liars and truth tellers resulting from the context's task demands and cognitive load. That is, investigators need to check whether a liar may be familiar with the reported event, whether the suspect may be employing counter-interrogation strategies, and whether (active) cognitive approaches to interviewing will be effective in these circumstances. Stated differently, investigators need to consider that in some contexts, liars may be as or more consistent than truth tellers.

The thesis replicates previous findings (Greuel, 1992; Moston & Engelberg, 2011) on police officers' views of the importance of evidence in making decisions about suspects' veracity. Officers focused on statement-evidence consistency more than other types of consistency and stated they were reluctant to use other consistency types because they thought liars employed various counter-interrogation strategies (e.g., maintaining within-statement consistency, pre-interview preparation) to maintain these types. However, because physical evidence is often not available in actual cases (Innocence Project, 2016; Williamson et al., 2009), it is necessary for officers to use the different types of consistency. Therefore, officers may need to consider all consistency types simultaneously rather than separately when possible. Even though liars may maintain one type of consistency (e.g., within-statement consistency), that comes at the expense of other consistency types (e.g., between-statement consistency), so officers may weigh these consistency types against each other to detect deception. This is particularly helpful if there is a chance that liars may be familiar with the reported event. Hence, considering different types of consistency in addition to the context of the interview may enhance deception detection and provide more leads to resolving the case.

Practical Implications for Different Interview Contexts

The thesis tested specific interview techniques that may be implemented by investigators to increase the cognitive load on deceptive suspects, challenge their counter-interrogation strategies, and elicit differences between their statements and truth tellers' statements on different types of statement consistency. These interview techniques may be implemented in informant, immigration, and criminal interviews as discussed below.

Interviews with Informants

Informants provide investigators with intelligence about criminal or extremist networks (Harfield, 2012; Stabile, 2014). The nature of their work requires frequent interviews with investigators and may involve reporting about more than one event (Maguire & John, 1995). This intelligence may be truthful or partially deceitful; informants who do not want to provide new information to investigators tend to provide well-known or fabricated information along with truthful information (Miller, 2011; Rosenfeld et al., 2003). To detect whether informants are lying, investigators may change the question format across interviews. They may ask informants for a free recall of each event in the first interview, and specific, non-sequentially ordered (simultaneous) questions about the events in the second interview. Informants who are deceptive about at least one of the events may (a) provide few repetitions across interviews for the reported events, and (b) repeat the same number of details for each event. In contrast, informants who are truthful are likely to repeat as much information as possible about the events in subsequent interviews, and they are not likely to exhibit within-statement consistency. Hence, investigators are advised to look for maintained within-statement consistency and reduced between-statement consistency. However, it is critical that investigators do not assume the informant is deceptive based on this outcome; rather, if they suspect deception, they need to probe the informant further and collect more evidence to evaluate their hypotheses.

Interviews with Suspected Extremists

Immigration officers or officers at checkpoints may suspect that someone attempting to enter the country or pass the checkpoint holds violent extremist views, and they may conduct a screening interview to detect whether the suspect is lying. However, extremists are often prepared to evade interception for this kind of interview. Extremists affiliated with al Qaeda, for example, prepare responses to possible questions with their unit commander to provide false and/or already known information (Soufan, 2011; U.S. Department of Justice, 2002). The *Manchester Manual* includes typical questions asked at airports, checkpoints, or immigration settings and encourages members to rehearse

responses to these questions to appear honest to the interviewer. Hence, extremists are prepared to provide statements and arguments to cover their extreme views and goals. Extremists also uphold their group's extreme values and beliefs and refuse to take more moderate views into account due to confirmation bias (Horgan, 2014). They selectively attend to evidence that supports the group's ideology and ignore countering evidence. This confirmation bias strengthens their ideology, which ultimately assists them in providing supporting arguments where required (Borum, 2011).

Accordingly, when the Devil's Advocate approach is implemented with pairs of suspects, extremist suspects (liars) may be more consistent with each other than non-extremist suspects (truth tellers). Therefore, officers may need to look for consistency rather than inconsistency to detect deception in such a context. If future research corroborates our findings, pair members who repeat each other's arguments to interview questions may be suspected of lying.

Interviews with Criminal Suspects

When criminal suspects have an alibi, it is helpful to ask them to provide a visuospatial statement (e.g., drawing) of the alibi setting. Visuospatial statements are useful tools for detecting deception (Vrij et al., 2010b, 2012b), and they allow investigators to compare these statements with suspects' verbal statements for (in)consistencies (Study IV). However, liars often use familiar alibis (Culhane et al., 2008, 2013), which may make detecting deception difficult. To assess familiarity, investigators may look for statements that (a) include salient and non-salient details and (b) are consistent with the alibi setting (i.e., accurately placed objects within the visuospatial statement). The more detailed and consistent the statements, the more likely it is that suspects are familiar with the alibi setting. Because suspects differ in the extent to which they include details about familiar alibis, investigators may ask suspects to provide another visuospatial statement of a familiar setting (e.g., work setting) to compare the alibi statement and the familiar setting statement for (non-salient) details and consistency in an effort to assess the suspect's actual level of familiarity with the alibi setting.

When liars know about the visuospatial component before the interview, deception detection is enhanced, because liars' statements will be overly detailed. Because visuospatial statements are widely used in interviews (Dando et al., 2009a; Marlow & Hilbourne, 2011), criminals may come to know about this interview tool. Consequently, they may employ counter-interrogation strategies by preparing for the interview and studying the alibi setting to be able to provide a convincing statement. When investigators are not sure whether the suspect knows about this tool, they can inform the suspect in

advance that they may ask for a visuospatial statement of the alibi in a subsequent interview. This gives liars the opportunity to prepare for the interview and to visit the alibi setting to study it. Preparation is likely to result in overly detailed statements, particularly in terms of non-salient details. It is important, however, for future studies to examine the effect of these instructions on truth tellers before this strategy is implemented in practice.

Finally, it was demonstrated in Study IV that the police officers used evidence-based interviews, and held informed views regarding statement (in)consistency, implying that they would be willing to learn more about suspect behaviour and interview techniques. It may thus be important to improve their interview skills through more exposure to research, networking with academia, and training in contextual factors (e.g., familiarity, counter-interrogation strategies) and effective interview techniques to elicit statement (in)consistency. It is more effective to train officers in interview techniques that increase differences between liars and truth tellers than to train them in cues to deception (Hartwig & Bond, 2011; Volbert & Banse, 2014). This finding was corroborated in the thesis as the direction of statement (in)consistency differed for liars and truth tellers.

Officers may also combine various interview techniques that have been supported empirically to detect deception and/or to obtain further information from the suspect. For example, they might ask the suspect specific unanticipated questions followed by a request for a visuospatial statement. Other interview techniques include the reverse order technique (Vrij et al., 2012a), the inclusion of secondary tasks (Lancaster, Vrij, Hope, & Waller, 2013), and the Strategic Use of Evidence technique in cases where incriminating evidence exists (Granhag et al., 2013b).

In conclusion, investigators implementing information-gathering interviews generally tend to hold experience-based views about detecting deception through consistency types. Their experience with interviewing seems to have exposed them to suspects' and investigators' behaviours and metacognitive processes. The thesis findings suggest that investigators may also need to (a) consider factors that may affect suspect behaviour (e.g., familiarity with the reported event, counter-interrogation strategies, and interview techniques), and (b) shift their focus from statement-evidence consistency and contradictions to weighing all consistency types and measures against each other simultaneously, while considering the context and disregarding the consistency heuristic. Before any recommendations may be made, however, these findings should be replicated by other researchers in other labs and in applied settings.

Methodological Considerations

It is impossible for lab-based experiments to mirror the high stakes inherent in actual suspect situations, partly because of ethical considerations that prohibit researchers from imposing extreme emotions on participants, and partly because the consequences for a suspect in a forensic setting are more grave than for volunteers in a lab (Ekman, 1989; Levine & Parkinson, 2014). Students and university staff members recruited for the experimental studies in this thesis may therefore have reacted differently from actual suspects. However, a recent meta-analysis revealed that sample, motivation, and emotions showed no effect on deception detection (Hartwig & Bond, 2014). Also, criminals and violent extremists employ the same counter-interrogation strategies adopted by participants in the present thesis, including preparing for the interview, maintaining consistent behaviour when lying and when telling the truth, keeping the story simple, providing rehearsed or known information, staying calm and relaxed, and withholding incriminating information (Alison et al., 2014; Strömwall & Willén, 2011; U.S. Department of Justice, 2002).

In Study IV, a questionnaire was distributed to police officers. Questionnaires are self-report tools that may be influenced by (a) social desirability (Levine & Parkinson, 2014), and/or (b) inaccurate introspection (Nisbett & Wilson, 1977). With respect to social desirability, officers may have completed the questionnaire with favourable responses to be perceived positively. However, it has been argued that social desirability may be reduced by guaranteeing anonymity (Levine & Parkinson, 2014). Officers were assured anonymity and confidentiality in the informed consent form they read before starting the questionnaire. In addition, officers' ratings did not seem to show social desirability; for example, they indicated that they found it difficult to detect inconsistency types. They also justified their responses and provided examples from their own experience, which demonstrated that their intent was not to provide strategic (and desirable) responses. Finally, as the main aim of Study IV was to gain further understanding of how officers use each (in)consistency type, and the results allowed for such a comparison, the study purpose was fulfilled.

As for introspective processes, police officers may have not been able to accurately reflect on how they would react and think during an actual interview. Research into self-reports has shown that people draw on causal inferences and stereotypical views rather than on

memory to form judgements (Nisbett & Wilson, 1977). Hence, rather than providing responses that reflect how they had used consistency in previous interviews with suspects, officers may have used stereotypical views (i.e., heuristics) about deception detection to respond to questionnaire items. A prominent example is the consistency heuristic. If officers were inaccurate in their introspections about their behaviour during interviews, they would have responded by using this heuristic. However, their responses about reminiscences showed they did not use this heuristic randomly which suggests that they reflected on their memories of such interviews rather than on stereotypical views. Further, these study findings agreed with those from previous survey studies that investigated police officers' perceptions of suspects' statement consistency in other countries (Greuel, 1992; Strömwall & Granhag, 2003; Tekin et al., 2017) and those from experimental studies examining statement consistency (Granhag et al., 2015a; Mac Giolla & Granhag, 2015).

Ethical Considerations

Advertisements used to recruit participants did not announce the true purpose of the studies. This is customary in deception research (e.g., Leal et al., 2010; Vrij et al., 2009), because potential participants who know they will be lying or telling the truth may behave in a manner that does not reflect that of actual truth tellers/liars and hence bias the results. However, it was made clear during the informed consent process that participants could withdraw at any point during the experiment without any penalty, and all participants were debriefed immediately following the experiment with an opportunity to ask any questions and raise any concerns they may have had.

In Study II, which tested the Devil's Advocate approach, the practical value of the interview technique was to uncover extreme opinions of a violent nature. However, due to ethical concerns, questions about violent extremism could not be used and participants were asked about their biased opinions on social topics. The results of this study may have been more representative of extreme opinions in applied settings had questions about extremism been included.

Ethical concerns also pertain to applied settings. It is critical that investigators follow an ethical approach to interviewing to avoid confirmation bias. Investigators should not assume the guilt of a suspect based on perceived cues to deception or on an existent criminal record. Such assumptions may increase accusations on the part of investigators

which in turn elicit further anxious reactions from the suspect, ultimately confirming the investigators' biased presumptions (Meissner & Kassin, 2002; Moston & Engelberg, 2011). This may lead to a cycle of confirmation bias and eventually to false confessions (Kassin, 2015). It has been demonstrated in past research that an information-gathering approach to interviewing reduces confirmation bias and enhances deception detection (Kassin, 2015; Vrij et al., 2006c). Hence, investigators are advised to conduct interviews impartially using an (active) cognitive approach and to compare consistency types against each other, without presuming the suspect's guilt or deception and without using the consistency heuristic. Where investigators suspect deception, they need to probe further and to collect more evidence to make an informed decision. In further support of the advantages of the information-gathering interview, Study IV demonstrated that police officers who followed this approach to interviewing were aware of confirmation bias and warned against it themselves.

Future Directions

The experimental studies tested interview techniques applicable to discussions overheard by informants, false opinions expressed by pairs of suspects, and false alibis provided by criminals. Future studies might consider examining various scenarios. For example, mock informants might report a discussion or event they engaged in—rather than one they overheard—because that is more likely to mirror events that police informants report (Rosenfeld et al., 2003). To examine false opinions in suspects, groups of varying sizes might be tested using certain interview techniques that seem to have different effects on the statement consistency in groups of different sizes (Sooniste et al., 2016). Furthermore, since preparation contributed to truth tellers' within-group consistency when their opinions were examined with the Devil's Advocate approach, it is important for future studies to strategically manipulate preparation within the experimental design to understand differences in within-group consistency between liars and truth tellers who do and do not prepare. Finally, various alibi settings need to be examined because different suspects will have different alibis. Previous research has shown that individuals tend to use schema-consistent information to fill in memory gaps (Brewer & Treyens, 1981; Leins & Charman, 2016), so it would be interesting to examine consistency in statements about alibis for which people do not generally have a schematic representation, i.e. settings that people do not often visit.

Counter-interrogation strategies, familiarity with the reported event, and question difficulty contributed greatly to the results of the thesis. In future studies, the counter-interrogation strategy of maintaining within-statement consistency exercised by liars may be countered by increasing the difficulty of the interview questions (for example, by asking about three events). Also, as familiarity with the reported event has a major role in reducing deception detection, it is critical for researchers to examine interview techniques that may elicit differences between liars and truth tellers who are equally familiar with the reported event. This may be achieved by exploiting liars' inability to accurately reflect on truth tellers' metacognitive processes and by facilitating the opportunity for liars to score higher on statement consistency types than truth tellers. For example, the amount of needed (salient and non-salient) details in visuospatial statements may be manipulated to elicit differences in statement consistency types. Other methods to counter the effects of familiarity may include assessing different consistency types simultaneously when an active approach to interviewing is implemented or measuring the precision of details, since truth tellers are more precise in their verbal statements than liars who use embedded lies (Harvey, 2013).

Liars' characteristics that may contribute to their statement consistency may also be examined in future studies. Police officers recruited for the Study IV believed that criminal history, personality, and intelligence assisted suspects in eliminating statement inconsistency. The effects of these factors on statement consistency have not been tested, but they have been shown to impact deceptive behaviour. For example, outgoing people with manipulative personalities are better deceivers than other-oriented and shy people (Cherulnik et al., 1981; DePaulo & Rosenthal, 1979; Kashy & DePaulo, 1996; Vrij, 2008). Similarly, suspects with a criminal history who are experienced in interviewing are good at deceiving others (Granhag et al., 2004).

In addition, police officers believed that younger, elderly, and non-native suspects manifested more statement inconsistency than non-elderly adults and native suspects respectively. These results, however, are not corroborated in previous research, which found that children as young as three years are good at lying (Ceci & DeSimone Leichtman, 1992; Gongola et al., 2017) and that deceptive children and adolescents are as consistent as their truthful counterparts (Roos af Hjelmsäter et al., 2014; Strömwall & Granhag, 2005). Furthermore, deception studies in non-native speakers have revealed that truthful and deceptive suspects speaking a second language are as consistent as each other because they all need to manage the cognitive load imposed by the second language (Ewens et al., 2015). Different interview techniques may therefore be tested on liars and truth tellers with different characteristics to understand their effects on statement consistency types.

Finally, in order to generalise these results to the field, it is critical that researchers recruit criminals and/or extremists as participants. Also, investigators should be recruited for experiments involving mock crimes to explore how they would use each statement (in)consistency type to reach a decision about a suspects' credibility.

Conclusions

This thesis advances the scientific knowledge of (a) the manner in which officers following an information-gathering approach to interviewing use the consistency heuristic and different types of consistency, (b) the effectiveness of changing the question format and asking non-sequentially ordered questions about two events, (c) the effectiveness of employing the Devil's Advocate approach with pairs of suspects, (d) liars' counter-interrogation strategies that involve maintaining within-statement consistency between truthful and deceitful accounts, (e) contexts in which counter-interrogation strategies fail to produce statements similar to those of truth tellers, and (f) how familiarity with the reported event may enhance details and consistency in both liars' and truth tellers' statements and induce them to be more forthcoming.

The results also replicate previous findings by showing that (a) statement consistency is one of the most frequently used cues by investigative practitioners to detect deception, (b) active cognitive approaches to interviewing are effective in eliciting differences between liars and truth tellers, (c) liars employ a variety of counter-interrogation strategies, (d) liars hold inaccurate perceptions of truth tellers' metacognitive processes even when they tell embedded lies, and (e) liars who are familiar with the reported event can provide statements similar to those of truth tellers.

Multiple factors were found to affect the direction of change in liars' and truth tellers' statement consistency, because liars may be less, more, or equally consistent to truth tellers. These findings support previous calls by scholars (Granhag & Strömwall, 2002; Granhag et al., 2013b) to abandon the consistency heuristic and to weigh statement consistency types against each other to detect deception. The findings also add to these calls, emphasising the need to consider the overall effects of influential factors within the context of the interview.

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APPENDIX

Study I

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WILEY

RESEARCH ARTICLE

Suspects' consistency in statements concerning two events when different question formats are used

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Abstract

Lie detection research has typically focused on reports about a single event. However, in many forensic and security contexts, suspects are likely to report on several events, some of them may be untruthful. This presents interviewers with the challenge of detecting which reports are true and which are not. Varying question format in a second interview, we examined differences in liars' and truth-tellers' statement consistency about two events. One hundred and fifty participants viewed a meeting in which a noncritical and a critical event were discussed. Truth-tellers were instructed to be honest in their reports about both events, whereas liars had to lie about the critical event. In the first interview, all participants provided a free recall account. In a second interview, participants either gave another free recall account or responded to specific questions presented sequentially (concerning one event at a time) or nonsequentially (concerning both events simultaneously). Liars' accounts featured fewer repetitions than truth-tellers for both events, particularly in response to questions presented in nonsequential order. The implications for the use of this question format are discussed.

KEYWORDS

consistency, deception, multiple events, question format, sequential order

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1 | INTRODUCTION

Lie detection research has typically focused on reports about a single event. However, in many forensic and security contexts, investigators may interrogate suspects about more than one event. This may be especially the case with police informants who often offer multiple pieces of information, some of which may be unreliable (Harfield, 2012; Stabile, 2014). Informants may provide inaccurate information to receive rewards (e.g., money, legal status, or permanent residence permit), seek revenge from a competitor, or escape incarceration (Harfield, 2012; McGarrell, Freilich, & Chermak, 2007; Miller, 2011). In terrorist cases, informants may lie to investigators about the details of a planned terrorist attack or about a terrorist's identity (Greer, 1995; Stabile, 2014). Despite informants not always providing truthful information, investigators continue to use informants in criminal and terrorist cases as they are considered vital and cost-effective sources of information in unresolved cases (Innes, 2000; Maguire & John, 1995; Stabile, 2014). Hence, it is important to explore interrogation techniques that may assist law enforcement agencies to effectively distinguish between truthful and deceptive informants when an interview involves questioning about more than one event.

Consistency is frequently cited by investigators as the most useful cue for detecting lies in suspect statements (Strömwall & Granhag, 2003). In repeated statements, information is typically considered consistent if subsequent statements include many repetitions and few omissions (details provided in an earlier statement but not in a subsequent statement), reminiscences (details provided in a subsequent statement but not in an earlier statement), and/or contradictions (conflicting details across statements; Fisher, Brewer, & Mitchell, 2009; Granhag, Strömwall & Jonsson, 2003; Vredeveldt, van Koppen, & Granhag, 2014).

In an examination of truth-tellers' and liars' consistency across multiple interviews, Granhag, Strömwall, and colleagues found that when statements regarding a single event were repeated over time, liars were equally or more consistent than truth-tellers (e.g., Granhag & Strömwall, 2002; Granhag et al., 2003). These findings negate the consistency heuristic, which assumes that truth-tellers but not liars provide consistent statements (Strömwall & Granhag, 2003). Granhag and colleagues interpreted these findings in light of a 'repeat versus reconstruct' hypothesis. This hypothesis postulates that liars prepare and rehearse their responses before the first interview. When they are interviewed again, liars attempt to repeat those responses to maintain their statement consistency, which they assume gives an impression of honesty. In contrast, truth-tellers do not rely on rehearsing and repeating their responses but instead rely on their memory of the event. Therefore, truthful statements across interviews are less likely to appear consistent because, as a function of natural remembering, some information in a repeated interview may be different. For example, truth-tellers may add extra information (reminiscences) or forget some information (i.e., omissions; Fisher et al., 2009).

The rehearsal strategy used by liars may be counteracted by asking questions in a different format across interviews (Leins, Fisher, & Vrij, 2012). Liars should find it more difficult to respond to a changed question format, because they have not experienced or encoded the relevant event, so their statements are less likely to be consistent. To test this hypothesis, Leins et al. (2012) asked interviewees to respond in different modes, (either verbally or pictorially) across two interviews. Liars were less consistent (provided significantly fewer repetitions and more contradictions) than truth-tellers when they reported their statements in different modes but not when they reported their statements verbally or pictorially only; no significant differences were found between liars and truth-tellers for reminiscences and omissions. Leins and colleagues also explored the strategies participants used to appear credible during the interview. Eighty eight percent of the liars reported that they used consistency during the second interview, whereas only 42% of the truth-tellers reported using this strategy. Hence, even though liars attempted to maintain consistency, they failed to achieve that when the interview format was changed.

In another study, interviewees were asked to report an event in chronological order and then again in reverse order to the same or to a different interviewer (Shaw et al., 2014). Liars provided significantly fewer repetitions than truth-tellers but only when the interviewer was changed in the second interview. When this reverse order technique

was used with non-native speakers in the presence of an interpreter, liars repeated the same number of details but reminisced significantly fewer details than truth-tellers (Ewens, Vrij, Mann, & Leal, 2015).

