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Deceiving suspects about the content of their alibis: Consequences for truthful and untruthful suspects

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Purpose

To test how modifying one's alibi statement interacts with exposure to deceptive interrogation techniques.

Design/methodology/approach

Ninety participants walked about a university building for 15 minutes and either stole an envelope from a staff pigeonhole (guilty condition) or put the envelope there along the way (innocent condition). Subsequently, participants were asked to provide an alibi for the past 15 minutes. Guilty and half of the innocent participants were instructed to omit that they had been in the vicinity of the pigeonholes. The rest of the innocent participants were asked to tell the truth. Several days later, participants were questioned about six statements taken from their alibis, three of which contained altered information.

Findings

As expected, participants were largely blind to our alterations, with detection rates ranging from 1% to 36%. Contrary to cognitive load predictions, detection rates did not vary as a function of truthfulness. Rather, guilty participants were less likely to detect alterations than innocents.

Research limitations/implications

Memory distrust and guilty suspects' aim to keep a low profile might be possible explanations for these findings.

Practical implications

It is recommended that law enforcement officers and other legal practitioners refrain from using deceptive interrogation techniques and such techniques that can cause inconsistencies in suspects' reports. Researcher should make it their task to educate these professional groups about the natural occurrence of memory related, non-deceptive inconsistencies in successive statements.

Originality/value

This research uses a new methodology to study the effect of deceptive interrogation techniques on both innocent and guilty suspects. The findings are relevant for legal practitioners and researchers.

Keywords: alibis, cognitive load, deceptive interrogation techniques, inconsistency, investigative interviewing, interrogation, interrogation protocol, misinformation, suspects

Deceiving suspects about the content of their alibis: Consequences for truthful and untruthful suspects

When being accused of a crime, the presentation of a plausible alibi is of crucial importance for the suspect. The consequences of being unconvincing in a criminal investigation are grave and this may be a concern for both innocent and guilty suspects (National Research Council, 2003; Vrij *et al.*, 2011). In fact, this concern is well justified given the skepticism law enforcement officers display towards suspects and their alibi statements (Dysart and Strange, 2012; Kassin *et al.*, 2010b). Alibi distrust is especially high when there is no physical evidence or statement from a non-motivated other (cf. Olson and Wells, 2004). In reality, however, alibis contain leads or references to physical evidence in only one of four to five cases (Culhane *et al.*, 2013; Dysart and Strange, 2012; Nieuwkamp *et al.*, 2016; Olson and Charman, 2012). In an attempt to increase their credibility, even innocent suspects who fear that the truth may appear overly incriminating, may choose to alter their alibis, that is, to be partly untruthful (Allison *et al.*, 2012).

While the credibility and corroboration of their alibis is one concern for suspects, another source of disquiet is their possible exposure to deceptive and inducing interrogation techniques. For example, because they are convinced of the suspect's guilt, interrogators may by accident or in some cases consciously decide to alter some of the information provided by the suspect in consecutive (non tape-recorded) interrogations (Janardhanan, 2013; Ridolfi and Possley, 2010). If these alterations go without being queried by the suspect, suspects may be considered inconsistent and therefore deceptive. Indeed, the belief prevails that inconsistencies across statements are a sign of inaccuracy (Berman and Cutler, 1996; Brewer and Hupfeld, 2004; Brewer *et al.*, 1999; Culhane and Hosch, 2012), despite evidence to the opposite (e.g., Krix et al., 2015; Odinot *et al.*, 2013; Oeberst, 2012; Smeets *et al.*, 2004). Hence, as a consequence of the alleged inconsistency, investigators may become more and

more convinced about the suspect's guilt and increase their efforts to obtain a confession, regardless of the suspect's actual guilt or innocence (Kassin *et al.*, 2003). Such efforts in turn increase the risk of a *false* confession (Kassin *et al.*, 2010a, 2010b).