These studies demonstrate that asking questions in a different format across repeated interviews about a single event decreases consistency in liars' statements but not in truth-tellers' statements. In this study, we devised a strategic questioning approach to assess consistency across statements when a suspect is interviewed about two or more events. Specifically, suspects were asked in the first interview to provide separate free recall accounts on witnessed discussions about a noncritical event and about a critical event. Truth-tellers were instructed to report both events truthfully, whereas liars were asked to tell the truth about the noncritical event and to lie about the critical event. This procedure simulated real-life scenarios in which deceptive informants report a mixture of true and false information so that their responses are believed by investigators (Maguire & John, 1995; Stabile, 2014). Informants typically strive to appear credible, so they may volunteer trivial information the investigator already knows (Rosenfeld, Jacobs, & Wright, 2003). To simulate this situation, we required liars in the current study to tell the truth about one of the events (the noncritical event that concerned less important information than the critical event and about which the interviewer was already informed).

In the second interview, participants were required to produce further free recall accounts for both events or were asked a series of specific questions for details of the events. Questions were asked either (a) separately about each event with the order of questioning following the order of the witnessed events (sequentially ordered questions), or (b) simultaneously about both events with the order of questioning not following the order of the witnessed event (nonsequentially ordered questions). In line with previous findings regarding change in question format, these specific questions were expected to decrease statement consistency for liars more than for truth-tellers. The free recall account would be easy for liars as they already provided the account in the first interview. Also, free recall accounts allow liars to be vague and evasive (Granhag & Strömwall, 1999; Hartwig et al., 2011). Specific questions, on the other hand, require suspects to provide specific responses (Evans & Fisher, 2011), which liars find more difficult than truth-tellers, particularly if liars have not experienced the event on which they are reporting. More precisely, the nonsequentially ordered questions were expected to disrupt reliance on sequentially rehearsed responses and to exhaust the cognitive resources of liars, which further increase the differences between liars' and truth-tellers' statement consistency.

We predicted that when liars tell the truth (i.e., discussing the noncritical event twice), they would be as consistent as truth-tellers in their statements. The predicted consistency in truth-tellers' statements is based on the eyewitness recall literature. Truthful witnesses tend to be more consistent when they are asked the same questions across interviews than when they are asked different questions (for an overview, see Fisher et al., 2009). Hence, we expected all participants recalling the noncritical event to be less consistent when they will be asked specific questions than when they will be asked to repeat a free recall. The nonsequentially ordered questions reflect a more drastic change in the interview format, so we expected participants in the nonsequentially ordered questions condition to be the least consistent and those in the free recall condition to be the most consistent when reporting about the noncritical event (Hypothesis 1).

As for the critical event about which liars provided false information, we predicted that liars and truth-tellers would not differ significantly with respect to statement consistency when they are asked questions in the same format in both interviews (i.e., free recall), because all participants had the chance to prepare their statements prior to the interviews. When questions are asked in a different format, liars can no longer use the rehearsed responses or repeat responses they provided in a previous interview (for a review, see Fisher, Vrij, & Leins, 2013). Hence, we expected liars to become significantly less consistent than truth-tellers when reporting about the critical event if the question format is changed between the interviews, particularly when the question format in the second interview is dramatically different to that in the first interview (i.e., in the nonsequentially ordered questions condition; Hypothesis 2).

We examined within-subjects differences among liars and truth-tellers. We expected truth-tellers' performance on consistency to be the same for the critical and noncritical events. As lying is more cognitively demanding than

truth-telling (Vrij, 2008), we expected liars to be less consistent when they will lie about the critical event than when they will tell the truth about the noncritical event (Hypothesis 3).

We were also interested in examining the strategies that suspects use when reporting about two events to convince the interviewer that their statement is credible. When interviewed multiple times, liars typically attempt to maintain consistency to appear credible (Leins et al., 2012). Hence, we predicted that liars would be more likely than truth-tellers to report using consistency across interviews for both events as a strategy to convince the interviewer of their responses (Hypothesis 4).

2 | METHOD

2.1 | Participants and design

One-hundred fifty participants (68 males, 82 females, M_{age} = 25.3 years, SD_{age} = 8.86) were recruited through the departmental participant pool and announcements posted in the university buildings, via email and on the university intranet. Participants received a reward of either a participation credit or £5 for taking part in the research.

A 2 (veracity [truth-teller, liar]) × 3 (second interview question format [free recall, sequentially ordered, nonsequentially ordered]) between-subjects design was used. The dependent variables were the number of repetitions, reminiscences, and contradictions reported across both interviews for both critical and noncritical events. The number of omissions may be deduced from repetitions as fewer repetitions means more omissions. Participants were randomly assigned to the veracity conditions (75 participants in each condition) and to the second interview question format conditions (50 participants in each condition).

2.2 | Materials

A video of a 4-min Skype meeting was produced for the study. The meeting was between three undercover agents named "Chief," "Tiger," and "Bird." Each of them was given certain character features that were evident in their discussion: Chief made the decisions, Bird complained about those decisions, and Tiger was the enthusiastic agent who often criticized Bird. The agents had two discussions about two separate events. The Skype meeting started with the agents discussing a noncritical event about a field trip to Prague to meet and collaborate with Czech agents. Then, they discussed a critical event about a potential terrorist attack in London. This discussion involved an exchange about how to plant a spying device in the workplace of the suspected terrorist under the guise of presenting a workshop.

2.3 | Procedure

After participants signed the informed consent form, they were instructed to imagine that they worked as undercover agents for an intelligence agency and that they were authorized to view a confidential Skype meeting between three undercover agents who work for the agency. They had to pay attention to everything in the meeting as they were to be interviewed about the meeting afterwards. The experimenter waited outside the room while the participants viewed the meeting video. Participants were then randomly assigned to either the truth-teller or liar condition. Truth-tellers read on the computer screen that there was a spy working in the agency, and this alleged spy aimed to protect the terrorist and stop the three agents from tracking him. As the agency suspected that the spy was able to trace the online meeting, the participant was to be interviewed to know what information might have leaked. Therefore, participants needed to report everything that happened as honestly as possible so that the interviewer would not conclude they were hiding relevant information.

Liars read similar instructions, but they were informed that they would be interviewed by the alleged spy. The agency wanted to check if the alleged spy would act on any information the participant might reveal. If the alleged spy acted on that information, it would be clear that this person works for the terrorist. Hence, participants had to convince the alleged spy they were telling the truth in the following manner: They were to give an honest impression by telling the truth about

the first (noncritical) event about Prague, which the spy knew about and which was not considered to include significant information. The second (critical) event, however, included very sensitive information, so they had to lie about it. As the alleged spy might possess information that the agents were trying to track the suspected terrorist, participants were asked to discuss the spying device but not to reveal the true details regarding how and where it will be planted. Therefore, they needed to fabricate another story in which the spying device would be planted elsewhere. We instructed liars which event to lie about so that all liars' stories would be similar (as would be the case for all truth-tellers' stories). Moreover, these instructions helped liars to fabricate a "believable lie."

After participants read the instructions, the experimenter verbally clarified the instructions, and reiterated that, to receive the reward, participants needed to convince the interviewer they are being honest. This instruction has been used in many lie detection studies to simulate motivation in real suspect interviews by prompting interviewees, especially liars, to try to convince the interviewer that they are being truthful (e.g., Vrij et al., 2009). Participants were given as much time as they needed to prepare for the interview.

One of four interviewers, blind to the participants' veracity condition and to the study hypotheses, interviewed the participants. In the first interview, all participants were asked to give a detailed free recall about what each of the agents said concerning the noncritical event followed by another request to give a free recall about what each agent said concerning the critical event. This request for a free recall account simulates the information-gathering approach used by investigators (Vrij, Granhag, & Porter, 2010). At the end of this interview, participants were asked to think back and to try and remember any details they might have missed. After participants provided their statements, the interviewer gave them a crossword puzzle to complete and apologized for having to leave the room. Participants worked on this filler task for 10 min.

Afterwards, the same interviewer conducted the second interview in which participants were randomly assigned to the free recall condition, sequentially ordered questions condition, or nonsequentially ordered questions condition. Those in the free recall condition were again asked to freely recall as much as they could about each discussed event. Participants in the sequentially ordered questions condition were asked questions about what each of the agents said in the noncritical event followed by the same questions about the critical event. Participants in the nonsequentially ordered questions condition responded to questions alternating between the critical and noncritical events (See *Appendix* for the questions asked). At the end of this interview, all participants were prompted to think back and to try and remember any details they might have missed.

Participants then completed a post-interview questionnaire that assessed their motivation to convince the interviewer of their responses on a 7-point Likert scale (1 = *not motivated at all* to 7 = *very motivated*). They also responded to an open-ended question on the strategy they used to make their responses credible across interviews. Participants were then fully debriefed and thanked.

2.4 | Coding

All interviews were transcribed and then coded by one rater. Every noun, verb, adjective, or adverb that interviewees used to describe what an agent said was marked as a single detail. These details were categorized for each agent such that each detail referred to one of the agents. For example, the statement "the Chief was telling them that the terrorist's brother works on a train" contains five details (Chief, terrorist, brother, works, and train) that are ascribed to the agent Chief. All details mentioned more than once, including the agents' names, were coded only once in any single interview. When it was not clear to which agent the details referred to, the details were coded as "unspecified" details. Details repeated in the second interview were coded as repetitions, details that were mentioned in the first interview but not in the second interview were coded as omissions, details that were mentioned in the second interview but not in the first interview were coded as reminiscences, and details in the second interview that contradicted relevant details in the first interview were coded as contradictions.

A second rater blind to the experimental conditions and to the study hypotheses coded the responses of 24 participants (20% of the total sample). The rater started by coding interviews with four participants, and disagreements with the first rater were discussed and resolved. Then, the rater coded the responses of the remaining 20 participants.

An inter-rater reliability analysis revealed that the intra-class correlations (*ICC*) were .97 for repetitions, .92 for omissions, .85 for reminiscences, and .57 for contradictions.

We were interested in liars' strategies when they report truthful and false information about separate events. Hence, two raters coded participants' responses to the post-interview question on the strategy they used to appear credible during the interview. Strategies were coded into general categories, which were data driven (i.e., not predetermined).

Truth-tellers' responses were categorized into five categories, and liars' responses were categorized into six categories. The categories that emerged for truth-tellers were (a) providing details (e.g., "I tried to include as much information as possible"), (b) being honest (e.g., "I just told the truth about what I have seen"), (c) reporting in chronological order (e.g., "I tried to remember everything in sequence"), (d) using memory-enhancement strategies (e.g., "I put myself in the agent's position to be able to connect the information"), and (e) maintaining consistency (e.g., "I tried to be consisted in the information I delivered").

For liars, the categories that emerged were (a) maintaining consistency (e.g., "I hesitated when asked about the trip to Prague so that if I hesitated when asked about the spy mission, it might not sound so obviously different to the usual way in which I answered questions"), (b) appearing truthful (e.g., "I tried to keep some details that were in the actual discussion"), (c) providing details (e.g., "I gave as many details and reasons as possible for the agents' actions"), (d) keeping the story simple (e.g., "Don't over explain things; try to keep it easy to remember"), and (e) rehearsing (e.g., "I practiced what I thought the conversation would be before going into the interview"). The sixth category labeled "Other" included strategies that did not fit into the other five categories and that were reported by fewer than four participants (e.g., "Look him to the eye"). A second rater allocated the responses to these categories. Inter-rater reliability was high (*ICC* = .84). Disagreements between the raters were discussed and resolved.

3 | RESULTS

A manipulation check revealed that participants were highly motivated to convince the interviewer that they were telling the truth ($M = 5.56$, $SD = 1.23$, on a 7-point Likert scale). A two-way analysis of variance (ANOVA) with veracity and second interview question format as the independent variables and rated motivation as the dependent variable did not reveal significant differences between truth-tellers ($M = 5.72$, $SD = 1.11$) and liars ($M = 5.40$, $SD = 1.34$), $F(1,144) = 2.54$, $p = .113$, $d = 0.26$, 95% confidence interval (CI) [0.07, 0.46]. Similarly, motivation was not significantly different between participants in the free recall condition ($M = 5.34$, $SD = 1.22$), in the sequentially ordered questions condition ($M = 5.72$, $SD = 1.23$), and in the non-sequentially ordered questions condition ($M = 5.62$, $SD = 1.24$), $F(2,144) = 1.28$, $p = .28$, Cohen's $f = .14$.

3.1 | Hypotheses testing

Contradictions and reminiscences[1] did not occur frequently enough to be analyzed, as shown in Table 1. Hence, we could not analyze contradictions and reminiscences, so the relevant hypotheses could not be tested, and we only report the results for repetitions.

The number of details provided at Interview 1 may have affected the number of repetitions at Interview 2. That is, the more details provided at Interview 1, the more opportunities for repetitions to occur. Hence, we calculated the repetitions proportion scores (number of repetitions for the critical or the noncritical event at Interview 2/number of details for the critical or the noncritical event at Interview 1) to take into account the number of details at Interview 1. The average

[1]Reminiscences comprised only 11% of the total number of details for the critical and noncritical events. When we ran an ANOVA with veracity and second interview question format as the independent variables and reminiscences for each of the critical and noncritical events as the dependent variable, we found significant main effects for veracity and second interview question format on reminiscences regarding the noncritical event but not regarding the critical event. We believe that these results are due to the small number of reminiscences. The veracity main effect regarding the noncritical event revealed that participants in the truth-telling condition provided more reminiscences than those in the lying condition, F (1, 144) = 5.74, $p = .018$. As for question format regarding the noncritical event, the nonsequentially ordered questions produced significantly more reminiscences than the sequentially ordered questions and the free recall, F (2, 144) = 5.15, $p = .007$.

TABLE 1 Means and standard deviations of the dependent variables for the noncritical and critical events

	Truth		Lie	
	M	*SD*	*M*	*SD*
Noncritical event				
Repetitions	26.92	9.95	20.84	9.61
Omissions	6.40	4.03	6.64	3.95
Reminiscences	4.87	2.17	2.67	1.28
Contradictions	0.20	0.46	0.21	0.44
Critical event				
Repetitions	32.13	10.66	22.80	9.85
Omissions	10.91	6.43	13.84	7.35
Reminiscences	3.38	1.25	4.24	2.15
Contradictions	0.32	0.61	0.48	0.76

number of details provided at Interview 1 regarding the noncritical event was 33.75 (*SD* = 10.80) for truth-tellers and 27.95 (*SD* = 9.84) for liars. As for the critical event, truth-tellers provided an average of 43.65 Details (*SD* = 12.46), whereas liars provided an average of 37.48 Details (*SD* = 14.11) at Interview 1. Analyses using the repetitions proportion scores yielded similar results as the analyses using raw frequencies. We report the data for the raw frequencies because they are more informative. Also, the proportion scores can be inferred from these scores**.** The analyses for the critical and the noncritical events are presented separately, because liars only lied about the critical event (they told the truth about the noncritical event).

3.1.1 | Noncritical event

We conducted a 2 (veracity) × 3 (second interview question format) ANOVA on the noncritical event data with the number of repetitions between the first free recall interview and the second interview as the dependent variable. Veracity, $F(1, 144) = 15.25$, $p < .001$, Cohen's $f = .31$, and second interview question format, $F(2, 144) = 5.80$, $p = .004$, Cohen's $f = .27$, showed a significant main effect, but no interaction effect emerged, $F(2, 144) = 0.06$, $p = .942$, Cohen's $f = .03$. As Table 2 shows, liars unexpectedly provided fewer repetitions than truth-tellers, $d = 0.62$, 95% CI [0.29, 0.95].

Planned comparisons revealed that the nonsequentially ordered questions ($M = 21.22$, $SD = 8.22$) elicited significantly fewer repetitions than the free recall ($M = 27.50$, $SD = 11.93$), $t(98) = 3.07$, $p = .003$, $d = 0.61$, 95% CI [0.21, 1.01]. The sequentially ordered questions ($M = 22.92$, $SD = 9.27$) did not elicit a significantly different number of repetitions than the non-sequentially ordered questions, $t(98) = 0.97$, $p = .334$, $d = 0.19$, 95% CI [−0.20, 0.59], or the free recall, $t(98) = 2.14$, $p = .053$, $d = 0.43$, 95% CI [0.03, 0.83]. These findings on the second interview question format are in line with Hypothesis 1, which predicted that statement consistency will be lowest in the nonsequentially ordered questions condition and highest in the free recall condition.

3.1.2 | Critical event

A 2 (veracity) × 3 (second interview question format) ANOVA on the critical event data, with the number of repetitions as the dependent variable, revealed a significant main effect for veracity, $F(1, 144) = 32.85$, $p < .001$, Cohen's $f = .46$, and for second interview question format, $F(2, 144) = 5.50$, $p = .005$, Cohen's $f = .25$. As Table 2 shows, truth-tellers provided significantly more repetitions than liars, $d = 0.91$, 95% CI [0.57, 1.25].

Regarding the second interview question format main effect, planned comparisons revealed that non-sequentially ordered questions ($M = 24.72$, $SD = 10.32$) elicited significantly fewer repetitions than the free recall ($M = 31.14$, $SD = 13.15$), $t(98) = 2.72$, $p = .008$, $d = 0.54$, 95% CI [0.14, 0.94]. The sequentially ordered questions ($M = 26.54$, $SD = 9.13$) did not elicit a significantly different number of repetitions than the nonsequentially ordered questions, $t(98) = 0.93$, $p = .352$, $d = 0.19$, 95% CI [−0.21, 0.58], or the free recall, $t(98) = 2.03$, $p = .068$, $d = 0.41$, 95% CI [0.01, 0.80].

No interaction effect emerged between veracity and second interview question format, $F(2,144) = 0.90$, $p = .409$, Cohen's $f = .10$. However, this interaction effect was not an appropriate test for Hypothesis 2, because the interaction

TABLE 2 Repetitions for the noncritical and critical events as a function of veracity and second interview question format

	Truth		Lie				
	M	*SD*	*M*	*SD*	*F*	*p*	*d* [95% CI]
Noncritical event							
Repetitions							
Free recall	30.88	10.80	24.12	12.25	4.28	.044	0.59 [0.02, 1.15]
Sequential	25.64	9.66	20.20	8.17	4.63	.037	0.61 [0.04, 1.18]
Nonsequential	24.24	8.36	18.20	6.99	7.68	.008	0.78 [0.21, 1.36]
Total	26.92	9.95	20.84	9.61	15.25	<.001	0.62 [0.29, 0.95]
Critical event							
Repetitions							
Free recall	35.40	12.79	26.88	12.31	5.76	.02	0.68 [0.11, 1.25]
Sequential	30.12	9.32	22.96	7.52	8.94	.004	0.85 [0.27, 1.42]
Nonsequential	30.88	9.12	18.56	7.42	27.46	<.001	1.48 [0.86, 2.11]
Total	32.13	10.66	22.80	9.85	32.85	<.001	0.91 [0.57, 1.25]

statistic (p = .409) may refer to any type of interaction. As we predicted a directional effect with specific group differences based on evidence from previous studies, a more informative test of Hypothesis 2 is to statistically test for significant differences between truth-tellers and liars in each of the three experimental conditions and to compare the groups' effect sizes to understand the magnitude of differences in each of the three truth–lie comparisons (for a review on the importance of effect sizes compared with significant effects, see du Prel, Hommel, Röhrig, & Blettner, 2009; Fritz, Morris & Richler, 2012). The larger the magnitude, the easier it is for investigators to spot the differences between liars and truth-tellers. Hence, for our study, the magnitude of the effects plays a more important role than the significance of the effects.

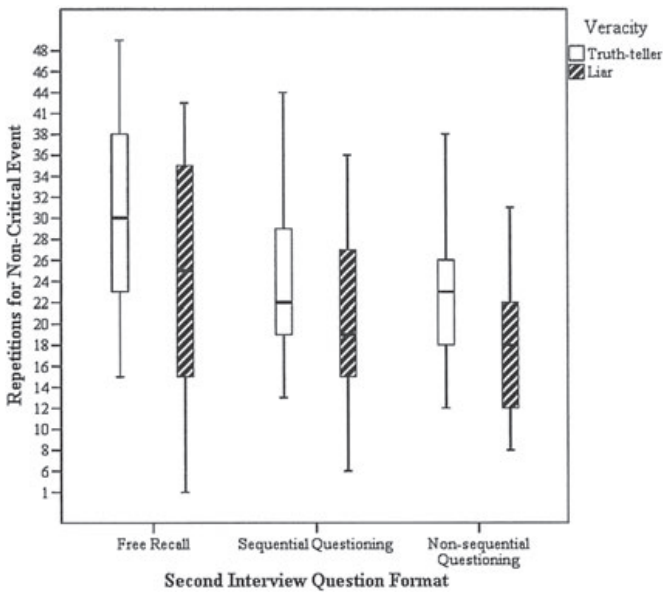

FIGURE 1 Comparison of the number of repetitions provided by truth-tellers and liars in each of the question format conditions for the noncritical event

Univariate analyses that compared liars and truth-tellers in each question format condition were conducted. The results are presented in Table 2. The truth–lie differences were significant in all three comparisons, particularly in the nonsequentially ordered questions condition, d = 1.48, 95% CI [0.86, 2.11], *PS* = 85. The effect size for Cohen's d may be small (.20), medium (.50), or large (.80; Cohen, 1992). The effect size for this condition was very large, so the differences between liars and truth-tellers could be more easily detected in this condition compared with the sequentially ordered questions condition, d = 0.85, 95% CI [0.27, 1.42], *PS* = 75, and to the free recall condition, d = 0.68, 95% CI [0.11, 1.25], *PS* = 68. The sequentially ordered questions condition and the free recall condition also showed a large effect, but not as large as the nonsequentially ordered questions condition. Moreover, the lower CI limit of the effect size of nonsequentially ordered questions condition was far from zero and considerably higher than the two other question format conditions, which further corroborates our findings. Also in line with this finding, the probability of superiority *(PS)* or "the percentage of occasions when a randomly sampled member of the distribution with the higher mean will have a higher score than a randomly sampled member of the other distribution" (Fritz et al., 2012, p. 8) was larger for the nonsequentially ordered questions condition compared with the two other question format conditions. Figure 2 further shows that liars' scores in the nonsequentially ordered questions condition were lower than liars' scores in the other conditions and also substantially lower than truth-tellers' scores in the nonsequentially ordered questions condition. These results supported Hypothesis 2, which posited that differences in statement consistency between liars and truth-tellers would be most pronounced in the nonsequentially ordered questions condition and least pronounced in the free recall condition.

We conducted a follow-up discriminant analysis with the veracity groups as the classifying variable and repetitions for the critical event as the independent variable to understand how accurately nonsequentially ordered questions could classify liars and truth-tellers based on repetitions. The analysis revealed that 84% of liars and 72% of truth-tellers could be classified correctly by the non-sequentially ordered questions, $\chi 2(1) = 21.49$, Wilk's Lambda =0.64, $p < .001$, which is more than could be classified correctly by the sequentially ordered questions (72% of liars and 68% of truth-tellers) and the free recall (68% of liars and 48% of truth-tellers).

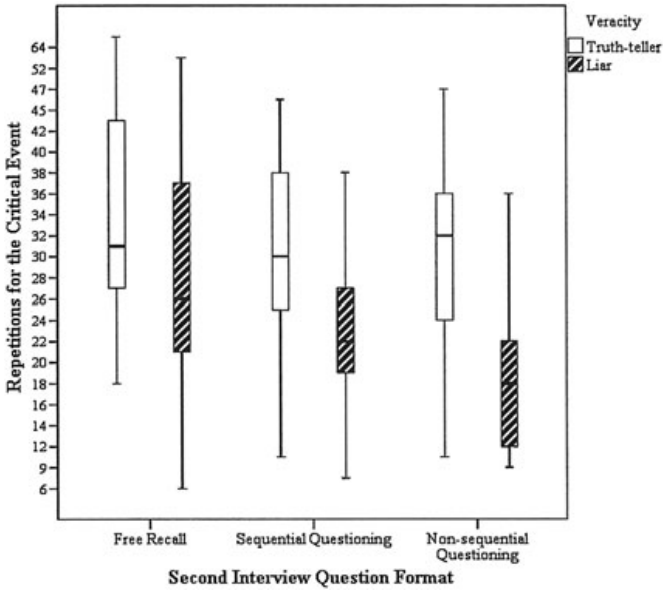

FIGURE 2 Comparison of the number of repetitions provided by truth-tellers and liars in each of the question format conditions for the critical event

3.1.3 | Comparing repetitions for the critical and noncritical events among liars and truth-tellers

We ran separate within-subjects ANOVAs for liars and truth-tellers with event (noncritical, critical) as the independent variable and repetitions as the dependent variable to compare repetitions for the noncritical and critical events within each veracity group. Truth-tellers provided more repetitions when they reported about the critical event than when they reported about the noncritical event, $F(1, 74) = 26.42$, $p < .001$, $d = 0.51$, 95% CI [0.18, 0.83]. Liars' repetitions for the critical and the noncritical events were not significantly different, $F(1, 74) = 3.51$, $p = .065$, $d = 0.20$, 95% CI [−0.12, 0.52]. Thus, Hypothesis 3, which postulated that liars would be less consistent when they report about the critical event than when they report about the noncritical event, was not supported.

3.1.4 | Reported strategies

Table 3 shows the frequency of occurrence of each strategy used by liars and truth-tellers. More than half of the truth-tellers attempted to provide as many details as they could to convince the interviewer they were innocent. We were particularly interested in the "consistency strategy." This strategy was reported by only 8% of truth-tellers. Among liars, this was the most frequently reported strategy with 45% of liars reporting having used that strategy. This indicates that half of the liars responded according to the consistency heuristic and attempted to remain consistent across interviews for each event as well as across events so that the interviewer believes they are truthful. The consistency strategy was used significantly more by liars than by than truth-tellers, $\chi 2\ (7) = 138.99$, $p < .001$, *Cramer's* V = .778, which supported Hypothesis 4.

4 | DISCUSSION

This study examined whether asking questions in a nonsequential order about two events would elicit cues to deceit in terms of statement consistency. All participants told the truth about a noncritical event, but liars had to fabricate new details about a critical event. Across interviews, truth-tellers repeated more details than liars for the critical event. We predicted that for the critical event the differences in repetitions between liars and truth-tellers would be most

TABLE 3 Frequency and percentage of occurrence of strategies used by truth-tellers and liars to convince the interviewer of their responses

Category	Frequency	Percentage (%)
Truth-tellers		
Providing details	38	51
Being honest	24	32
Reporting in chronological order	12	16
Using memory enhancement strategies	9	12
Maintaining consistency	6	8
Liars		
Maintaining consistency	34	45
Staying close to the truth	24	32
Providing as many details as possible	13	17
Keeping the story simple	8	11
Rehearsing the lie	4	5
Other	6	8

Note. The percentages are calculated for truth-tellers and liars separately. The total exceeds 100% for each group because each participant could contribute to more than one category.

pronounced in the nonsequentially ordered questions condition and least pronounced in the free recall condition. Hence, we were interested in the magnitude of the difference between truth-tellers' and liars' repetitions in each of the question format conditions. Our results revealed that truth-tellers repeated more details than liars across all question format conditions, but the nonsequentially ordered questions revealed the highest effect size (d = 1.48) compared with the sequentially ordered questions and the free recall. This is in line with previous research on lie detection, which demonstrated that liars become less consistent than truth-tellers when a change in question format is introduced in the interview (e.g., Leins et al., 2012; Shaw et al., 2014).

The discriminant analysis corroborated these findings. Nonsequentially ordered questions showed the highest correct classification rate (78%) compared with the other two question formats. Hence, asking nonsequentially ordered questions in a second interview is a better strategy in reducing liars' consistency and in accurately classifying liars and truth-tellers than asking sequentially ordered questions or requesting a free recall.

Interestingly, liars (who were asked to lie about the critical event but to tell the truth about the noncritical event) repeated fewer details than truth-tellers for the noncritical event. This is in contrast with our prediction that liars would perform the same as truth-tellers when they truthfully report about the noncritical event. It might be that liars were cognitively loaded because they had to recall two events and—unlike truth-tellers—lie about one of the events. It is possible that liars' cognitive resources are depleted when they have to lie about one of the events, and as a result, it becomes difficult for them to maintain consistency. However, the liars' reported strategies provide another explanation for this finding. Approximately 45% of liars indicated that they tried to maintain consistency across interviews about both events. They actually achieved this as the within-subjects analyses indicated. Many liars reported that they thought it will be difficult to remain consistent when deceptively answering questions about the critical event. Therefore, they adopted the strategy of providing fewer repetitions for the noncritical event to lower their "baseline consistency." Applying this strategy, the number of repetitions they provided when they lied (regarding the critical event) would match the number of repetitions they provided when they told the truth. Nonetheless, these repeated details were fewer than those provided by truth-tellers. These two explanations do not necessarily contradict each other, because the increased cognitive load and the deliberate strategy may be occurring simultaneously. Even though liars attempted to maintain consistency across events, they may as well have found it difficult to lie about one of the two events, which further decreased their consistency levels.

4.1 | Limitations and future directions

We could not analyze reminiscences and contradictions in our study because they did not occur frequently enough to be analyzed. Previous studies on lie detection have also reported that contradictions could not be analyzed for the same reason (e.g., Ewens et al., 2015; Granhag & Strömwall, 2002). The very few reminiscences in our study might be explained by the difficulty of the task for participants, because they had to report about two events. The literature on reminiscences corroborates these findings, because cognitive interference inhibits individuals from providing additional information (Erdelyi, 1996; Ewens et al., 2015). Even though specific questions are more likely to increase reminiscences than a free recall (Fisher et al., 2009), it appears that increasing the difficulty of the questions by asking about two events rather than one event may interrupt memory retrieval and impede reminiscences. As previous research on reminiscences in the eyewitness and lie detection literatures demonstrated, reminiscences are characteristic of truth-tellers' statements rather than of liars' statements, so researchers in both fields may further examine reminiscences among innocent suspects when they report about two or more events.

It is worth noting that we deliberately did not counterbalance the order of the discussed events. We introduced the critical event after the noncritical event, because liars find it more difficult to start responding truthfully and then to lie rather than vice versa (Vrij, Leal, Mann, & Fisher, 2012). We also presented the nonsequentially ordered questions in the same order with questions about the noncritical event followed by the same questions about the critical event. Hence, liars might have been able to predict the nature of subsequent questions as the interview progressed. Nonsequentially ordered questioning may become more effective if the nature and order of the questions are varied

within an interview. For example, the interviewer may ask questions about what each person said during each event as well as about the events' details, including temporal and spatial details (which are questions that suspects do not anticipate; Vrij et al., 2009).

Participants viewed a Skype discussion and were asked to recall it and/or distort some of the details. This may not reflect real criminal cases because informants are often more involved in overheard discussions, so this might have affected the ecological validity of our study. Even though we aimed to examine overheard discussions by informants, it is important for future studies to investigate how liars' and truth-tellers' statement consistency changes as a function of question format when they engage in the discussions themselves. In addition, sometimes informants engage in actions rather than discussions, so future studies might investigate consistency in reporting actions.

Our findings suggest that liars adopt different strategies when they have to report about more than one event compared with only one event as it becomes more difficult for them to use a rehearse and repeat strategy (Granhag & Strömwall, 1999). Liars often incorporate lies and truths in a single account to make it easier to fabricate the lie (Leins, Fisher, & Ross, 2013), so their cognitive load may increase when they have to report about two events, even when one of the events is truthful. We found that nonsequentially ordered questions magnified the differences between liars and truth-tellers for two events, but we expect this questioning to be more effective when used for more than two events. However, more research is needed to further explore liars' performance when they report about more than one event and when they tell the truth and lie in a single account.

Lastly, the finding that liars were significantly less consistent than truth-tellers even when telling the truth was interesting. Liars seem to use the same strategy when they tell the truth and when they lie in a single interview. It may be that in investigative settings, suspects who provide few repetitions for all reported events may be lying about at least one of the events. Of course, in our experimental design, the investigator knew the facts about the first discussed event, the noncritical event. This may not always be the case in real life. However, investigators may often be able to verify some of the information of one of the events discussed in a first interview and may reach the conclusion that the suspect was truthful when describing that event. As our findings show, suspects who provide only few repetitions and omit a large amount of information about this verified information in a subsequent interview may be suspected of lying about the other nonverifiable information. When suspects asked nonsequentially ordered questions do not repeat many details, suspicion may be well justified as our discriminant analysis showed that these questions may help investigators accurately classify liars 78% of the time. Moreover, the large effect sizes we found when using nonsequentially ordered questions indicate that investigators can detect decreased consistency while they are conducting the interview.

Nonsequentially ordered questions affect truth-tellers as much as liars. These questions disrupt the natural and chronological recall by truth-tellers and decrease their reporting accuracy, so they may not match proposed guidelines on good interviewing practice (Fisher et al., 2009; Walsh, Oxburgh, Redlich, & Myklebust, 2015). However, our findings that truth-tellers were significantly more consistent than liars demonstrate that truth-tellers did not find responding to these questions as difficult as liars found them, and they managed to repeat a good amount of information. Hence, these questions may be used in investigative contexts where investigators have sufficient bases to assume that the suspect may be deceptive or in contexts where possible deception is detrimental for the case.

The current research is the first to investigate nonsequentially ordered questions when liars report about two events. The large effect size for repetitions when these nonsequentially ordered questions were used compared with a free recall or with sequentially ordered questions suggests that it is a promising interview technique for use with potentially unreliable informants. More research is needed on this technique to demonstrate its applied potential.

CONFLICT OF INTEREST STATEMENT

The authors declare that there are no conflicts of interest.

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APPENDIX

Sequentially ordered questions

1. Tell me in detail what Chief said when they were discussing the trip to Prague?
2. Tell me in detail what Tiger said when they were discussing the trip to Prague?
3. Tell me in detail what Bird said when they were discussing the trip to Prague?
4. Tell me in detail what Chief said when they were discussing the spying mission against the terrorist?
5. Tell me in detail what Tiger said when they were discussing the spying mission against the terrorist?
6. Tell me in detail what Bird said when they were discussing the spying mission against the terrorist?

Nonsequentially ordered questions

1. Tell me in detail what Chief said when they were discussing the trip to Prague?
2. Tell me in detail what Chief said when they were discussing the spying mission against the terrorist?
3. Tell me in detail what Tiger said when they were discussing the trip to Prague?
4. Tell me in detail what Tiger said when they were discussing the spying mission against the terrorist?
5. Tell me in detail what Bird said when they were discussing the trip to Prague?
6. Tell me in detail what Bird said when they were discussing the spying mission against the terrorist?

Study II

The Devil's Advocate Approach: An Interview Technique for Assessing Consistency among Deceptive and Truth-telling Pairs of Suspects

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Abstract

The aim of this study was to assess statement consistency in pairs of deceptive and truth-telling suspects when the Devil's Advocate approach is implemented. This approach involves asking suspects an 'opinion-eliciting' question for arguments that support their opinions followed by a 'devil's advocate' question to elicit opposing arguments. Forty-nine pairs of participants were matched, based on their strong opinions about a controversial topic, and were asked to either tell the truth or lie about their opinions to an interviewer. Pair members were permitted to prepare for the interview together. Each participant was interviewed individually with the Devil's Advocate approach. Prepared truth-telling pairs were more consistent with each other in response to the opinion-eliciting question than to the devil's advocate question. As predicted, deceptive pairs were equally consistent with each other in response to both questions. Hence, the Devil's Advocate approach seems to be a promising interview technique for assessing consistency among pairs who hold false opinions and pairs who hold true opinions. It also has implications for the consistency heuristic as consistency is not diagnostic of deception or honesty unless the interview technique is taken into consideration.

Introduction

In light of violent attacks by extremist groups (Soufan, 2011; Weiss & Hassan, 2015), it is essential for intelligence and security officers to identify the nature of suspect affiliations to political, ideological, and religious organisations. Often, militant extremists work in cells so they travel and launch their attacks in small groups (Turretini, 2015; White, 2014). They may travel as couples such as the San Bernardino shooters ("San Bernardino Shooting: Who Were the Attackers?," 2015) or they may pose as refugees, such as the Paris attackers ("Paris Attacks: Who Were the Attackers?," 2016). Officers who suspect and question individuals at checkpoints may need to assess whether suspects hold views that support extremist organisations (e.g., the so-called Islamic State) or not. In the current study, an interview technique that may assist officers in uncovering false opinions of pairs of suspects was examined: the Devil's Advocate approach.

In the Devil's Advocate approach interview (Leal, Vrij, Mann, & Fisher, 2010), suspects are asked two types of questions: One about their opinions on a topic (the opinion-eliciting question) and another for which they are asked to take the 'devil's advocate' position and generate arguments that run counter to their opinions (the devil's advocate question). In a deception scenario, truth-tellers are likely to provide their truly held opinions in response to the opinion-eliciting question, whereas liars are likely to provide their truly held opinions in response to the devil's advocate question.

Theoretical Framework for the Devil's Advocate Approach

Confirmation Bias

Attitudes are activated in line with one's experience with the target object, and these attitudes are often maintained by confirmation bias (Ajzen, 2001). Individuals selectively attend to evidence that supports their views , and at the same time, ignore evidence that runs counter to their views, because they deem opposing evidence to be weaker than supporting evidence (Edwards & Smith, 1996; Felton, Garcia-Mila, & Gilabert, 2009; Mercier & Sperber, 2011). Their reactions eliminate the discomfort of having to confront contrary evidence and enable them to maintain their own attitudes which in turn reduce cognitive dissonance (Petty, Wegener, & Fabrigar, 1997). This cycle sustains individuals' views and enhances their access to arguments that support those views.

Therefore, if individuals are asked to generate arguments for a topic about which they have strong views, they would find it easier to generate supporting than opposing arguments (Ajzen, 2001; Nickerson, 1998). Truth-tellers interviewed with the Devil's Advocate approach should be able to provide arguments in response to the opinion-eliciting question as these represent their genuine opinions. Given that individuals ignore arguments that refute their opinions, it would be difficult for truth-tellers to generate arguments for the devil's advocate question. A similar pattern may be true for liars who would have easier access to arguments that support their genuine views in response to the

devil's advocate question than to opposing arguments for the opinion-eliciting question. Nevertheless, as described in the following section, liars can also have access to arguments for the opinion-eliciting question if they employ counter-interrogation strategies to make an honest impression on the interviewer.

Impression Management

In forensic contexts, both liars and truth-tellers want to convince the interviewer they are innocent, but they employ different strategies to achieve this goal (DePaulo et al., 2003; Hartwig, Granhag, Strömwall, & Doering, 2010). According to the self-presentation perspective, truth-tellers may change their behaviour to make an honest impression on the interviewer, but they do that within the boundaries of honesty (DePaulo et al., 2003). Examples of this strategy include waiving their rights to silence and being forthcoming (Hartwig et al., 2010; Kassin, 2015; Luke Dawson, Hartwig, & Granhag, 2014).

Liars' change in behaviour is designed to mislead the interviewer. Liars invest more effort than truth-tellers in self-presenting themselves positively, and they employ a variety of counter-interrogation strategies to make their lie easier (Hartwig, Granhag, & Strömwall, 2007; Leins, Fisher, & Ross, 2013). One commonly used counter-interrogation strategy is preparation. Liars think of questions that may be asked during the interview and rehearse responses to them (Clemens, Granhag, & Strömwall, 2013; Vrij, Mann, Leal, & Granhag, 2010). The importance of preparation is emphasised in

manuals of extremist organisations, such as the Manchester Manual by Al Qaeda (U.S. Department of Justice, 2002). Sample questions that are asked at airports or immigration checkpoints are provided in the manual, and members are encouraged to rehearse responses to them with their unit commander. They are also instructed to discuss information they may provide in case they are intercepted. Hence, extremists may prepare arguments that counter their opinions to demonstrate to the interviewer that they do not hold extreme views and that they are not affiliated with the extremist organisation (Soufan, 2011). This enables liars to provide arguments in response to the opinion-eliciting question when the Devil's Advocate approach is implemented. In contrast, truth-tellers often do not prepare for the interview (Granhag & Strömwall, 1999; Granhag, Vrij, & Verschuere, 2015b; Vrij et al., 2009, 2010), and hence they may have more difficulty providing opposing arguments in response to the devil's advocate question.

Another common counter-interrogation strategy used by liars is maintaining statement consistency. Liars attempt to maintain consistency in interviews to appear honest and they achieve that by preparing and rehearsing responses for anticipated interview questions (Granhag & Strömwall, 1999, 2002; Vrij et al., 2009). Research has shown that liars are at least as consistent as truth-tellers, which contradicts the commonly held belief by investigative practitioners that consistency is a valid cue to deception (Greuel, 1992; Strömwall & Granhag, 2003). These findings also contradict the widely employed consistency heuristic which assumes that consistency is associated with truth-

telling (Granhag & Strömwall, 2001; Granhag, Strömwall, & Hartwig, 2005). Hence, it seems that practitioners fail to consider that liars want to appear convincing so they prepare and maintain consistency during interviews.

Statement consistency may be a valid cue to deception but only when certain interview techniques are employed, such as strategically disclosing evidence (Granhag, Strömwall, Willén, & Hartwig, 2013b), imposing cognitive load (Ewens, Vrij, Mann, & Leal, 2016; Masip, Blandón-Gitlin, Martinez, Herrero, & Ibabe, 2016), asking unanticipated questions (Vrij et al., 2009), and employing different question formats (Leins, Fisher, & Vrij, 2012). These techniques have received empirical evidence demonstrating that they are effective at increasing interview difficulty for liars but not for truth-tellers, which eventually reduces liars' —but not truth-tellers'— statement consistency. In the context of the Devil's Advocate approach, however, the interview is not difficult for liars as they would have access to supporting arguments (their genuine opinions) and they would have prepared opposing arguments. Hence, it would be easy for them to maintain consistency within their statement (Granhag et al., 2013b; Strömwall & Willén, 2011). Truth-tellers, on the other hand, would find it difficult to generate arguments for the devil's advocate question for which they did not prepare so, as they would not be concerned about consistency, they are not likely to be consistent in their responses to interview questions.

Overall, impression management indicates that liars would provide arguments for both the opinion-eliciting and the devil's advocate question which makes them appear consistent, whereas truth-tellers would provide more arguments in response to the opinion-eliciting question than to the devil's advocate question which reduces their statement consistency.

The Devil's Advocate Approach

Leal and colleagues (2010) conducted the only study on the Devil's Advocate approach. They examined differences between liars and truth-tellers for the number of details and for latency time. Truth-tellers' statements featured more words and shorter latency time in response to the opinion-eliciting question than to the devil's advocate question. Liars' statements, on the other hand, did not differ on the number of words and latency time when responding to the opinion-eliciting and the devil's advocate questions. In addition, truth-tellers were judged as more talkative, immediate, emotional, and plausible in their responses to the opinion-eliciting question compared to their responses to the devil's advocate question. However, liars' responses were judged similarly across questions in terms of being immediate, emotional and plausible.

These findings may be explained by confirmation bias and impression management. Truth-tellers and liars had access to arguments that supported their views. Liars, however, were more concerned about impression management, and hence they may have attempted to maintain consistency by using accessible arguments to respond to

the devil's advocate question and rehearsed arguments to respond to the opinion-eliciting question. Accordingly, truth-tellers'—but not liars'—responses to the opinion-eliciting and devil's advocate questions differed from each other. These results suggest that liars' responses to the Devil's Advocate approach questions may be more consistent than those of truth-tellers. The current study examines this speculation.

The Current Study

The current study was designed to extend the findings by Leal and colleagues (2010) on the Devil's Advocate approach to pairs of suspects by assessing within-group statement consistency. The procedure involved matching pairs of participants who shared similar and strong opinions about a topic. After they were given the opportunity to prepare and were then separately interviewed with the Devil's Advocate approach, the consistency of their arguments was measured. Within-Group consistency is generally defined by the level of correspondence between statements from different suspects in a single case (Granhag, Rangmar, & Strömwall, 2015a; Vredeveldt, van Koppen, & Granhag, 2014). Hence, consistency indicated the extent to which pair members reported the same number of similar arguments to the opinion-eliciting question and to the devil's advocate question.

Previous studies have shown that truth-tellers do not tend to prepare together for an interview when given the opportunity (Vrij et al., 2009, 2010). In those studies, however, truth-tellers engaged in an event which they were asked to recall later in the

interview. As they experienced the event, they may have believed they did not need to prepare for the interview. Recall of opinions, however, is more abstract than the recall of a single event, which is aided by episodic memory (Tulving, 1984). Hence, truth-tellers may want to prepare to remember possible arguments for their opinions and to enhance impression management during the interview (DePaulo et al., 2003; Vernham, Granhag, & Mac Giolla, 2016; Vrij et al., 2010). Their preparation was predicted to involve responses to expected questions, and hence they would discuss arguments that support rather than oppose their opinions (Vrij et al., 2009). As for deceptive pairs, it was expected that, in line with the deception literature on alibis and events (Granhag, Mac Giolla, Strömwall, & Rangmar, 2013a; Vrij et al., 2009, 2010), they would prepare for the interview and anticipate they would be asked questions about their false opinions. Hence, they would be likely to prepare arguments that oppose their genuine views. Accordingly, both deceptive and truth-telling pairs would prepare responses for the opinion-eliciting question. Therefore, truth-telling pairs who decide to prepare were expected to discuss arguments that supported their opinions, whereas liars would discuss arguments that opposed their genuine opinions (Hypothesis 1).

As a result of confirmation bias, truth-telling and deceptive pairs would have more access to arguments that support their views, because individuals tend to ignore opposing arguments. As individuals who share similar views are able to provide similar arguments (Mercier & Landemore, 2012), truth-telling pairs should provide similar arguments in

response to the opinion-eliciting question, whereas deceptive pairs should provide similar arguments in response to the devil's advocate question. However, liars would also prepare arguments that oppose their genuine views, and hence are likely to provide similar arguments for the opinion-eliciting and the devil's advocate questions. Accordingly, it was predicted that truth-telling pairs would be more consistent with each other in response to the opinion-eliciting question than to the devil's advocate question, but no such difference was expected for deceptive pairs (Hypothesis 2).

Method

Participants and Design

One hundred (50 pairs) university students and staff members were recruited, through the departmental participant pool and announcements posted in the university buildings, to participate in a study that examined interactions between pairs discussing their opinions. Participants received a reward of either one course credit or £5 for taking part in the research. The sample included 82 females and 18 males, and their average age was 21.60 years (SD = 5.97).

A 2 (Veracity: truth-teller, liar) × 2 (Question Type: opinion eliciting question, devil's advocate question) mixed design was used with veracity as the between-subjects factor, question type as the within-subjects factor, and prepared argument type and within-group consistency as the dependent variables.

Procedure

Before their appointment, participants were sent an online questionnaire (adapted from Leal et al., 2010) that included 23 statements about controversial social and political topics (see Table 1). Participants rated the extent to which they agreed or disagreed with each statement on a 7-point scale (1= *I disagree* to 7 = *I agree*). The order of questions was counterbalanced between participants. Ratings were examined for extreme scores (1 or 7). Pairs who gave the same extreme rating for one of the 23 topics were matched and given an appointment at the same time. They were not informed about why or with whom they were paired, or about the topic they would be discussing during the experimental session.

On the appointment date, pairs were informed they had been chosen because they shared the same opinion on a specific topic, and they were to be interviewed separately by the same interviewer about their opinions regarding that topic. Each pair was randomly allocated to the truth or lie condition. Truth-telling pairs were instructed to discuss their genuine opinions when interviewed, whereas deceptive pairs had to claim they held opposing views (to their own opinions). All pairs were instructed that they needed to convince the interviewer that their opinions (either genuine or contrived) were true. To motivate participants to be convincing, they were informed that they would receive the course credit /£5 only if the interviewer believed them; otherwise, they would be asked to write about their opinions. In fact, all participants were rewarded and none

was asked to write about their opinions. Pairs were given the opportunity to prepare for the interview as long as they needed, and their preparations were timed.

Pair members were interviewed separately by one of two research assistants, both of whom were blind to the study hypotheses and to the participants' actual opinions. The interviews were audio-taped. Participants were first asked about their attitude towards the topic (whether they were in favour of, or opposed to, the topic). Then, they were asked the opinion-eliciting question ('Why and what do you think led you to having this view on the topic? Please try to be as detailed as possible in your response.'), followed by the devil's advocate question ('Try to play devil's advocate and imagine that you do not have this view at all. That is, imagine that you (dis)agree with the statement. What can you say in favour of this opposing view? Please be as detailed as possible in your response.'). Participants who did not provide at least three arguments for each of the questions were asked to do that. Previous research has shown that participants can typically generate at least three arguments in such tasks (Ajzen, 2001; Haddock, Rothman, & Schwarz, 1996; Wänke, Bless, & Biller, 1996). Also, obtaining at least three arguments allowed for a more accurate measurement of consistency between pair members.

Table 1

Topics Participants Rated in the Opinion Questionnaire on a 7-Point Scale

1) Women should have the right to an abortion
2) Capital punishment (i.e. death penalty) should be a legal option in judicial systems for very serious crimes
3) CCTV in streets and public areas is a good thing
4) The UK immigration laws should be much tougher for anyone wanting to live in the UK
5) I am firmly atheist (disbelief in God)
6) The smoking ban in public places is a good thing
7) Euthanasia should be a lawful option in the terminally ill
8) Obese people should pay for their own healthcare
9) It is right that animals are used for experimentation in medical research
10) Governments should allow polygamy (marriage to more than one spouse)
11) Sex before marriage is morally wrong
12) Couples should not cohabit before being married
13) I support the Labour Party
14) Arranged marriages should be disallowed
15) Telling young children that Father Christmas exists is wrong
16) I generally agree with Donald Trump's remarks
17) I would not mind if the Prime Minister of my country was female
18) It is okay for the minimum age for purchasing alcohol to be 18 years
19) The inclusion policy at schools, whereby children with behavioural problems are kept in mainstream school classrooms, is a good thing
20) I support the Conservative Party
21) Governments should allow the use of cannabis for personal use
22) The refugees' crisis will have an increased negative influence on European nations
23) I am happy that the Brexit campaign succeeded

At the end of the interview, participants were asked to honestly complete a computerised post-interview questionnaire. They indicated their age and gender and rated on a 7-point scale their motivation to convince the interviewer of their opinions (1 = *not motivated at all* and 7 = *very motivated*), their belief that they would receive a reward/write down their opinions (1 = *did not believe at all* and 7 = *definitely believed this*), and the difficulty of the opinion-eliciting and the devil's advocate questions (1 = *extremely easy* and 7 = *extremely difficult*). They were asked the following closed-ended questions: (a) Did you prepare for the interview with your partner (yes/no response options); and (b) Did you discuss with your partner arguments that (i) support your opinions, (ii) counter your opinions, (iii) support and counter your true opinion, or (iv) other *[open-ended]*. Moreover, participants were asked open-ended questions: (a) How did you prepare for the interview with your partner; and (b) What is the strategy you used to convince the interviewer of your responses to the opinion-eliciting/devil's advocate question. After completing the questionnaire, all participants were remunerated, debriefed and thanked.

Coding

All interviews were transcribed and then coded for information units. An information unit was either an argument or an aspect of an argument. Every information unit included at least one noun and one verb. For example, the statement 'abusing cannabis is harmful for anyone' was considered to be one information unit. The statement

'a lot of cultures permit arranged marriages but these are more likely to be forced' constituted two information units: 'a lot of cultures permit arranged marriages' as one unit and 'these are more likely to be forced' as the second unit. Similarly, the statement 'if you are willing to move with someone means you are committed to them' constituted two information units: 'willing to move with someone' and 'you are committed to them'. Every information unit reported by both pair members (by content, not verbatim) was considered a consistent argument. That is, if pair members mentioned the same argument regarding the topic, this argument was considered one consistent argument. For example, if one member reported 'animals are more accessible than humans for medical research' and the other member reported 'animals are a lot easier to obtain than humans', this was considered as one consistent argument. Similarly, 'he generalises quite a lot' and 'he often describes groups of people using stereotypes' was considered as one consistent argument.

Two coders first counted the number of consistent arguments in three randomly selected pairs of interviews (n = 6). Disagreements were discussed and resolved. One coder coded nine other interviews (25% of the sample) whereas the second coder coded all the remaining interviews. An inter-rater reliability analysis indicated that the Intra-Class Correlation coefficients (*ICC*) were .68 for the opinion-eliciting question and .84 for the devil's advocate question. The coefficient for the opinion-eliciting question is not high but demonstrates *good* agreement in common with similar lie detection studies (Mac

Giolla & Granhag, 2015; Vrij, 2005; Vrij, Leal, Mann, & Fisher, 2012; also see Nahari & Vrij, 2015).

One of the coders coded the responses for the open-ended questions in the post-interview questionnaire (participants' preparation strategy with their partners and convincing strategies during the interview) and generated data-driven general categories (i.e. not predetermined) in accordance with the reported strategies. Responses by some participants were allocated to more than one category. Another coder allocated the responses to the adopted categories, and disagreements between the two coders were discussed and resolved.

Preparation strategies were classified into three categories for liars and truth-tellers. For liars, the categories were: Discussing arguments, preparing convincing techniques (e.g., 'we largely just discussed difficulties that we would come across and how to state our opinion without actually agreeing with it'; 'we discussed how to sound convincing'), and other strategies. For truth-tellers, the categories were: Discussing arguments, discussing arguments only briefly, and other strategies. The other category for liars and truth-tellers included infrequently mentioned strategies such as writing down arguments and offering personal experience. Inter-rater reliability was very high, *ICC* = .99 for truth-tellers and .92 for liars.

Participants' *convincing strategies during the interview* are displayed in Table 2. For the opinion-eliciting question, six categories emerged for truth-tellers and seven

categories for liars. As for the devil's advocate question, seven categories emerged for truth-tellers as well as for liars. The categorised strategies included an 'other' category which referred to strategies that were not mentioned frequently such as 'was finding it difficult to respond' or 'attempting to control my behaviour'. For the opinion-eliciting question, inter-rater reliability was high, *ICC* = .97 for truth-tellers and .86 for liars. Regarding the devil's advocate question, *ICC* = .88 for truth-tellers and .74 for liars.

Results

Before conducting the analyses, the data was screened for outliers. Cases with a z-score > ±3.29 were considered as outliers (Field, 2009). One case emerged as an outlier for within-group consistency across the opinion-eliciting question and the devil's advocate question, so it was deleted. Hence, the assumptions for parametric tests were met and the final sample included 98 participants with 50 liars and 48 truth-tellers (i.e., 25 deceptive pairs and 24 truth-telling pairs).

Post-Interview Questionnaire

Motivation. A *t*-test with level of motivation as dependent variable and veracity as the independent factor revealed that liars (M = 5.38, SD =1.52) and truth-tellers (M = 5.48, SD =1.11) did not differ significantly with respect to self-reported motivation to convince the interviewer, $t(96) = .37$, $p = .715$, $d = 0.07$, 95% CI [-0.32, 0.47].

Another *t*-test revealed that both truth-tellers (M = 5.44, SD = 1.32) and liars (M = 4.75, SD = 1.67) believed they would receive a course credit or monetary remuneration

for convincing the interviewer of their responses, but truth-tellers believed that to a significantly higher extent, $t(96) = 2.26$, $p = .026$, $d = 0.46$, 95% CI [0.06, 0.86]. A separate *t*-test showed that both liars ($M = 4.52$, $SD = 1.48$) and truth-tellers ($M = 3.90$, $SD = 1.79$) did not differ in the extent to which they believed they would have to write an opinion paper, $t(96) = 1.88$, $p = 0.063$, $d = 0.38$, 95% CI [-0.02, 0.78].

Perceived question difficulty. A mixed ANOVA on question difficulty with question type as the within-subjects factor and veracity as the between-subjects factor did not result in a significant effect for veracity, $F(1, 96) = 0.20$, $p = .653$, $\eta_p^2 = .002$, but the question type main effect, $F(1, 96) = 15.78$, $p < .001$, $\eta_p^2 = .14$, and the veracity x question type interaction effect, $F(1, 96) = 55.28$, $p < .001$, $\eta_p^2 = .37$, were significant. Overall, the devil's advocate question ($M = 4.56$, $SD = 1.74$) was perceived as more difficult to answer than the opinion-eliciting question ($M = 3.74$, $SD = 1.92$). Regarding the interaction effect, simple effects analyses revealed that liars found the opinion-eliciting question ($M = 4.58$, $SD = 1.75$) significantly more difficult to answer than the devil's advocate question ($M = 3.84$, $SD = 1.75$), $F(1, 96) = 6.12$, $p = .015$, whereas truth-tellers found the devil's advocate question ($M = 5.31$, $SD = 1.39$) significantly more difficult to answer than the opinion-eliciting question ($M = 2.87$, $SD = 1.70$), $F(1, 96) = 63.75$, $p < .001$. This is in alignment with the idea that people's true arguments are more accessible than their counter-arguments.

Table 2

Percentages of Convincing Strategies Reported by Truth-tellers and Liars for the Opinion-Eliciting Question and the Devil's Advocate Question

Strategy	Truth	Lie
Opinion Eliciting Question (OE)		
Providing details	54%	34%
Being honest	28%	0%
Attempting to seem passionate about the topic	15%	8%
Controlling nonverbal behaviour	14%	13%
Thinking of standardised arguments/ Appearing logical	4%	18%
Taking the opposing perspective/ Reversing own views	0%	32%
Keeping it simple	0%	8%
Other	10%	14%
Devil's Advocate Question (DA)		
Taking the opposing perspective/ Reversing responses to OE	58%	20%
Providing details	17%	8%
Disengaging from my actual opinions/ Including standardised arguments	8%	28%
Being honest	6%	42%
Maintaining response consistency with OE	4%	30%
Keeping it simple	2%	10%
Other	4%	12%

Note. Percentages are calculated for truth-tellers and liars separately. The total exceeds 100% for each group because each participant could contribute to more than one category.

Preparation strategies. A chi-square test showed that liars and truth-tellers did not differ on whether they chose to prepare together before the interview, $\chi 2$ (1, N = 98)

= 0.13, p = .723, Cramer's V = .01. Only six pairs of liars and six pairs of truth-tellers chose not to prepare at all. Among those who prepared, average preparation time was 3 min 48 s for deceptive pairs and 3 min 00 s for truth-telling pairs, $F(1, 47) = .91$, p = .346, $\eta_p^2 = .02$.

To test Hypothesis 1, that deceptive pairs would prepare opposing arguments whereas truth-telling pairs would prepare supporting arguments, differences between pairs were analysed for prepared argument type (arguments that countered, supported, or countered and supported their views). There was a significant association between veracity and prepared argument type, $\chi 2$ (3, N = 74) = 47.40, $p < .001$, Cramer's V = .84. Among truth-tellers, 87.5% discussed arguments that supported their opinions, 9.4% discussed arguments that both countered and supported their opinions, and 3.1% discussed other types of arguments. Among liars, 57.1% discussed arguments that countered their opinions, 31.4% discussed arguments that both countered and supported their opinions, 5.8% discussed arguments that supported their opinions, and 5.7% discussed other types of arguments. Hence, Hypothesis 1 was supported.

The preparation strategies employed by liars and truth-tellers were also explored. Among the 38 liars who prepared themselves for the interview, 50% reported discussing arguments in general, 39% reported preparing convincing techniques, and 3% mentioned other strategies. Among the 36 truth-tellers who prepared themselves, 53% reported

discussing arguments in general, 25% reported discussing arguments only briefly, and 14% mentioned other strategies.

Interview strategies. The frequencies in Table 2 show that when responding to the opinion-eliciting question, more truth-tellers than liars were honest, provided details, and attempted to seem passionate about the discussed topic, but more liars than truth-tellers tried to keep their responses simple and used standardised (commonly held) arguments to appear logical. As for the devil's advocate question, truth-tellers reported providing details more than liars did, but liars tried more than truth-tellers to appear honest, include standardised arguments, disengage from their actual opinions, keep their responses simple, and maintain response consistency with the opinion-eliciting question.

Within-Group Consistency Analyses

As consistency of arguments between pair members would vary with the number of arguments provided, the total number of information units was included as a covariate in the analyses.[1]

A mixed ANCOVA was conducted on within-group consistency with veracity as the between-subjects factor, question type as the within-subjects factor, and information units as the covariate.[2] The analysis did not reveal a significant main effect for question type, $F(1, 45) = 1.73$, $p = .196$, $\eta_p^2 = .04$, or veracity, $F(1, 45) = 1.97$, $p = .167$, $\eta_p^2 = .04$. However, the analysis yielded a significant veracity × question type interaction, $F(1, 45) = 4.42$, $p = .041$, $\eta_p^2 = .09$.

Simple effects revealed that truth-telling pairs were more consistent with each other in response to the opinion-eliciting question ($M = 3.17$, $SD = 2.26$) than to the devil's advocate question ($M = 1.33$, $SD = 1.05$), $F(1, 47) = 15.49$, $p < .001$, $d = 1.04$, 95% CI [0.62, 1.47]. However, deceptive pairs were similarly consistent with each other in response to the opinion-eliciting question ($M = 2.24$, $SD = 1.54$) and to the devil's advocate question ($M = 1.56$, $SD = 1.16$), $F(1, 47) = 2.22$, $p = .143$, $d = 0.50$, 95% CI [0.10, 0.90]. Hence, Hypothesis 2 was supported.

As it is uncommon for truth-tellers to prepare for interviews, pairs of truth-tellers who opted to prepare (18 pairs) were compared with truth-telling pairs who did not prepare (six pairs). The analysis was exploratory and cannot be generalised given that the group sizes were small and discrepant, preparation was not manipulated, and participants were not randomly allocated to group conditions. However, the analysis may prove useful for future research. A mixed ANCOVA on within-group consistency with preparation as the between-subjects factor, question type as the within-subjects factor, and information units as the covariate did not reveal significant main effects for question type, $F(1, 20) = 0.55$, $p = .466$, $\eta_p^2 = .03$, and preparation, $F(1, 20) = 0.07$, $p = .796$, $\eta_p^2 = .003$, or a significant question type × preparation interaction effect, $F(1, 20) = 2.81$, $p = .109$, $\eta_p^2 = .12$. This suggested that preparation had no effect on the results for truth-telling pairs. Yet, to be certain of this, within-group comparisons were ran for the prepared and unprepared truth-tellers separately. The analyses showed that truth-telling pairs who

prepared themselves were significantly more consistent with each other in response to the opinion-eliciting question (M = 3.44, SD = 2.53) than to the devil's advocate question (M = 1.17, SD = 0.86), $F(1, 17) = 14.22$, $p = .002$, $d = 1.20$, 95% CI [0.49, 1.91]. However, truth-telling pairs who did not prepare were consistent with each other in response to the opinion-eliciting question (M = 2.33, SD = 0.82) and to the devil's advocate question (M = 1.83, SD = 1.47), $F(1, 5) = 0.43$, $p = .542$, $d = 0.42$, 95% CI [-0.72, 1.56].

Discussion

The current study extended the findings on the effectiveness of the Devil's Advocate approach to pairs of suspects. As predicted, deceptive pairs were as consistent with each other in response to the opinion-eliciting as in response to the devil's advocate questions. Deceptive pairs prepared for the interview and discussed arguments that opposed their genuine opinions, with some also discussing arguments that supported their opinions. They reported preparing convincing strategies and rehearsing arguments to make them seem real and consistent and hence honest. These reports corroborate previous findings that liars are concerned about impression management, particularly consistency (DePaulo et al., 2003; Granhag & Hartwig, 2008; Leins et al., 2012). These strategies are reflected in terrorist manuals, such as the Manchester Manual (U.S. Department of Justice, 2002) in which extremists are encouraged to prepare together for interviews in case they are apprehended so that they can provide convincing and consistent responses. Extremists' preparations enable them to provide consistent

arguments to the opinion-eliciting question. In addition, extremists are likely to find it easy to provide consistent arguments for the devil's advocate question, because they are repeatedly lectured about their ideologies which ultimately results in attitude polarisation and conformity (Horgan, 2014).

Truth-telling pairs were more consistent with each other when they were asked to support their own opinions than when they were asked for opposing arguments. Additional analyses revealed this was particularly true for truth-telling pairs who prepared for the interview. Truth-tellers may have needed to prepare briefly to generate specific arguments to support their opinions during the interview and eventually to make a positive impression on the interviewer. Indeed, the majority of truth-tellers reported having discussed supporting arguments, and 25% of them had very brief discussions aimed solely at remembering arguments (none of the liars mentioned preparing 'briefly' for the interview). Hence, unlike previous deception studies in which truth-tellers often did not make use of the opportunity to prepare for the interview (e.g., Vrij et al., 2009, 2010), it seems that the abstract nature of opinions prompt truth-telling pairs to prepare. However, truth-tellers only prepared responses for the anticipated question: Opinion-eliciting question. As people are generally less likely to have access to arguments that oppose their own views (Felton et al., 2009; Nickerson, 1998), truth-tellers could not provide similar arguments for the devil's advocate question. Hence, they were less

consistent with each other in response to this question than to the opinion-eliciting question.

It may be argued that the within-pair consistency means indicate that deceptive and truth-telling pairs exhibited a similar pattern, with higher consistency levels for the opinion-eliciting question than for the devil's advocate question. However, as the analysis showed, this finding was more significant and the effect was larger for truth-tellers than for liars. Nonetheless, the similar pattern may make it difficult for investigative practitioners to discriminate between deceptive and honest statements. This is a typical problem for deception detection, which remains one of the most challenging tasks in investigative interviewing (Vrij et al., in press). Research on deception detection has demonstrated that individuals are generally poor at accurately judging statement veracity, that judgments are made subjectively even in the presence of established criteria, and that several contextual factors such as counter-interrogation strategies employed by liars (Alison et al., 2014), experience with the reported event (Warmelink, Vrij, Mann, Leal, & Poletiek, 2013), and individual differences (Kashy & DePaulo, 1996) affect suspect and interviewer behaviours (Bond & DePaulo, 2006; Nahari & Vrij, 2015; Volbert & Steller, 2014). Whereas certain interview techniques (such as the interview technique used in this study) may enhance deception detection (Vrij, Granhag, Mann, & Leal, 2011; Vrij, Fisher, & Blank, 2017), the effectiveness of these techniques may only be estimated but not determined (Vrij, 2016). Within-subjects designs and baselining may

assist in partially resolving this problem by controlling for some factors such as individual differences and counter-interrogation strategies (Vrij, 2016). Accordingly, the within-subjects design utilised in the current study has removed some extraneous effects.

Also, it is speculated that the effect of the interview technique would be more pronounced in real life due to suspects' motivation and concerns about making an honest impression (DePaulo et al., 2003; Granhag & Hartwig, 2008). Hence, unlike innocent suspects, extremists who have several opportunities to rehearse responses (rather than only three minutes as in the current study) would be similarly consistent in response to the interview questions.

These findings expand the literature on statement consistency. Previous research has shown that laypeople and professionals tend to employ the consistency heuristic by associating consistency with honesty (Granhag, Andersson, Strömwall, & Hartwig, 2004; Strömwall & Granhag, 2003). In contrast to these beliefs, the current study findings suggest that liars are more concerned about consistency than truth-tellers, and they invest more effort in maintaining high levels of consistency. Similar results have been obtained in previous research (Granhag & Strömwall, 2002; Hartwig, Granhag, Strömwall, & Andersson, 2004). Hence, practitioners are cautioned against the use of the consistency heuristic. Instead, they need to consider the interview context, particularly the interview technique, when assessing veracity based on consistency. Certain interview techniques such as the Strategic Use of Evidence (Granhag et al., 2013b) and imposing cognitive

load (Vrij et al., 2012) reduce liars' —but not truth-tellers'— consistency, so assessments may be made in line with the consistency heuristic. However, the Devil's Advocate approach seems to reduce consistency among truth-tellers more so than among liars which contradicts this heuristic.

Limitations and Future Directions

As reported earlier, the preparation analysis suffered from several limitations. Hence, these findings cannot be confirmed before future research systematically manipulates preparation prior to the interview to examine its effect on statement consistency. This may be achieved by providing only half of the participants (liars and truth-tellers) with the opportunity to prepare for the interview.

Pairs of strangers were recruited rather than pairs who were acquainted with each other. It is expected that similar results would emerge if acquaintances are recruited. Individuals become close to each other if they share similar attitudes (Gore, Cross, & Morris, 2006; Park & Shaller, 2005). This implies that acquaintances would be familiar with each other's opinions and are likely to provide similar arguments that support their genuine views. Future research might investigate this assumption.

The order of the opinion-eliciting and the devil's advocate questions was not counterbalanced. When the order of the two questions was counterbalanced in a pilot study, truth-tellers did not understand the devil's advocate question when it was asked first as it seemed unnatural. Truth-tellers had no problem with understanding the devil's

advocate question when it was asked after the opinion-eliciting question. Hence, counterbalancing questions may have made the interview more difficult for truth-tellers than for liars, eliminating possible differences between liars and truth-tellers (see Vrij, 2008).

The study design involved pairs of suspects. However, cells of suspects might of course comprise more than two members (White, 2014). Suspects in larger groups undergo different social, psychological, and hierarchical processes compared to those in smaller groups (Vernham et al., 2016). Previous deception detection studies have shown that unexpected questions about past events reduced within-group consistency among deceptive pairs (Vrij et al., 2009) as well as among deceptive triads (Roos af Hjelmsäter, Öhman, Granhag, & Vrij, 2014). Interestingly, when unexpected questions were about an intended activity, deceptive quartets were less consistent with each other than deceptive pairs (Sooniste, Granhag, Strömwall, & Vrij, 2016). Future research on the Devil's Advocate approach might compare consistency of opinions in smaller and larger deceptive and truth-telling groups.

Conclusions

Deceptive pairs were consistent with each other in response to the Devil's Advocate approach questions, whereas prepared truth-telling pairs were more consistent on the opinion-eliciting question than on the devil's advocate question. More research is needed before this approach is used in applied settings. However, the results corroborate

previous findings contradicting the consistency heuristic. Hence, security and intelligence officers are warned against over-reliance on this heuristic when assessing suspect credibility.

Endnotes

[1]The covariate (information units) and the independent variables (veracity and question type) were independent, and the relationship between the covariate and the dependent variable (within-group consistency) was linear for all groups. Hence, the assumptions of covariance were met and information units could be included as a covariate in the analysis.

[2]Thirty six liars and 36 truth-tellers were prompted to provide at least three arguments for the opinion-eliciting questions, whereas 30 liars and 38 truth-tellers were given a similar prompt for the devil's advocate question. Separate analyses conducted for responses provided prior to and following the prompt revealed similar results so the results for the complete statement are reported (with at least three arguments).

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Study III

Visuospatial Counter-Interrogation Strategies by Liars Familiar with the Alibi Setting

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Abstract

The current study addresses visuospatial counter-interrogation strategies employed by liars who are highly or poorly familiar with their claimed alibi. Participants (N =144) visited a restaurant to buy a sandwich (truth-tellers) or to use it as an alibi (liars). Half of the liars were informed they might be asked for a drawing of the alibi setting if interviewed (informed liars). Participants spent either 10 minutes (high familiarity condition) or 30 seconds (low familiarity condition) in the restaurant. All participants were interviewed twice with different visuospatial tasks. Visuospatial statements were assessed for salient details, non-salient details, between-statement consistency, and statement-evidence consistency. Informed liars provided significantly more salient and non-salient details than uninformed liars and truth-tellers. The difference for non-salient details was more pronounced in the high familiarity than in the low familiarity condition. No differences emerged for statement consistency types. The results suggest that liars are more concerned than truth tellers about making a positive impression on the interviewer, and hence they fail to accurately reflect on truth-tellers' visuospatial statements when they are acquainted with the interview technique, even if they are familiar with the reported event.

Introduction

Liars employ *counter-interrogation strategies* in investigative interviews by deliberately attempting to appear credible to avoid detection (Vrij, Granhag, & Porter, 2010a). They actively prepare for the interview by anticipating the questions that will be asked and rehearsing responses to them (Clemens, Granhag, & Strömwall, 2013; Hartwig, Granhag, Strömwall, & Doering, 2010; Vrij, Mann, Leal, & Granhag, 2010c). Preparation enables liars to avoid the need to improvise spontaneous lies (Vrij, Granhag, Mann, & Leal, 2011). Prepared liars may stick to their cover story during the interview and hence provide a consistent statement (Granhag & Strömwall, 2002; Vrij et al., 2009).

In anticipation of the interview, liars also try to know the implemented interview techniques to counter them (Nahari, Vrij, & Fisher, 2014). Information on investigative interview techniques can be easily found in scholarly work (e.g., Carson, Milne, Pakes, Shalev, & Shawyer, 2007), online (e.g., www.legislation.gov.uk/ukpga/1984/60/contents; The National Archives, 2017), and in terrorist organisations' manuals (e.g., *The Green Book*; Conflict Archive on the INternet, 2016), among others. The aim of the current study was to examine the effectiveness of counter-interrogation strategies when suspects who are highly or poorly familiar with their alibi are asked to provide *'visuospatial statements'* (e.g., drawings) of their alibi setting.

Counter-Interrogation Strategies in Lie Detection Contexts

Liars want to make an honest impression on the interviewer, so they plan for the interview, anticipate questions, and rehearse responses in an attempt to counter the interview technique. Research on counter-interrogation strategies has shown that liars can counter credibility assessment tools if they are acquainted with them. Criteria-Based Content Analysis (CBCA) and Reality Monitoring (RM) are verbal lie detection tools that assume that statements about experienced events are more detailed and coherent than statements about unexperienced events (Johnson & Raye, 1981; Vrij, 2005, 2008). A study examining the coaching of 180 children and undergraduate students in CBCA and RM revealed that coached liars, but not uncoached liars, obtained similar scores as truth-tellers (Vrij, Akehurst, Soukara, & Bull, 2004). These results confirmed earlier findings by Vrij, Kneller, and Mann (2000) which showed that CBCA coaching helped liars to counter this lie detection tool. Other credibility assessment tools such as EEGs scans and polygraph examinations are also susceptible to counter-interrogation strategies (for an overview, see Granhag, Vrij, & Verschuere, 2015).

Liars attempt to control their nonverbal behaviour during the interview by avoiding behaviour commonly associated with deception such as gaze aversion and nervousness (DePaulo et al., 2003; Global Deception Group, 2006; Vrij et al., 2010a). However, they do not achieve full control of their nonverbal behaviour, even when explicitly informed about the negative relationship between nonverbal behaviour and

deception (Vrij, Semin, & Bull, 1996). Similarly, studies on the verifiability approach have shown that liars fail to provide as many checkable details as truth-tellers following instructions that the interviewer will be verifying information they provide in their statements (Harvey, Vrij, Nahari, & Ludwig, 2017b; Nahari et al., 2014). Overall, these findings suggest that liars attempt to employ several strategies to appear credible, but they do not always succeed in imitating truth-tellers' behaviour and statements. Therefore, it is important to examine possible counter-interrogation strategies and the effect of these strategies on liars' statements.

Suspects' Familiarity with the Alibi

In real life, liars are more likely to choose familiar alibis about which they can be forthcoming (Culhane, Hosch, & Kehn, 2008; Culhane et al., 2013; Hartwig, Granhag, & Strömwall, 2007; Leins Fisher, & Ross, 2013; Vrij et al., 2010a). To our knowledge, there are only three studies that have examined familiarity in the context of deception. Children aged 9-12 who reported about an event they were familiar with scored higher on CBCA, indicating more truthfulness, than children of the same age group who were unfamiliar with the reported event (Blandon-Gitlin, Pezdek, Rogers, & Brodie, 2005). These differences remained whether the children were lying or telling the truth. Similar results were obtained in a study examining deception in mock job interviews with undergraduate students (Warmelink, Vrij, Mann, Leal, & Poletiek, 2013). Liars who were familiar with the job could not be distinguished from truth-tellers who were familiar with

it, and liars who were unfamiliar with the job were rated as lowest in truthfulness. Finally, a study to discern true and false intentions among undergraduate students who fabricated or told the truth about an activity they intended to execute in a familiar or unfamiliar setting found that truth-tellers had a more vivid mental image of the activity and setting than liars (Knieps, Granhag, & Vrij, 2014). Although familiarity did not moderate these results, those who were familiar with the physical setting could describe it in more details than unfamiliar participants.

The results of these studies are not easy to compare, because the studies differed in their purpose, sample, and design. Nonetheless, it can be inferred that familiarity plays an essential role in verbal statements. As liars' familiarity with the reported event increased, the statements of liars and truth-tellers became more similar. This inference is in line with findings from the spatial cognition literature that the longer individuals are exposed to a setting, the more familiar they become with it and the better their performance and accuracy on relevant spatial tasks (Prestopnik & Roskos-Ewoldsen, 2000). In a parallel manner, when liars have no experience of the alibi setting, they do not have a memory representation of that location, so they find it difficult to include spatial, sensory, and other details in their statements (Gnisci, Caso, & Vrij, 2010; Granhag et al., 2015; Vrij, 2008). This results in liars providing less detailed and consistent statements than truth-tellers who, by definition, have a memorial experience of the alibi setting (Leins, Fisher, & Vrij, 2012; Roos af Hjelmsäter, Öhman, Granhag, & Vrij, 2014; Vrij et al., 2009).

However, when liars have actually experienced the alibi setting, they have a better memory representation of it (Arnold, McDermott, & Szpunar, 2011; Kent & Allen, 1994) and tend to respond faster to the questions asked (Yonelinas, 2002), so they become as detailed and as forthcoming as truth-tellers (DePaulo et al., 2003; Vrij et al., 2010b).

Visuospatial Statements in Interviews with Suspects

Visuospatial statements are increasingly being used as an interview tool in investigative settings and as evidence in courts (Marlow & Hilbourne, 2011). Suspects, particularly liars, who are asked for a visuospatial statement find this report mode more unanticipated and difficult than when asked for a verbal statement (Vrij et al., 2009). When reporting verbally, liars can omit information and provide vague statements (Hartwig, et al., 2011), but when reporting visuospatially, liars have to be detailed and consistent in providing spatial information (i.e., locate objects in their correct location).

A study that examined self-generated drawings showed that liars who drew an imagined workplace were significantly less detailed than truth-tellers who drew their actual workplace (Vrij, Mann, Leal, & Fisher, 2012). However, another study that investigated self-generated drawings by police officers revealed that officers in the liar condition did not differ on the number of details from officers in the truth-teller condition (Vrij et al., 2010b). The researchers explained that liars thought of a familiar setting which may have resulted in the equal number of details provided by liars and truth-tellers.

Previous studies have also examined the saliency of details in suspects' statements (Masip, Blandón-Gitlin, Martínez, Herrero, & Ibabe, 2016; Roos af Hjelmsäter et al., 2014). Salient details are defined as central details about an event which are most likely to attract attention, whereas non-salient details are peripheral details about the event that may not be noticeable (Heath & Erickson, 1998; Roos af Hjelmsäter et al., 2014). When salient (central) and non-salient (peripheral) aspects of an event were distinguished in visuospatial statements, deceptive triads who fabricated the event together and were then interviewed individually, were not consistent with each other about the salient and non-salient details (Roos af Hjelmsäter et al., 2014). In contrast, truth telling triads who experienced the event together were consistent with each other about the salient details. Hence, truth-tellers focused on, and had a better memory for, salient aspects, so they were able to incorporate those aspects consistently in their statements. This finding is in line with the eyewitness and memory literatures which have established that people tend to correctly remember and consistently report salient details of an event to a greater extent than non-salient details (Herlihy, Scragg, & Turner, 2002; Wright & Stroud, 1998).

In sum, visuospatial statements seem to be a promising tool in distinguishing truth-tellers from liars. Nonetheless, it is important that investigators take into account the reported salient and non-salient aspects of the event as well as the familiarity of the suspect with the event.

The Self-Regulation Theory

In this section, the theory upon which the hypotheses were based is presented. The self-regulation theory posits that individuals attempt to control their behaviour through natural, automatic tendencies to achieve long-term goals (Bauer & Baumeister, 2011; Baumeister & Alquist, 2009). In an investigative interview, both liars and truth-tellers want to present themselves positively to the interviewer (DePaulo et al., 2003; Granhag & Hartwig, 2008; Granhag et al., 2015). Hence, liars and truth-tellers need to change their behaviour to make an honest impression. Nonetheless, they differ in their information management strategies, because truth-tellers provide information honestly, whereas liars rehearse their lies, avoid providing incriminating information, and control the amount and content of the information they provide (Granhag et al., 2015; Hartwig et al., 2010). Therefore, liars are more deliberate in controlling their behavior (DePaulo et al., 2003), but they do not always succeed (Vrij et al., 1996). If they report about an unfamiliar event, for example, they will not be able to be detailed and forthcoming, because they do not have a memory representation of the event (Warmelink et al., 2013). Moreover, when unanticipated questions are posed or visuospatial statements are requested, the task becomes even more difficult for liars which consequently depletes their cognitive resources and worsens their performance (Vrij et al., 2009).

Liars' strategies may be more successful if they report about a familiar, non-criminal event as that allows them to refrain from revealing incriminating information

and, at the same time, to be forthcoming by including as many details as possible about the familiar event. Hence, the more familiar liars are with the reported event, the more detailed their statements (Blandon-Gitlin et al., 2005; Warmelink et al., 2013). Liars would assume that this forthcomingness, which is associated with honesty (DePaulo et al., 2003; Greuel, 1992), may make them appear truthful (Granhag et al., 2015). Nonetheless, this does not mean that their statements would be similar to those of truth-tellers.

Research has shown that liars do not have an adequate understanding of truth-tellers' metacognitive processes (Harvey, 2013; Harvey, Vrij, Leal, Hope, & Mann, 2017a). Instead, their primary focus is on providing detailed and consistent statements rather than statements similar to those of truth-tellers (Blandon-Gitlin et al., 2005; Clemens et al., 2013; Deeb et al., 2017; Granhag & Strömwall, 1999; Leins et al., 2012). Therefore, while they are able to provide statements that resemble those of truth-tellers if they are equally familiar with the reported event (Warmelink et al., 2013), their concern about being detailed and consistent may make them more detailed and consistent than truth-tellers when they employ counter-interrogation strategies such as preparing for the interview or acquainting themselves with the interview technique (Deeb et al., 2017; Granhag & Strömwall, 2002; Harvey et al., 2017a). In other words, liars who are familiar with the reported event or interview technique may not necessarily provide statements similar to those of truth-tellers.

The Current Study

The main purpose of the study was to examine the effect of counter-interrogation strategies on liars' visuospatial statements about an alibi. All participants visited an alibi setting to familiarise themselves with it, because suspects usually report about familiar alibis (Culhane et al., 2008; Leins et al., 2013). Half of the liars possessed information about the interview technique before committing a mock crime (informed liars). None of the truth-tellers were provided with this information (uninformed truth-tellers), because in real life, when a crime is committed, truth-tellers (i.e., innocent suspects) are often not aware of the crime as they have nothing to do with it. Hence, they cannot possibly anticipate they will be mistakenly accused of the crime and interviewed about it, and thus they do not rehearse responses for interview questions (Granhag & Strömwall, 1999; Nahari et al., 2014; Vrij et al., 2010c). Accordingly, it was not logical for truth-tellers to receive instructions about a forthcoming interview. Previous deception studies have used similar designs that excluded truth-tellers where the scenario would not apply to innocent suspects (Honts, Raskin, & Kircher, 1994; Nahari & Vrij, 2015; Tekin, Granhag, Strömwall, & Vrij, 2016).

All participants were able to provide a familiar alibi and to talk about it. However, liars also had to withhold information about the crime and to lie about the time they were at the alibi setting (withholding incriminating information is also considered lying; for an overview on types of lies, see Vrij, 2008). Hence, even though liars visited the alibi

setting and could respond honestly about it, the counter-interrogation strategies they would employ from preparing for the interview to withholding information about their criminal activities to maintaining consistency (Granhag, Mac Giolla, Strömwall, & Rangmar, 2013; Vrij et al., 2010c) would not be used by truth-tellers. This is in line with the self-regulation theory as liars who employ counter-interrogation strategies tend to be more deliberate than truth-tellers when preparing and reporting about their alibi (Granhag et al., 2015; Hartwig et al., 2010). Given that liars are likely to withhold incriminating information and to be forthcoming when they report about an alibi, the main focus of the current study is on differences between liars' and truth-tellers' statements in response to questions about their alibi.

Previous familiarity studies have only examined the statements of liars who were either familiar or unfamiliar with the alibi, but none manipulated the level of familiarity with the alibi. Therefore, the second purpose of this study was to examine if informed liars differ from uninformed liars and uninformed truth-tellers when they are highly or poorly familiar with the alibi setting. An 'unfamiliar' condition was not included in the design, because liars typically do not choose an alibi setting with which they are unfamiliar (Culhane et al., 2008; Leins et al., 2013).

Taken together, the effects of familiarity and veracity information status on salient and non-salient aspects of the alibi setting, statement-evidence consistency (consistency with the alibi setting), and between-statement consistency (consistency between

interviews) were examined. Participants were interviewed twice using different visuospatial tasks to measure between-statement consistency. Previous research has shown that varying question format across interviews has helped truth-tellers recall more information in a subsequent interview (Fisher, Brewer, & Mitchell, 2009; Granhag, Strömwall, & Jonsson, 2003), but has hindered liars from repeating information due to the difficult nature of the task (Leins et al., 2012). Hence, the effect of varying the visuospatial tasks across interviews on statements by liars who employ counter-interrogation strategies was examined. To operationalise the terms, between-statement consistency was defined as the number of repeated items in the two visuospatial statements, and statement-evidence consistency was defined as the number of reported details in each visuospatial statement that accurately matched items found in the alibi setting.

In general, all participants in the high familiarity condition were expected to score higher on the number of salient and non-salient details, statement-evidence consistency, and between-statement consistency than participants in the low familiarity condition (Hypothesis 1). In line with the self-regulation theory, it was predicted that liars and truth-tellers would want to convince the interviewer of their credibility but only liars would employ information management. In other words, liars would withhold information about the crime and include as many details as possible about the alibi. Nonetheless, uninformed liars and uninformed truth-tellers who spend the same duration

at the alibi setting would have the same memory representation of it and would therefore not differ in their statements. On the other hand, when liars obtain information about the interview technique before committing the mock crime (informed liars), they are likely to prepare for the interview technique and look more closely at the alibi setting prior to the interview. This enables them to be more forthcoming about the alibi than truth-tellers and to provide detailed and consistent statements. Therefore, informed liars were expected to score higher than uninformed liars and uninformed truth-tellers on salient and non-salient details, statement-evidence consistency, and between-statement consistency (Hypothesis 2). It was anticipated that the differences between informed liars and uninformed liars and truth-tellers would be more pronounced in the high familiarity condition than in the low familiarity condition (Hypothesis 3), because informed liars have a stronger memory representation of the alibi setting when they stay longer there.

Method

Participants and Design

A total of 144 participants (61.5% females; M_{age} = 27.65 years, SD_{age} = 10.38) were recruited through the participant pool database at the University of Gothenburg to participate in a study on 'networking strategies'. Volunteers received a free lunch as part of their participation, and their names were entered in a draw to win two movie tickets.

A 3 × 2 randomised between-participants design was used with veracity information status (informed liars, uninformed liars, uninformed truth-tellers) and

familiarity (high familiarity, low familiarity) as factors and the salient details, non-salient details, between-statement consistency, and statement-evidence consistency in the visuospatial statements as dependent variables. Participants were equally distributed to the conditions, with 24 participants in each cell.

For the analysis, an average score was calculated for the salient details and non-salient details provided by each participant in the two interviews. A between-statement consistency proportion score (Repetitions provided in the second interview/total number of details provided in the first interview) was also calculated, because the number of repeated details provided in the second interview varies with the number of details provided in the first interview. Similarly, a statement-evidence consistency proportion score was calculated for each visuospatial statement (Number of statement-evidence consistent items/total number of details in the statement), and then the scores of statements provided by each participant were averaged.

Procedure

Liars. Liars were given briefing instructions to imagine there was a visitor at the department who might have violent radical views. They were asked to steal her USB memory stick, which was suspected to include extremist material, from her office, and to deliver it to a mail box in the building so that a member of university staff could inspect the contents. Then, they were instructed to have a cover story in case they were suspected of stealing the USB stick. Therefore, they were given a free sandwich coupon from a

local restaurant so they could use the restaurant as their alibi. A restaurant was used as an alibi because liars often mention settings where there are witnesses and about which they can be forthcoming (Culhane et al., 2008, 2013). All participants were asked prior to their appointment if they had ever visited the restaurant specified in the instructions. Only those who had never visited it were eligible to participate in the study.

Liars randomly allocated to the informed liars condition received these additional instructions:

If the radical visitor or anyone else suspects you of stealing the USB memory stick, they will want you to prove you were at the restaurant, so they might ask you to draw a sketch of the restaurant to confirm that you were there. Therefore, try as much as possible to attend to the layout of the restaurant and remember as many things as you can from the setting. You need to look for the smallest details in the restaurant to be able to complete the drawing.

These instructions were detailed so that liars would be able to adequately process and understand the requirement of this condition. In real life cases, criminals who anticipate the interview technique are also likely to think of minute details relevant to the interview technique to be able to counter it (Honts et al., 1994).

Participants randomly allocated to the low familiarity condition spent 30 seconds in the restaurant picking up a sandwich previously ordered by phone by the experimenter. Participants in the high familiarity condition spent 10 minutes in the restaurant, so they

ordered their sandwich themselves when they visited the restaurant. Participants in the low familiarity condition spent 30 seconds in the restaurant, in line with previous studies that have shown that this duration is sufficient for individuals to encode different objects within a location (Brewer & Tryens, 1981). Also, a few minutes were enough to familiarise truth-tellers with their alibi setting (Roos af Hjelmsäter et al., 2014), so 10 minutes were suggested as an appropriate duration for the high familiarity condition.

It was pre-arranged with the restaurant staff that participants in the low familiarity condition would be given a sandwich as soon as they reached the restaurant, while participants in the high familiarity condition would be given a sandwich 10 minutes from the time they entered the restaurant. The staff members confirmed that all participants left the restaurant after being provided with the sandwich.

Truth-tellers. All truth-tellers read instructions to go to the restaurant, buy a sandwich using a free lunch coupon, and return immediately to the department. As with liars, truth-tellers in the high familiarity condition waited for 10 minutes in the restaurant to get their sandwich and those in the low familiarity condition were handed the sandwich 30 seconds after entering the restaurant.

The interviews. After participants returned to the department, they were given the opportunity to eat their sandwich. Then, they were informed that a visitor claimed she had lost her USB stick which contained personal and confidential information. Hence, she was interviewing everybody who was at the department on that day. Liars were also

notified that the USB stick contained dangerous information, so they should not mention knowing anything about the USB stick or about stealing it. Liars were asked to use the restaurant as an alibi, and informed liars were reminded that they might be asked to draw the restaurant. Lastly, all participants were instructed to convince the interviewer that they were being truthful. To further motivate participants, they were informed that their names will be entered in a draw to win two movie tickets if they were convincing (in fact, all participants were entered in the draw). Participants were given as much time as they needed to prepare for the interview.

Participants were interviewed by one of four female interviewers who pretended to be the visitor who lost her USB stick. Interviewers were blind to the participants' veracity conditions and to the study hypotheses. Participants were first asked if they have stolen the USB stick. Then, the interviewer mentioned that the experimenter has informed her the participant was at the restaurant when the USB stick was stolen. To prove this was true, the participant was asked to try to recall and draw as many details as possible from the restaurant, including decorations, tables, chairs, etc., and to imagine viewing the restaurant from the ceiling to have a full view of the restaurant. Participants were asked to draw the restaurant from a ceiling view, because a pilot study showed that when participants were not guided about the drawing, they tended to draw the restaurant from an entrance view and did not include all the zones within the restaurant. Participants were

provided with a blank A3 sheet and were given as much time as needed to complete the drawing.

Individuals tend to have different drawing skills, spatial orientation, visual attention, and memory capacity (Huang, Mo., & Li, 2012; Skogsberg et al., 2015; Vogel & Machizawa, 2004), so it was conceived that participants would differ on the number of details they provide as a result of both individual differences and experimental manipulation. Hence, participants were asked to draw the interview room to control for individual differences. The order of the requests to draw the interview room and the restaurant was counterbalanced.

After completing these visuospatial tasks, the interviewer left the room and the participant engaged in a filler task. The interviewer reentered the room after 10 minutes to start the second interview. She informed the participant she had been able to find an A3 layout sketch of the restaurant on which the restaurant's entrance door, food counter, and sofa were drawn and 37 small black-and-white photographs of items, all found in the restaurant. Participants were requested to place the correct items in their exact location, and they were given as much time as needed to complete the task. This recognition task is somewhat similar to maps used in actual investigative interviews on which suspects need to mark locations, people, and objects related to the crime (S. Kleinman, personal communication, June 27, 2016).

As in the first interview, and to control for individual differences in spatial orientation skills, visual attention, and memory capacity, participants were provided with 23 white-and-black photos from the interview room and were asked to place them on a blank A3 sheet. The questions regarding the interview room and the restaurant were also counterbalanced.

After completing these tasks, participants responded to a computerised post-interview questionnaire. They were asked to indicate their age and gender and to rate on a 7-point scale their motivation to complete the tasks involved in the experiment (1 = *not motivated at all* and 7 = *very motivated*), their anticipation of the visuospatial tasks (1 = *not anticipated at all* and 7 = *very anticipated*), their surprise when asked to complete the visuospatial tasks (1 = *not surprised at all* and 7 = *very surprised*) and the extent to which they looked closely at the restaurant setting while they were there (1 = *did not look around at all* and 7 = *looked around very much*).

Coding

Two coders, blind to the participants' condition and study hypotheses, rated the visuospatial statements of the restaurant and the interview room for the first and second interviews. The coders first rated the statements of five participants and then discussed discrepancies in the ratings. Afterwards, they rated the statements of three more participants and resolved the discrepancies. For the purpose of establishing inter-rater

reliability, one coder rated the statements of 35 participants, and the other coder rated all the statements.

To determine the salient details in each of the restaurant and the interview room statements, a pilot study with 20 participants was conducted. Participants visited the restaurant/interview room and were asked to point out the salient item (i.e. items that caught their attention the most). Items chosen by more than 60% of the participants were considered salient. The salient items identified in the restaurant included foreign pastries, colourful pillows, colourful chairs, and the employee. The salient items identified in the interview room were a sandbox, a bookshelf with toys, and the interviewer. All other items in the restaurant/interview room were considered as non-salient.

The coders counted the number of salient and non-salient details in each visuospatial statement. There were many pieces of the same salient item in the restaurant; that is, there were numerous pieces of foreign pastries, colourful pillows, and colourful chairs of the same shape. Hence, if the same (salient or non-salient) item was drawn more than once, it received a score in accordance with the number of times it appeared. For example, if the same-shaped chair was drawn four times in the same statement, a score of four was given. Also, items that were rich in details were given additional scores. For example, if a feature (e.g., colour) of a chair was provided, the chair received a score of two (one score for including the chair and one score for including the colour feature of

the chair). If two features of the chair were included (e.g., colour and drawings on the chair), the same chair received a score of three.

The Intra-Class Correlation Coefficient (*ICC*), which measured the agreement between the two coders, was used for the restaurant and interview room statements in the two interviews. In other words, the number of salient items in the restaurant statement provided in the first interview were added to the number of salient items in the second interview. The same was done for non-salient details and for the interview room statements. For salient details, the scores ranged between 3 and 84 for the restaurant statements and between 5 and 15 for the interview room statements. The *ICC* score was .98 for the restaurant statements and .92 for the interview room statements. As for non-salient details, the scores ranged between 10 and 116.5 for the restaurant statements and between 15 and 33 for the interview room statements. The *ICC* score was .97 for the restaurant statements and .89 for the interview room statements.

To measure between-statement consistency (i.e. repetitions) between the self-generated drawing in the first interview and the layout sketch in the second interview, the coders counted the number of repeated items (as well as repeated features of those items) in the restaurant and interview room statements. Between-Statement consistency scores ranged between 5 and 110.5 for the restaurant statements and between 12.5 and 47 for the

interview room statements. The *ICC*s were .94 for both the restaurant and the interview room statements.

After rating all the statements for the number of salient details, non-salient details, and between-statement consistency, the coders visited the restaurant/interview room to code statement-evidence consistency (if they were acquainted with the restaurant/interview room before rating the other dependent variables, coders may have been biased in their ratings). The same protocol used for coding the visuospatial statements' number of salient details, non-salient details, and between-statement consistency was used to resolve discrepancies when rating statement-evidence consistency. The coders gave a consistency score for each correctly drawn/chosen item that was drawn/placed in its correct location (for both the restaurant and interview room statements). Moreover, if the participant correctly included a feature of that item, the items received an additional consistency score. That is, a correctly drawn chair would receive a score of one, but if the participant correctly added a feature of that chair (e.g., colour), two statement-evidence consistency scores were given for that chair. An additional consistency score was also given for correctly drawn features of items. For each participant, the restaurant/interview room statement-evidence consistency score for the first interview was combined with the score for the second interview. Scores ranged between 16 and 203.5 for the restaurant statements and between 36 and 69.5 for the

interview room statements. The *ICC*s (for the first and second interviews combined) were .98 for the restaurant statements and .93 for the interview room statements.

Results

Post-Interview Questionnaire

Four separate ANOVAs were conducted with familiarity and veracity information status as the independent variables and each of motivation, surprise, anticipation, or looking closely at the restaurant setting (measured on 7-point scales) as the dependent variable.[1] The analyses revealed a significant familiarity effect for motivation, $F(1, 62) = 6.56$, $p = .013$, $\eta_p^2 = .10$, with higher motivation among participants in the high familiarity condition ($M = 6.08$, $SD=1.00$) than participants in the low familiarity condition ($M = 5.34$, $SD = 1.38$). However, the means showed that participants in both conditions were highly motivated as they scored at the upper end of the motivation scale.

A significant main effect of veracity information status was found for anticipation, $F(2, 62) = 26.53$, $p < .001$, $\eta_p^2 = .46$, with informed liars ($M = 4.23$, $SD = 2.20$) anticipating the visuospatial task significantly more than uninformed liars ($M = 1.33$, $SD = 1.11$) or uninformed truth-tellers ($M = 1.40$, $SD = 0.87$). In line with this finding, veracity information status showed a significant main effect for surprise, $F(2, 62) = 9.10$, $p < .001$, $\eta_p^2 = .23$, as informed liars ($M = 3.00$, $SD = 1.80$) reported being significantly less surprised by the visuospatial tasks than uninformed liars ($M = 5.24$, $SD = 1.45$) and uninformed truth-tellers ($M = 4.60$, $SD = 2.10$). Lastly, informed liars ($M = 4.95$, $SD =$

1.21) reported that they looked closely at the restaurant setting significantly more than uninformed liars (M = 2.86, SD = 1.39) and uninformed truth-tellers (M = 3.20, SD = 1.50), $F(2, 62) = 15.66$, $p < .001$, $\eta_p^2 = .34$. The uninformed liars and uninformed truth-tellers did not differ significantly from each other on any of the variables. Hence, the manipulations were successful.

Hypotheses Testing

The correlations between salient details, non-salient details, statement-evidence consistency proportion score, and between-statement consistency proportion score were examined to determine if the dependent variables were correlated and a single MANCOVA may be conducted on all dependent variables combined. Salient and non-salient details correlated significantly with each other, $r = .565$, $p < .001$. Also, the between-statement consistency proportion score was significantly correlated with the statement-evidence consistency proportion score, $r = .338$, $p < .001$. Importantly, non-salient details were significantly correlated with the between-statement consistency proportion score, $r = .230$, $p = .006$, and the statement-evidence consistency proportion score, $r = .231$, $p = .005$. These correlations indicated that details' saliency and statement consistency were interdependent, and therefore a single MANCOVA was conducted with the four dependent variables combined.

The analysis included familiarity and veracity information status as the independent variables, the restaurant's salient details, non-salient details, between-

statement consistency proportion score, and statement-evidence consistency proportion score as the dependent variables, and the interview room's salient details, non-salient details, between-statement consistency proportion score, and statement-evidence consistency proportion score as the covariates. The results revealed significant multivariate main effects of familiarity, Wilk's Lambda $\Lambda = 0.76$, $F(4, 131) = 10.21$, $p < .001$, $\eta_p^2 = .24$, and veracity information status, Wilk's Lambda $\Lambda = 0.67$, $F(8, 262) = 7.32$, $p = .001$, $\eta_p^2 = .18$, and a significant multivariate veracity information status × familiarity interaction effect, Roy's Largest Root = 0.10, $F(4, 132) = 3.38$, $p = .012$, $\eta_p^2 = .09$.

Univariate analyses revealed that participants in the high familiarity condition scored higher than participants in the low familiarity condition on salient details, $F(1, 134) = 17.31$, $p < .001$, $\eta_p^2 = .11$, non-salient details, $F(1, 134) = 33.61$, $p < .001$, $\eta_p^2 = .20$, and statement-evidence consistency proportion score, $F(1, 134) = 4.73$, $p = .031$, $\eta_p^2 = .034$. Hence, Hypothesis 1 that participants in the high familiarity condition would score higher on the dependent variables than participants in the low familiarity condition received partial support.

As for veracity information status, informed liars scored higher than uninformed liars and truth-tellers on salient details, $F(2, 134) = 7.50$, $p = .001$, $\eta_p^2 = .10$, and non-salient details, $F(2, 134) = 29.52$, $p < .001$, $\eta_p^2 = .31$. Hence, Hypothesis 2 that informed

liars would score higher on the dependent variables than uninformed liars and uninformed truth-tellers was partially supported.

Table 1

Means and Standard Deviations of the Dependent Variables as a Function of Veracity Information Status and Familiarity

	Salient details		Non-Salient details		Between-Statement consistency proportion		Statement-Evidence consistency proportion	
	M (SD)	95% CI	*M (SD)*	95% CI	*M (SD)*	95% CI	*M (SD)*	95% CI
Informed liars								
Low familiarity	14.58 (7.56)	[11.39, 17.77]	22.46 (9.58)	[18.41, 26.50]	.57 (.15)	[.51, .64]	.80 (.12)	[.75, .85]
High familiarity	21.42 (8.48)	[17.83, 25.00]	36.98 (10.36)	[32.60, 41.35]	.64 (.16)	[.58, .71]	.87 (.08)	[.84, .90]
Uninformed liars								
Low familiarity	10.23 (6.37)	[7.54, 12.92]	15.21 (6.05)	[12.65, 17.76]	.56 (.22)	[.47, .66]	.77 (.14)	[.71, .36]
High familiarity	14.00 (5.97)	[11.48, 16.52]	21.13 (6.47)	[18.39, 23.86]	.60 (.18)	[.52, .67]	.82 (.09)	[.79, .86]
Uninformed truth tellers								
Low familiarity	11.25 (6.27)	[8.60, 13.90]	16.65 (7.10)	[13.65, 19.64]	.50 (.14)	[.44, .56]	.79 (.10)	[.74, .83]
High familiarity	15.60 (8.02)	[12.22, 19.00]	20.98 (7.28)	[17.90, 24.05]	.56 (.18)	[.49, .64]	.80 (.15)	[.73, .86]

The interaction effect was significant for non-salient details, $F(2, 134) = 6.26$, $p = .003$, $\eta_p^2 = .09$. Simple effects revealed that informed liars reported more non-salient details than uninformed liars and uninformed truth-tellers, and the effect size was more pronounced in the high familiarity condition, $F(2, 138) = 31.96$, $p < .001$, $\eta_p^2 = .47$, than in the low familiarity condition, $F(2, 138) = 5.57$, $p = .005$, $\eta_p^2 = .15$. Hence, Hypothesis 3 which postulated that the interaction effect would be more pronounced in the high familiarity condition than in the low familiarity condition for all dependent variables was

partially supported. Lastly, uninformed liars and uninformed truth-tellers did not differ in their reports in any of the familiarity conditions. In conclusion, these results generally supported the hypotheses although significant effects were not found for all the suggested dependent variables.

Discussion

The results suggest that liars employing counter-interrogation strategies do not always succeed in producing statements that resemble those of truth-tellers. Liars who knew prior to committing their crime that they might be asked to provide a visuospatial statement if interviewed provided more detailed statements than truth-tellers and liars who did not possess this knowledge. These findings can be explained by the self-regulation theory which postulates that individuals evade a threat by using an avoidance or an escape strategy (Bauer & Baumeister, 2011). Informed liars used an escape strategy by denying incriminating information and revealing as much information as possible about the alibi (DePaulo et al., 2003; Granhag & Hartwig, 2008). They believed that providing detailed visuospatial statements would make them appear forthcoming and honest. Therefore, the knowledge that informed liars possessed prompted them to pay more attention to the alibi setting and, consequently, to provide overly detailed statements. This deliberate strategy is in contrast with truth-tellers' reporting strategy which comprises only reporting the event as they recall it (Granhag & Hartwig, 2008; Granhag & Strömwall, 1999; Hartwig et al., 2007, 2010; Vrij et al., 2010c).

The self-regulation theory also explains the finding that participants who were highly familiar with the alibi setting provided visuospatial statements that were more detailed and consistent with the evidence than participants who were poorly familiar with the alibi setting. That is, participants would have wanted to make an honest impression on the interviewer and to appear convincing and forthcoming. Accomplishing this was easier for participants in the highly familiarity condition than participants in the low familiarity condition, because they had longer exposure to the setting. These results are in line with the spatial cognition research which has shown that the more familiar individuals are with the spatial setting, the stronger their memory of it which ultimately enables them to perform well on visuospatial tasks (Prestopnik et al., 2000). Nonetheless, the level of familiarity with the alibi setting does not seem to affect suspects' consistency across statements when different visuospatial tasks are implemented. It may be that as long as suspects are familiar with the alibi setting, they are able to maintain between-statement consistency, irrespective of whether they are liars or truth-tellers.

High familiarity with the alibi setting was particularly effective at increasing the number of non-salient details provided by informed liars. This finding is important for investigators, because liars are more likely to use a highly familiar alibi (Culhane et al., 2008, 2013), and hence to include non-salient details in their visuospatial statements. Nonetheless, the finding that informed liars provided more salient and non-salient details in their statements than other participants demonstrates that even poorly familiar

informed liars can provide detailed statements. The spatial cognition literature speaks to this as it is intentional learning rather than the passive experience of the spatial context that increases one's knowledge of the setting and eventually enhances performance on relevant spatial tasks (Acredolo, 1982; Gale, Golledge, Halperin, & Couclelis, 1990). For example, actively learning directions to reach a destination in a familiar area will enhance memory more than counting on one's passive familiarity with the area to reach that destination. In other words, even though high familiarity enhanced memory representation in the current study, that does not imply that participants in the high familiarity condition had excellent knowledge of the setting. It was only after liars intended to study the setting and paid close attention to it (informed liars) that their memory was enhanced and they could perform better on the visuospatial tasks. Therefore, in the event that suspects can anticipate being asked to report spatial information, liars' reports can be more detailed than truth-tellers' reports. Accordingly, investigators are cautioned against the assessment of suspects' statements without considering suspect background information, such as the possible familiarity of the suspect with the alibi setting and with the interview technique.

Uninformed liars did not significantly differ from uninformed truth-tellers, demonstrating that when liars and truth-tellers are equally familiar with (and informed about) the alibi setting, they provide similarly detailed and consistent visuospatial statements. These findings are in line with previous research showing that liars and truth-

tellers who are equally familiar with the reported event do not differ in their statements (Blandon-Gitlin et al., 2005; Warmelink et al., 2013). Hence, it may be concluded that familiarity with the alibi assists liars in providing statements similar to those of truth-tellers, but getting acquainted with the interview technique enables them to provide statements that are more detailed than those of truth-tellers.

None of the consistency proportion scores differed between liars and truth-tellers even when liars used counter-interrogation strategies. The correlation analysis indicated that participants who included more non-salient details in their statements also showed higher levels of statement-evidence consistency and between-statement consistency. As it was informed liars who strived to maintain a high number of non-salient details, it may be inferred that they also strived to maintain high levels of these statement consistency types. However, it appears that, even though they provided more non-salient details than truth-tellers, they could not be more consistent on these types. Therefore, it is conceived that, given the high number of non-salient details provided by informed liars, their statements may have been prone to errors (i.e., inaccurately recalled items), and they were hence not capable of enhancing statement-evidence consistency. Similarly, informed liars may have not been able to score higher than truth-tellers on between-statement consistency, because it was difficult for them to repeat all the provided details in the second interview. In line with previous studies which have found that instructing participants to counter the interview technique does not always assist liars in evading lie

detection (e.g. Harvey et al., 2017b; Vrij et al., 1996), the current research suggests that consistency may not be easily controlled by liars employing counter-interrogation strategies.

Limitations and Future Directions

The post-interview questionnaire showed that participants in the high familiarity condition were more motivated to convince the interviewer than participants in the low familiarity condition. It may be that participants who ordered and waited for their lunch at the restaurant found the overall experience more plausible and interactive than participants who picked up their sandwich and saw the restaurant for only a few seconds. This is corroborated by previous research on motivation demonstrating that more interactive experiences in language, learning, and work contexts enhance motivation (Jauregi, de Graaff, van den Bergh, & Kriz, 2012; Keller, 1987; Nichols & Miller, 1994; Orpen, 1997). Overall, all participants were highly motivated, and they were able to include salient and non-salient details in their statements irrespective of their level of familiarity with the restaurant. Hence, motivation does not seem to have impacted performance, indicating that the familiarity manipulation was effective.

In addition, informed liars self-reported that they looked more closely at the alibi setting than uninformed participants which was corroborated by the results. This question may have been better asked prior to the interviews, because reporting about an outcome increases the perceived likelihood that the outcome occurred (hindsight bias theory;

Fischoff, 1975). Informed liars might have thought that they looked closely at the alibi setting, because they performed well on the visuospatial tasks, and not because they looked closely at the restaurant. However, it is believed that if they have not looked closely at the restaurant, they would not have been able to incorporate more details in their drawings than uninformed liars and truth-tellers.

The alibi setting was a public venue that was used over a period of a few months. The restaurant staff sometimes changed the location of objects in the restaurant, but all these changes and their dates were recorded. Therefore, it was possible to accurately compare the visuospatial statements with the alibi setting on the date it was provided. Fortunately, the objects that were relocated were non-salient objects. Hence, they were neither central to the statements nor did they affect the hypotheses. In forensic investigations, alibi settings may change as well, so investigators inquiring about spatial details of the alibi setting need to make sure they have knowledge of the alibi setting for the time it was visited by the suspect (i.e. on the date the crime occurred).

Only one alibi setting was examined in the current research. It is important for future studies to examine different alibi settings (e.g. gym, office, etc.). It would also be interesting to replicate the study in other settings that may not be consistent with people's ordinary schemas (i.e. settings that people do not often visit). Previous research has shown that individuals often use schema-consistent information to fill in memory gaps (Brewer & Treyens, 1981; Leins & Charman, 2016). Participants in the current study may

have drawn objects they know to be found in a restaurant rather than objects found in the specific restaurant they have visited. Therefore, various settings should be studied before generalising the findings to different alibi settings.

The results suggest that liars, irrespective of their level of familiarity with the alibi setting, do not seem able to supersede truth-tellers on statement consistency—even when they employ counter-interrogation strategies. As liars cannot control consistency, it should not be difficult to elicit differences for consistency between liars and truth-tellers. Previous studies addressed this matter by asking participants to respond to different question formats (Hartwig et al., 2011) or to different report modes (Leins et al., 2012; Leins, Fisher, Vrij, Leal, & Mann, 2011) across or within interviews. The manipulations proved successful in reducing liars' consistency compared to that of truth-tellers. Hence, more research is needed to explore questioning techniques that may reduce statement consistency in deceptive statements when liars are familiar with their alibi or when they are acquainted with the interview technique.

Familiarity may also be examined within lie detection settings. Previous research have examined the effect of perceived situational familiarity with the target event on veracity judgments (Reinhard, Sporer, & Scharmach, 2013). Results demonstrated that high familiarity with the target event enhanced veracity judgments. This was explained by judges' reliance on verbal cues to deception, which are more useful and lead to more accurate judgments than nonverbal cues to deception (DePaulo et al., 2003). It may also

be that familiarity with the setting makes it easier for investigators to connect together other available information about the case, which ultimately enhances judgment accuracy (Blaire, Levine, & Shaw, 2010). Future research may examine this speculation, and may also test whether familiar versus unfamiliar investigators are accurate when detecting lies by familiar versus unfamiliar liars.

The current study advances our understanding of the effects of counter-interrogation strategies and of familiarity with the alibi setting on visuospatial statements. The results suggest that liars employing counter-interrogation strategies do not necessarily provide statements similar to those of truth-tellers. If liars employing counter-interrogation strategies are familiar with the alibi, they provide statements that are more detailed than those of truth-tellers. More research is needed to develop interview techniques that enhance lie detection by eliciting differences in verbal cues to deception between liars and truth-tellers.

Endnotes

[1]A technical problem allowed us to conduct the univariate analyses for the post-interview questionnaire on 68 participants only. A frequency analysis using all 144 participants revealed that 84% of the participants were highly motivated, 58% were very surprised, and 31% scrutinised the restaurant (scoring 5 or above on the 7-point scale). Seventy three percent of the participants did not anticipate they will be asked for a visuospatial statement (scoring 3 or below on the 7-point scale).

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Study IV

Police Officers' Perceptions of Statement Inconsistency

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Abstract

In this study, police officers' ($N = 71$) perceptions of statement inconsistency types (within-statement, between-statement, statement-evidence, and within-group inconsistencies) were examined. Approximately half of the officers reported looking for statement inconsistency to detect deception. Specifically, officers associated contradictions and omissions with deception, and repetitions and reminiscences with truthfulness. Officers reported using statement-evidence inconsistency more than any other inconsistency type, and they believed it was the easiest type to assess. They reported that liars attempt to eliminate within-statement inconsistency unless they are strategically presented with incriminating evidence. Moreover, the majority of officers indicated that they have used drawings to assess inconsistencies with suspects' verbal statements. Finally, suspects' criminal history, intelligence, and personality were considered important predictors of suspects' success or failure at eliminating inconsistencies in their statements. These findings are discussed in light of the literature on statement inconsistency, and recommendations regarding the applied use of statement inconsistency types are offered.

Introduction

According to investigative practitioners, statement inconsistency is one of the most important cues to deception (Akehurst, Köhknken, Vrij, & Bull, 1996; Granhag, Strömwall, & Hartwig, 2005; Greuel, 1992; Strömwall & Granhag, 2003). Despite this, research has not focused on how practitioners attempt to detect deception through statement inconsistency or how they perceive different types of statement inconsistency. In the current study, police officers' perceptions and usage of different types of statement inconsistency were examined.

There is a general tendency among practitioners and laypeople to perceive consistent statements as truthful, and inconsistent statements as deceptive (Granhag, Andersson, Strömwall, & Hartwig, 2004; Granhag & Strömwall, 2000; Lakhani & Taylor, 2003; Strömwall, Granhag, & Jonsson, 2003; Vrij, Granhag, & Porter, 2010a). This *consistency heuristic* has been empirically refuted as liars are often as consistent as, and sometimes more consistent than, truth-tellers (Granhag & Strömwall, 2002; Granhag, Strömwall, & Jonsson, 2003). In line with the 'repeat versus reconstruct' hypothesis that was posited by Granhag and Strömwall (1999), liars prepare and rehearse their statements for the investigative interview(s), and hence, they can easily *repeat* their statements consistently within and across interviews. Truth-tellers, however, provide their statements by recalling information from memory, which is susceptible to *omissions* (missing or

forgetting to report details that were previously reported) as well as *reminiscences* (recollection of previously unreported information; Fisher, Brewer, & Mitchell, 2009).

This ensuing inconsistency is more likely to occur if the event is poorly encoded, if there is a delay between the event and the interview, and/or if there is a delay between the interviews (Cohen, 2001; Harvey, Vrij, Leal, Hope, & Mann, 2017; Tulving & Thomson, 1973). Hence, truth-tellers reconstruct information when they recall the target event, and that consequently increases their statement inconsistency across interviews (Fisher, Vrij, & Leins, 2013; Odinot Memon La Rooy, & Millen, 2013).

Types of Statement Inconsistency

Scholars have examined four types of inconsistency (for an overview, see Vredeveldt, van Koppen, & Granhag, 2014): i) within-statement inconsistency (lack of correspondence between details provided by one suspect at different points within a single interview); ii) between-statement inconsistency (lack of correspondence between details provided by one suspect across repeated interviews); iii) statement-evidence inconsistency (lack of correspondence between details provided by a single suspect and available evidence); and iv) within-group inconsistency (lack of correspondence between details provided by different suspects in a single case involving multiple suspects). Research has demonstrated that simply observing suspects' statement inconsistency does not enhance deception detection (Granhag & Strömwall, 2001b; Vrij et al., 2009). The reason for this is that liars prepare for the interview by anticipating questions that may be

asked and rehearsing responses to them (Chan & Bull, 2014; Hartwig, Granhag, & Strömwall, 2007; Vrij, Mann, Leal, & Granhag, 2010b). These counter-interrogation strategies by liars reduce the cognitive load imposed on them during the interview and eventually enhance their statement consistency, so they may become as consistent as truth-tellers (Granhag & Strömwall, 2002).

However, the interviewer may play an active role in the interview by making the interview more cognitively demanding for liars and ultimately depleting their cognitive resources (Vrij, Granhag, Mann, & Leal, 2011). Asking unanticipated questions (Vrij et al., 2009) or imposing cognitive load (e.g., by asking suspects to report their story in reverse order; Vrij, Leal, Mann, & Fisher, 2012a) increases the cognitive demands of the interview. These questions may not be difficult for truth-tellers who recall information from memory, but they may be difficult for liars who have not anticipated them and need to generate a spontaneous lie (Vrij, 2008; Vrij et al., 2009). Increasing the interview difficulty for liars but not for truth-tellers elicits cues to deception, such as statement inconsistency, and thus enhances lie detection (Granhag, Vrij, & Verschuere, 2015a).

Unanticipated questions might relate to spatial and temporal details of the reported event (Vrij et al., 2009). They may also involve asking suspects to provide a drawing of the alibi location (Vrij, Mann, Leal & Fisher, 2012b; Vrij, Leal, Mann, Warmelink, Granhag, & Fisher, 2010c). These questions are typically not anticipated by either liars or truth-tellers, but they are more difficult to answer for liars because liars do not have a

vivid image of the alibi they fabricated. Therefore, liars are more likely to be inconsistent in their responses to these questions compared to truth-tellers. This assumption has been corroborated in studies showing that unanticipated questions reduced the level of within-statement consistency (Leins, Fisher, Vrij, Leal, & Mann, 2011), within-group consistency (Roos af Hjelmsäter, Öhman, Granhag, & Vrij, 2014; Sooniste, Granhag, Strömwall, & Vrij, 2016; Vrij et al., 2009) and between-statement consistency (Leins, Fisher, & Vrij, 2012) for liars but not for truth-tellers. However, asking unanticipated questions in an interview and then repeating the same questions in a subsequent interview did not increase differences between liars' and truth-tellers' between-statement consistency, a finding that may be explained by liars' counter-interrogation strategies such as preparation and question rehearsal (Granhag, Mac Giolla, Sooniste, Strömwall, & Liu-Jonsson, 2016; Granhag & Strömwall, 1999; Mac Giolla & Granhag, 2015).

Imposing cognitive load by asking suspects to respond quickly or to provide a reverse order narration (Masip, Blandón-Gitlin, Martinez, Herrero, & Ibabe, 2016; Vrij et al., 2012a) or by changing interviewers (Shaw et al., 2014) has been shown to reduce within-statement consistency and between-statement consistency for liars more than for truth-tellers. It is easier for truth-tellers than for liars to respond to these cognitively demanding questions, because truth-tellers encode the event along several dimensions and could hence recall information from memory along a different dimension (Leal et al., 2012; Vrij, 2016; Vrij et al., 2011). This explains the higher levels of consistency in

truth-tellers' statements in the aforementioned studies. For liars, however, the interview is already taxing given the cognitive load imposed by having to lie. Therefore, asking them questions different from those for which they prepared would deplete their cognitive resources and ultimately reduce consistency in their statements (Vrij et al., 2009).

Furthermore, the manner in which evidence is presented in the interview is critical to increase interview difficulty for liars more than for truth-tellers (Hartwig, Granhag, Strömwall, & Vrij, 2005). That is, if evidence is presented early in the interview, liars may find a non-incriminating explanation that is consistent with evidence. However, if evidence is presented strategically after exhausting all explanations for it, it becomes difficult for liars to maintain statement consistency. The Strategic Use of Evidence technique, which was developed to test these assumptions, was superior to the early presentation of evidence technique and elicited significantly more statement-evidence inconsistency, within-group inconsistency, and within-statement inconsistency in liars' than in truth-tellers' statements (Granhag, Rangmar, & Strömwall, 2015b; Granhag, Strömwall, Willén, & Hartwig, 2013). Taken together, past research demonstrates the importance of taking the interview protocol into consideration when detecting deception by carefully preparing which questions to ask, as well as when and how to ask them.

The Current Study

Previous surveys investigating police officers' perceptions of lie detection have included lists of predetermined verbal and nonverbal cues, which officers rated as

indicative of deception or truth (e.g., Akehurst et al., 1996; Strömwall & Granhag, 2003). In such studies, statement inconsistency was repeatedly rated as one of the most important cues to deception with up to 87% of officers agreeing that it is diagnostic of deception (Granhag et al., 2005; Greuel, 1992; Strömwall & Granhag, 2003). Accordingly, a questionnaire that focused specifically on statement inconsistency was devised. It examined how officers perceive different inconsistency types and how these are used to detect deception.

Investigative practitioners generally use the consistency heuristic by presuming that repetitions (consistent details) indicate truthfulness whereas omissions, reminiscences, and contradictions (inconsistent details) indicate deception (Fisher et al., 2009, 2013; Granhag et al., 2005). Hence, it was expected that officers would associate repetitions with truthfulness and contradictions, reminiscences, and omissions with deception (Hypothesis 1). Moreover, previous research has suggested that contradictions rarely occur in suspects' statements, and reminiscences and omissions are more likely to occur in truthful rather than in deceptive statements (Cohen, 2001; Fisher et al., 2009; Granhag & Strömwall, 2002; Shaw et al., 2014). Nonetheless, officers tend to look for contradictions more than any other (in)consistency measure (Granhag et al., 2005). Accordingly, it was predicted that officers would report looking for contradictions more than for reminiscences, omissions, and repetitions (Hypothesis 2).

Previous research has shown that in the presence of repeated statements by a single suspect, laypeople tend to look for between-statement inconsistency more than for within-statement inconsistency (Granhag & Strömwall, 2001a). In line with this finding, it was conceived that officers would report relying more on between-statement inconsistency than on within-statement inconsistency in the presence of different statements from a single suspect (Hypothesis 3).

Statement-Evidence inconsistency is perceived by officers and laypeople as a valid indicator of deception (Granhag et al., 2005; Greuel, 1992). Hence, it was expected that officers would report looking for statement-evidence inconsistency more than any other type of inconsistency (Hypothesis 4). In line with this hypothesis, they would indicate that it would be easier to accurately assess statement-evidence inconsistency than any other type of inconsistency (Hypothesis 5).

Officers were asked if they thought that liars who are presented with incriminating evidence, after explanations for it have been exhausted, would be more likely to change their statement to fit it with the evidence or to maintain their statement, risking statement-evidence inconsistency. Previous research has found that police officers in many countries tend to employ the Strategic Use of Evidence technique in investigative interviews (Tekin, Granhag, Strömwall, & Vrij, 2017). The application of this technique is more likely to elicit statement-evidence inconsistency than within-statement inconsistency (Granhag et al., 2013, Tekin, Granhag, Strömwall, & Vrij, 2016).

Accordingly, it was speculated that officers' experience may have made them notice this behaviour, so they would report that liars are more likely to be inconsistent with the evidence than within their statements (Hypothesis 6). In line with this hypothesis, officers were expected to report that liars generally attempt to eliminate within-statement inconsistency more than any other type of inconsistency (Hypothesis 7). Officers were not expected to report any differences in the levels of statement inconsistency types for truth tellers.

The survey also included questions about issues that have not been empirically examined yet, but that are of importance in this context. Questions were exploratory and hence open-ended. At the beginning of the questionnaire (inserted before the closed questions), officers were asked about the verbal cue(s) they were most likely to use to detect deception. Previous research has shown that investigative practitioners use statement inconsistency to a large extent in their decisions (Granhag et al., 2005; Greuel, 1992), so the purpose of this question was to explore the type of inconsistency they were most likely to employ in their decision making. Officers were also asked about their approach to assessing within-statement inconsistency, which may be more difficult to evaluate compared to other inconsistency types. Moreover, officers indicated if and how they implemented drawings in interviews to assess inconsistencies. Recent studies have suggested that drawings are a promising tool in distinguishing liars from truth-tellers and in eliciting inconsistencies (Leins et al, 2012; Roos af Hjelmsäter et al, 2014; Vrij et al.,

2009; Vrij et al., 2010c). Also, drawings are increasingly used in investigative interviews (e.g., the Cognitive Interview), and they are accepted as evidence in courts (e.g., United Kingdom; Geiselman 2012; Marlow & Hilbourne, 2011).

Last of all, officers were asked about their perceptions of possible factors (suspects' age, gender, level of education, social class, criminal history, personality, intelligence, race, nationality, and language proficiency) that might influence suspects' statement inconsistency. A number of previous studies have examined the effects of these factors on deception detection but not on statement inconsistency. One study found that police officers perceived suspects with a criminal record to be good at lying (Moston & Stephenson, 1992). That is, suspects acquainted with investigative interviewing have extensive opportunities to receive feedback regarding their behaviour which eventually make them good at hiding their lies (Granhag et al., 2004; Granhag, Clemens, & Strömwall, 2009; Hartwig, Granhag, Strömwall, & Andersson, 2004; Vrij et al., 2010a). Other studies have shown that police officers erroneously believed that younger children and adolescents are generally poor at controlling their behaviour (Vrij, Akehurst, & Knight, 2006) despite research demonstrating this population is good at behavioural control (Blandon-Gitlin, Pezdek, Rogers, & Brodie, 2005; Gongola, Scurich, & Quas, 2017).

Method

Participants

Police officers were formally or informally recruited through contacts in Australia, Canada, and the United Kingdom (UK). Following stakeholders' approvals, the first author or the contacts sent an email to police officers in the respective department to complete a questionnaire about "police officers' perceptions of cues to deception". Officers with at least three years of experience in investigative interviewing were eligible to participate. The response rate was 10% for Australian officers, whom the student candidate contacted. The response rate by officers in Canada and the UK could not be estimated, because the questionnaire was circulated by the contacts, so the original number of recipients cannot be known.

A total of 71 officers completed the questionnaire, of whom 52 were male (73%) and 19 were female (27%). Their age ranged between 31 and 60 (M = 41.80, SD = 7.13). Thirty-eight were from Australia (54%), 17 from the UK (24%), and 16 from Canada (22%). All were Caucasian except one who was Hispanic. Of the total sample, 46 indicated they were native English speakers (65%), 10 spoke English at an advanced level (14%), and one spoke English at the intermediate level (1%). The level of proficiency in English was not obtained for 14 officers in the UK (20%), because the item was added to the questionnaire after it had circulated to those officers. However, given the increasing demand for police officer candidates in the UK to be bilingual (Tonkin,

2015), as well as the requirement for non-native police candidates to have an English language qualification and to complete a training course offered in English (Metropolitan Police, 2017), UK officers would be expected to be proficient in English at least at the intermediate level.

The officers' experience in interviewing suspects ranged from 3 to 40 years (M = 16.80, SD = 7.86). Officers did not consider themselves up-to-date with the scientific literature on statement inconsistency (on a 7-point scale from 1 = *not up-to-date at all* to 7 = *extremely up-to-date*, M = 2.57, SD = 1.69), and although 27 reported being trained in statement inconsistency to detect deception (38%), 44 reported not having received such training (62%).

Questionnaire

A questionnaire was devised based on the existing literature to understand police officers' perceptions of statement inconsistency types and suspects' attempts at eliminating these inconsistencies. The questionnaire was in English and took approximately 20 minutes to complete. Officers had the option to fill out the questionnaire either online or on paper. Fifty-eight officers (82%) completed the questionnaire online and 13 (18%) on paper. Officers were informed that their responses would be treated confidentially, and they were asked to sign a consent form. Those who completed the online version were instructed that any uncompleted questionnaires would not be included in the analyses.

The questionnaire comprised eight closed questions rated on 7-point scales (see notes in Table 1 for anchors), some of which were followed by open-ended questions to allow officers to expand on their responses. Two questions (on drawings and factors influencing inconsistency) were also closed with yes/no response options (and a "maybe" alternative for the influential factors question) and followed by open-ended questions. In addition, the questionnaire included two exploratory open-ended questions. In the first question, officers were asked about verbal cues they use to detect deception; the aim of this question was to investigate the type of statement inconsistency that will be reported most frequently. The second question explored how officers assessed within-statement inconsistency in single statements by a single suspect. Importantly, definitions of inconsistency types (adapted from Vredeveldt et al., 2014) were provided in the questionnaire to clarify them to officers.

Coding

Two coders coded the responses for six open-ended questions. One coder classified all responses into general categories that were data driven (i.e. not predetermined), as shown in Table 2. One of the categories was labelled "other", because it included themes that were infrequently reported by officers and that could not be classified into one of the other categories. Responses from some officers were allocated to more than one category.

The second coder allocated the responses to the categories adopted by the first coder. Disagreements between the coders were discussed and resolved. The Intra-Class Correlation coefficient, which measures inter-rater reliability between the two coders, for the open-ended questions was .89.

Results

In this section, the results for scale items of the questionnaire are first presented along with their follow-up open-ended questions (closed questions subsection). Then, the analyses for the questions that were more exploratory and open-ended in nature (open-ended questions subsection) are presented. Table 1 shows the means and standard deviations for the closed questions. Table 2 displays the percentages of responses within categories for the open-ended questions. The analyses for each questionnaire item and the corresponding items in the tables are numbered to make it easier for the reader to follow.

The data-analytic strategy was to conduct repeated-measures ANOVAs comparing the responses on the rated categories, and to follow up with Bonferroni post hoc tests. For some ANOVAS, the assumption of sphericity was not fulfilled, so the corrected degrees of freedom according to the Huynh-Feldt procedure are reported.

Table 1
Means and Standard Deviations for Responses to Closed Questions

Closed Questions	*M*	*SD*
1. To what extent do you believe the following are indicative of deceit or honesty [a]		
Contradictions	2.77	1.47
Repetitions	4.24	0.89
Reminiscences	3.77	0.80
Omissions	3.42	0.92
2. In deciding whether the suspect is lying or telling the truth, how often do you look for [b]		
Contradictions	6.00	0.86
Repetitions	4.75	1.46
Reminiscences	5.04	1.28
Omissions	4.80	1.26
3. If you have available two statements provided by a single suspect across two interviews, to what extent do you rely on [b]		
Within-Statement inconsistency	5.10	1.03
Between-Statement inconsistency	5.04	1.14
4. In a case with multiple suspects, each suspect interviewed more than once, and critical evidence available, to what extent would you look for [b]		
Within-Statement inconsistency	5.10	1.12
Between-Statement inconsistency	5.26	1.06
Statement-Evidence inconsistency	6.00	0.94
Within-Group inconsistency	5.46	1.06
5. In general, to what extent do you find it difficult to assess [c]		
Within-Statement inconsistency	3.48	1.22
Between-Statement inconsistency	3.27	1.06
Statement-Evidence inconsistency	2.61	1.24
Within-Group inconsistency	3.45	1.26
6. Imagine that you questioned a suspect exhaustively, but their statement still did not match a critical piece of evidence. When you now confront the suspect with that evidence, do you believe liars are more likely to eliminate [b]		
Within-Statement inconsistency	4.31	1.04
Statement-Evidence inconsistency	4.92	1.01
7a. To what extent do you think liars find it important to eliminate [b]		
Within-Statement inconsistency	5.34	1.00
Between-Statement inconsistency	4.99	1.11
Statement-Evidence inconsistency	4.90	1.19
Within-Group inconsistency	4.76	1.30
7b. To what extent do you think truth-tellers find it important to eliminate [b]		
Within-Statement inconsistency	5.55	1.38
Between-Statement inconsistency	5.46	1.38
Statement-Evidence inconsistency	5.41	1.48
Within-Group inconsistency	5.23	1.57

[a] 7-point scale (1 = *strongly indicative of deceit* and 7 = *strongly indicative of honesty*).
[b] 7-point scale (1 = *never* and 7 = *always*). [c] 7-point scale (1 = *extremely easy* and 7 = *extremely difficult*).

Table 2

Categories and Corresponding Percentages for Responses to Open-Ended Questions

Open-Ended Questions	Frequency
1. In general, what type(s) of verbal cues are in your opinion the most important to decide whether the suspect is lying or telling the truth?	
Amount of detail	62%
Statement inconsistency	46%
Refusal to answer/ avoiding question	39%
Fillers (e.g., honestly, um, like, etc.)	14%
Other cues	45%
2. Please describe how you would determine whether the suspect's statement is inconsistent when you have available a single statement from one suspect [*within-statement inconsistency*].	
Different cues such as details, plausibility, etc.	34%
Interview manipulation	34%
Contradictions	32%
Comparison of suspect statement with the evidence	31%
Confrontation of the suspect with the evidence after exhausting alternative explanations	27%
Other	10%
3. Please explain how you used inconsistency in drawings to determine whether the suspect was lying or not.	
Correspondence between drawing and verbal statement	44%
Correspondence between drawing and evidence	33%
Improbable positioning of items within the drawing	14%
Unwillingness/Inability of the suspect to draw or complete the drawing	11%
Other	14%
4. Please insert any comments you might have about why you think (any of) the characteristics might or might not influence a suspect's credibility?	
Language proficiency (Suspects who are non-native speakers)	33%
Criminal history (Suspect's experience with interviewing)	30%
Many factors combined to influence inconsistency	20%
Age (Young or elderly suspects more inconsistent than adults)	18%
Intelligence (Reduces inconsistency)	15%
Personality traits (Narcissism, anxiousness)	13%
Officer interviewing style	13%
Suspect vulnerability	10%
Officer confirmation bias	10%
Type of offence	5%
Time factors influence inconsistency	5%
Other	23%

Closed Questions

1. Police officers' perceptions of (in)consistency measures

A repeated measures ANOVA showed that officers believed that repetitions and reminiscences are more indicative of honesty whereas contradictions and omissions are more indicative of deception, $F(1.90, 133.31) = 32.83$, $p < .001$, $\eta_p^2 = .32$. This finding partially supported Hypothesis 1, which posited that officers would associate repetitions with honesty and reminiscences, omissions, and contradictions with deception. The means are shown in Table 1. Post hoc analyses revealed that officers believed that contradictions differed from all other measures (ps < .001), reminiscences differed from repetitions and omissions (ps = .002), and omissions differed from repetitions ($p < .001$).

2. Police officers' use of consistency measures when detecting deception

A repeated measures ANOVA showed that when assessing credibility, officers reported that they were likely to look for contradictions significantly more than any other consistency measure, $F(2.50, 174.99) = 35.74$, $p < .001$, $\eta_p^2 = .34$. This finding supported Hypothesis 2. Post hoc analyses revealed that officers did not differ in the extent to which they looked for the other consistency measures (all ps > .05).

3. Police officers' perceptions of between-statement inconsistency

A repeated measures ANOVA revealed that in the presence of different statements from a single suspect, officers reported that they would look for within-statement inconsistency and between-statement inconsistency to the same extent, $F(1, 70) = 0.44$, p

= .509, η_p^2 = .006. Hence, Hypothesis 3, which posited that officers would report looking for between-statement inconsistency more than for within-statement inconsistency, was not supported.

4. Police officers' perceptions of statement inconsistency types

A repeated measures ANOVA revealed that in cases where officers potentially could assess all types of inconsistencies (i.e., statements by multiple suspects in a single case who are interviewed more than once and against whom incriminating evidence exists), officers reported that they would be most likely to use statement-evidence inconsistency and least likely to use within-statement inconsistency, $F(2.61, 182.95) = 17.89$, $p < .001$, $\eta_p^2 = .20$. Hypothesis 4 was thus supported. Post hoc analyses revealed that they used within-group inconsistency more than within-statement inconsistency ($p = .050$), but not more than between-statement inconsistency ($p = .669$).

Follow-up open-ended responses confirmed these findings as officers reported that statement-evidence inconsistency is the most reliable inconsistency type (39%). Sixteen percent believed that truth-tellers might be inconsistent across interviews due to time lag and forgetting, 14% reported that all inconsistency types are useful, and 8% reported that within-group inconsistency is the least reliable because liars can collude and be consistent or because it is difficult to validate statements in cases where multiple suspects are involved.

5. Police officers' perceptions of the difficulty of assessing inconsistency types

A repeated measures ANOVA revealed that officers perceived it is significantly less difficult to assess statement-evidence inconsistency than any other inconsistency type, $F(2.72, 190.33) = 19.00$, $p < .001$, $\eta_p^2 = .21$, which supported Hypothesis 5. Post hoc analyses indicated that officers found other inconsistency types equally difficult to assess (all ps $> .05$).

6. Police officers' perceptions of statement inconsistency following the strategic disclosure of evidence

A repeated measures ANOVA showed that officers believed that liars who are strategically confronted with a piece of evidence would attempt to change their statement to fit it with the evidence (within-statement inconsistency) significantly more than they would stick to their original statement (statement-evidence inconsistency), $F(1, 70) = 10.77$, $p = .002$, $\eta_p^2 = .13$. This finding refuted Hypothesis 6, which postulated that officers are more likely to believe that liars in such scenarios would exhibit higher statement-evidence inconsistency than within-statement inconsistency.

7. Police officers' perceptions of suspects' attempts at eliminating inconsistency types

A repeated measures ANOVA showed that officers believed that liars tend to eliminate within-statement inconsistency significantly more than any other type of inconsistency, $F(2.68, 187.79) = 9.09$, $p < .001$, $\eta_p^2 = .12$. Post hoc analyses indicated

that they thought liars do not differ in their attempts to eliminate other inconsistency types (all *p*s > .05). Another repeated measures ANOVA revealed that officers did not believe that truth-tellers would attempt to eliminate any type of inconsistency more than any other, $F(1.64, 114.79) = 3.08$, $p = .060$, $\eta_p^2 = .04$. These results supported Hypothesis 7.

Officers who responded to the follow-up open-ended question, in which they were able to elaborate on their responses, believed that truth-tellers are generally consistent (29%), maintain within-statement consistency (22%), and/or add information across statements (10%). Some officers considered liars to be generally consistent (22%), whereas others believed that liars are generally inconsistent (6%) or inconsistent across statements (14%). Twenty nine percent reported that evidence is important for liars. Eighteen percent indicated that liars would change their statement to fit it with the evidence, whereas only 4% mentioned that liars would maintain their statement following evidence disclosure.

Open-Ended Questions

1. Police officers' use of verbal cues to detect deception

The most frequently reported verbal cues were the amount of detail (62%) and statement inconsistency (46%). More categories are displayed in Table 2. The 'other' category included infrequently mentioned cues such as repeating questions, denial, forthcomingness, etc. Among officers specifying the type of statement inconsistency,

40% referred to statement-evidence inconsistency, 36% referred to within-statement inconsistency, and 24% referred to between-statement inconsistency. None of the officers mentioned within-group inconsistency, most probably due to the open-ended nature of this question.

2. Police officers' perceptions of within-statement inconsistency

When determining within-statement inconsistency, officers looked for cues such as the number of details and plausibility of the statement (34%) and contradictions (32%). They also reported using active interview techniques such as asking the suspect for a reverse order narration of events or probing with more in-depth questions to elicit inconsistencies (34%). They noted they may use evidence to corroborate their judgments (by comparing the suspect's statement with evidence [31%] or by confronting the suspect with evidence after exhausting alternative explanations [27%]), see Table 2. The 'other' category included responses such as suspects' refusal to answer, possible gain from lying, etc.

3. Police officers' use of drawings to assess statement inconsistency

Forty-eight officers (68%) reported using drawings in one or more of their interviews to detect deception. Thirty-four of them (71%) used the drawings to assess statement inconsistencies. Among those who used them to assess inconsistencies, 44% compared the drawing with the suspect's verbal statements and 33% compared it with evidence. Table 2 displays more categories. The 'other' category included responses such

as using drawings as an additional assessment tool, the effect of delay between the crime and the interview, etc.

4. Police officers' perceptions of possible influential factors on statement inconsistency

Officers reported the belief that statement inconsistency is influenced by criminal history (65%), intelligence (59%), personality (59%), age (49%), education level (45%), language proficiency (45%), and to a lesser extent by social class (23%), nationality (20%), race (17%), and gender (9%). Officers' elaborations on this question, as shown in Table 2, indicated that they considered suspects with a criminal history to have experience with investigative interviews (30%), which reduces inconsistency. Similarly, intelligence (15%) and personality factors (13%) were believed to reduce inconsistency. In contrast, suspects questioned in a second language (33%), young and elderly suspects (18%), and vulnerable suspects (10%) were considered as more susceptible to inconsistency. The 'other' category included responses such as miscommunication when truth-tellers misunderstand the questions but wish to be helpful, barriers such as unwillingness to disclose intimate issues due to religious reasons, etc.

Discussion

Police Officers' Perceptions of (In)Consistency Measures

Self-reports by police officers indicated that they tend to use contradictions to assess credibility, and that they are less likely to look for repetitions, reminiscences, and

omissions. This finding replicates previous research findings showing that investigative practitioners tend to assess contradictions more than any other consistency measure (Granhag et al., 2005; Greuel, 1992), which is concerning because research has indicated that contradictions rarely occur in suspects' statements (Fisher et al., 2009; Granhag & Strömwall, 2002).

Another finding that replicates previous research with practitioners is that officers associated contradictions and omissions with deception and repetitions with truthfulness, in line with the consistency heuristic (Granhag et al., 2004, 2005). It was unexpected, however, that officers would associate reminiscences with truthfulness. Their responses to the open-ended questions may explain this finding. Officers reported that truth-tellers may be inconsistent if there is a delay (time gap) between interviews. While some officers noted the effects of delay on forgetting information, others noted that truth-tellers may add information in subsequent interviews. Hence, officers seemed to be aware of the effects of memory which is supported by previous research demonstrating that truth-tellers provide additional information across statements, dependent on the questions asked (Cohen, 2001; Ewens, Vrij, Mann, & Leal, 2015; Fisher et al., 2009; Granhag & Strömwall, 2002).

Police Officers' Perceptions of Statement Inconsistency Types

The most frequently reported verbal cues to deception were the amount of detail and statement inconsistency, which replicates findings by previous studies (e.g., Granhag

et al., 2005; Strömwall & Granhag, 2003). A meta-analysis on deception cues showed that the amount of details within a statement is one of the few reliable cues to deception (DePaulo et al., 2003). Statement inconsistency, however, may not be a reliable cue across all situations, because liars may prepare and repeat rehearsed information during interviews, whereas truth-tellers recall and reconstruct information from memory (*repeat versus reconstruct hypothesis*; Granhag & Strömwall, 1999, 2002). Hence, liars' statements may be as consistent as truth-tellers' statements (Sakrisvold, Granhag, & Mac Giolla, 2017; Vrij et al., 2009).

In line with these findings and as predicted, officers tended to rate statement-evidence inconsistency as the most useful inconsistency type to detecting deception. According to their reports, any form of decision making is best substantiated by evidence. The concrete nature of evidence makes it easier and less time consuming to look for this type of inconsistency compared to other types. This replicates previous findings that investigative practitioners rely heavily on evidence and facts and thus on statement-evidence inconsistency (Granhag et al., 2005; Greuel, 1992). Nonetheless, physical evidence is not always available; rather, evidence is more likely to be available in the form of eyewitness testimony which is highly susceptible to inaccuracies or misjudgements (Scheck, Neufeld, & Dwyer, 2000; Williamson, Milne, & Savage, 2009). Hence, officers may need to look for more than one type of inconsistency to detect deception as suggested later.

Similar to previous research findings with laypeople (Strömwall et al., 2003), officers reported looking for within-group inconsistency when multiple suspects are involved in a case. However, not all officers agreed that within-group inconsistency is a reliable cue to deception. Some found it difficult to assess, because deceptive group members may rehearse together prior to the interview, have different motivations, or recall information differently. Nonetheless, with the implementation of strategic (Granhag et al., 2015b) or unanticipated questioning techniques (Sooniste et al., 2016; Vij et al., 2009), within-group inconsistency may be elicited in liars more than in truth-tellers.

Officers did not differ in their reliance on between-statement inconsistency and within-statement inconsistency, because they believed these to be the least useful inconsistency types. Time lapse between statements and memory factors were thought to jeopardise the meaningfulness of between-statement inconsistency. In addition, officers had divided views on whether liars or truth-tellers are more inconsistent across statements. The difficulty of assessing this type of inconsistency may be attributed to liars' attempts at thoroughly rehearsing and thus repeating statements consistently across interviews (Harvey et al., 2017).

Within-Statement inconsistency was thought to be the least useful type of inconsistency, because liars attempt to eliminate this type of inconsistency more than any other type. This is in line with previous research showing that liars attempt to eliminate

within-statement inconsistency to a greater extent than between-statement inconsistency, within-group inconsistency, and statement-evidence inconsistency (Granhag et al., 2013, 2015b; Tekin et al., 2016).

However, officers believed that when evidence is presented strategically and after all possible explanations for it have been exhausted, liars are likely to change their statement and fit it with the evidence. Although liars may eventually change their statement to be consistent with the evidence, they do not necessarily do this instantly (Granhag et al., 2015a; Luke, Dawson, Hartwig, & Granhag, 2014). Research on the Strategic Use of Evidence technique has found that liars rarely changed their statement, and statement-evidence inconsistency was found to be a relatively more valid indicator than within-statement inconsistency in distinguishing liars and truth-tellers (Granhag et al., 2015b). These findings may be explained by liars' counter-interrogation strategies as liars often use a withholding strategy (Granhag & Hartwig, 2008). Only when they estimate they can no longer maintain their statement do liars start giving more information or changing their statement. Nonetheless, in line with officers' beliefs, wherever a form of within-statement inconsistency exists, the suspect is more likely to be deceptive than truthful (Granhag et al., 2013; Tekin et al., 2016).

Based on these findings, it is recommended that practitioners look at inconsistency types simultaneously when possible. For example, in cases involving multiple suspects, it may not be enough to look at the evidence. It might be necessary to compare suspects'

statements to understand if they are covering up for somebody or if they are minimising their role in the crime, etc. Accordingly, and as Granhag et al. (2013) pointed out: "we want to warn against putting one measure *[statement-evidence inconsistency]* against the other *[within-statement inconsistency]*…. Our message is that both cues should be acknowledged and used, and that they may work in tandem to catch lying suspects." (p. 11).

It may be wise to simultaneously inspect different types of inconsistency in suspects' statements while at the same time actively using the interview protocol to elicit inconsistency in liars' statements (Vredeveldt et al., 2014). Police officers' responses to the open-ended questions revealed that 34% of the officers mentioned they played an active role in the interview by, for example, asking suspects for reverse order narrations of events to increase cognitive load or posing more in-depth questions. This rate may be even higher in real-life interviews, because (a) the question was open-ended and perhaps some officers missed mentioning interview manipulations they employ, and (b) the UK, Australia, and Canada are increasingly implementing information-gathering approaches to investigative interviewing and hence, officers are more likely to use evidence-based and ethical tactics during interviews (Alison, 2005; Walsh, Oxburgh, Redlich, & Myklebust, 2015; Williamson et al., 2009). Although Canada is known for officially implementing the Reid Technique—an accusatory approach to interviewing that is not empirically supported (Kassin, 2015; Vrij, Mann, & Fisher, 2006a, 2006b), Canadian

police departments seem to be moving towards the use of information-gathering techniques (Quan, 2015; Royal Canadian Mounted Police, 2016; Williamson et al., 2009). The Canadian officers who were approached communicated that they use evidence-based techniques during interviews, including unanticipated questions and the Strategic Use of Evidence technique.

Police Officers' Use of Drawings to Assess Inconsistency

More than half of the officers reported having used drawings of alibi settings, and the majority compared the drawings with the suspect's verbal statement(s) and less so with evidence. It may be that when officers have access to evidence, they compare the suspect's verbal statement with evidence to assess inconsistency. However, when evidence is not available, drawings may be a valuable tool to assess inconsistency (Roos af Hjelmsäter et al., 2014; Vrij et al., 2009).

In addition, officers thought drawings are a valuable tool to verify suspects' verbal statements, because liars are more likely to refuse to provide or to complete a drawing. This is in line with previous studies demonstrating that drawings are unexpected by suspects, and liars tend to provide less detailed, plausible and consistent drawings than truth-tellers (Leins et al., 2012; Vrij et al., 2009, 2012b). Accordingly, drawings are considered an important tool during interviews, even among novice officers (Dando, Wilcock, & Milne, 2009). Finally, officers are advised to assess the extent to which suspects are familiar with the alibi setting. Liars who are familiar with the alibi setting

may be able to produce statements that are as consistent as those of truth-tellers (Blandon-Gitlin et al., 2005; Warmelink, Vrij, Mann, Leal, & Poletiek, 2013).

Police Officers' Reports of Possible Influential Factors

Possible factors that officers believed to influence suspects' statement inconsistency were explored. The most frequently reported influential factor was criminal history. Officers indicated that previous experience in interviewing would reduce suspect inconsistency. This is in line with previous research with inmates who reported that they attempt to eliminate inconsistency during interviews to appear truthful (Granhag et al., 2004, 2009; Strömwall & Willén, 2011). Also, the majority of officers mentioned intelligence and personality as influential factors. Similarly, deception research has demonstrated that manipulative, Machiavellian, and psychopathic personalities are generally more willing and better at deceiving others compared to more conscientious personalities (Cherulnik, Way, Ames, & Hutto, 1981; Kashy & DePaulo, 1996; Vrij, 2008).

Approximately half of the police officers thought that age, education level, and language proficiency are influential factors. Officers believed that young, old, and non-native suspects are likely to be inconsistent. However, research has shown that children as young as three years are good at lying (Ceci & DeSimone Leichtman, 1992), and deceptive children and adolescents are as consistent as their truthful counterparts (Roos af Hjelmsäter et al., 2014; Strömwall & Granhag, 2005). Moreover, a study with non-native

speakers revealed that truth-telling and deceptive suspects speaking in a second language were equally consistent in their statements as a result of the cognitive load imposed by the second language (Ewens et al., 2015). Hence, officers are cautioned against overlooking successful attempts at deception (by children) or making a wrong decision (mistaking the cognitive load imposed by a spoken second language for deception).

Officers also thought that police interviewing style has an effect on statement inconsistency. It has been empirically demonstrated that officers sometimes hold biases which they need to keep aside and instead use an information-gathering approach by asking open-ended questions that are formulated in accordance with the suspect's comprehension level (Goodman-Delahunty, Martschuk, & Dhami, 2014; Kassin, 2015; Vrij et al., 2010a; Vrij et al., 2006a). Fortunately, officers were aware of these problematic issues and some reiterated them throughout their responses. Finally, officers believed that suspects' vulnerability, social class, nationality, race, and gender do not influence statement inconsistency. To our knowledge, the effects of these variables on inconsistency have not been previously examined, and field studies with suspects may be particularly helpful in understanding their effects on statement inconsistency.

Methodological Considerations

Questionnaires are self-report tools that have been criticised for not mirroring accurate cognitive processes (Fischoff, 1975; Nisbett & Wilson, 1977). Stated differently, individuals do not necessarily have access to their higher order cognitive processes and

hence may not accurately reflect on them. One way this could have been overcome in the questionnaire would be by asking officers to indicate the extent to which they use inconsistency types across different scenarios. However, the use of scenarios would limit the generalisability of the study results to similar scenarios only. Hence, the questions were kept broad to understand how officers use inconsistency types in general. Moreover, the findings concur with previous studies investigating police officers' perceptions of statement inconsistency in other countries (Alison, 2005; Greuel, 1982; Strömwall & Granhag, 2003; Tekin et al., 2017) as well as with experimental studies examining statement inconsistency (Granhag et al., 2015b; Mac Giolla & Granhag, 2015), which support the validity of police officers' reports in this study.

Conclusions

The findings replicate and expand previous research on police officers' perceptions of statement inconsistency. Officers tended to use the consistency heuristic, and they relied heavily on contradictions and statement-evidence inconsistency to detect deception. This is concerning given that (a) inconsistency is not diagnostic of either deception or truth, (b) liars employ withholding strategies to eliminate within-statement inconsistency and to reduce contradictions in their statements, and (c) physical evidence rarely exists in actual cases. Nonetheless, it was interesting to find that officers employing an information-gathering approach to interviewing have accurate views regarding suspects' behaviours, and are able to reflect on suspects' memory processes

(reminiscences) and on suspects' attempts at eliminating within-statement inconsistency. These reflections are critical to understanding liars' and truth-tellers' metacognitive processes and eventually to enhancing deception detection.

Officers are advised to consider inconsistency types simultaneously rather than separately to make more informed decisions regarding suspects' deception and guilt. They also need to take the interview context and protocol into account; otherwise, the tendency to rely on statement inconsistency may in some cases lead to the wrongful conviction of innocent suspects.

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