Recent evidence suggests that some suspects may not necessarily notice tampering with their statements. Sauerland *et al.* (2013) showed that up to 40% of participants failed to notice alterations in their own accounts of past transgressions. Similarly, participants were largely blind to distortions introduced to their interrogation protocols concerning a robbery, with blindness varying from 40 to 90%, depending on the experimental condition (Christianson *et al.*, 2007, Experiment 2; van Bergen *et al.*, 2010).

In the current study, we wanted to test how being untruthful about parts of one's alibi statement interacts with exposure to deceptive interrogation techniques in both innocent and guilty suspects. We chose to study untruthfulness as a factor that may apply to many investigations. As explained above, both guilty and innocent suspects may decide to be untruthful about at least part of their testimony because they consider this beneficial in their situation.

In this study, participants walked about a university building for 15 minutes and were asked to remember where they went, what they did, and whom they talked to while doing so. Participants were also instructed to either steal an envelope containing valuable gift certificates from a staff pigeonhole (guilty) or to put the envelope there along the way (innocent). Upon their return, they provided an alibi for the past 15 minutes. The guilty (guilty-modification group) and half of the innocent participants (innocent-modification group) were told not to mention that they had been in the vicinity of the staff pigeonholes. Whether they would simply omit their walk to the pigeonholes or whether they would add details to their alibis was left to them. The remaining innocent participants (innocent-truthful group) were simply instructed to tell the truth. Several days later, in a second session,

participants were questioned about six statements taken from their alibi statement. Unknown to participants, three of these statements were altered prior to the interview.

Drawing from previous studies, we expected a significant proportion of participants to be blind to these alterations (Christianson *et al.*, 2007; Sauerland *et al.*, 2013; van Bergen *et al.*, 2010). More importantly, we expected that the combination of untruthfulness of the suspect and deceptive interrogation techniques would put innocent as well as guilty suspects at risk of being disbelieved. This should occur as a consequence of the sequence 1) being blind to statement alterations, 2) being perceived as inconsistent. Specifically, based on the cognitive load approach (Vrij *et al.*, 2006, 2008, 2011), we expected the truthful group to outperform the two modification groups with regard to their detection of alterations. The cognitive load approach is based on the assumption that lying is more cognitively demanding than telling the truth. In the context of the current study, that means that during the interview, the guilty-modification and innocent-modification groups need to more carefully monitor and remind themselves of what actually happened while walking about the university building and how they modified their accounts for their alibis. To wit, these participants have to activate an adapted version of what happened during those 15 minutes, while, at the same time, suppressing the truthful version. Both of these processes require more mental effort than simply telling the truth. Additionally, in an attempt to appear honest, people are more inclined to monitor and control their demeanor when being untruthful. Simultaneously, they tend to carefully monitor the interviewer's reactions in order to detect any cues of doubt or disbelief. Such monitoring is not necessary in the innocent-truthful group. Accordingly, we expected blindness rates to be similar for both innocent and guilty modification participants, while we expected a relatively higher detection rate in innocent-truthful participants.

Method

Participants

Ninety-three participants took part in session 1. One did not return for session 2 and two more had to be excluded; the first one because she said she would not lie for the experimenter, the second one because he did not follow the instructions. The sample thus consisted of 90 participants (30 men, 60 women; M_{age} = 22.2 years, SD_{age} = 2.4, age range 18–31 years). Except for one participant, participants were Bachelor (80.0%) or Master students (16.7%), mostly studying psychology (63.3%) or health sciences (23.3%), and PhD students (2.2%) from other faculties. They received course credit or a 10 € voucher in return for their participation. The study was approved by the standing ethical board of the faculty.

Design

Participants were randomly assigned to one of three conditions: innocent-truthful (n = 31), innocent-modification (n = 30), and guilty-modification (n = 29).

Detection of the alterations served as dependent variable. Detections that occurred during the interview were termed concurrent detection and detections indicated in the post-interview questionnaire were labeled retrospective detection. All concurrent detections were automatically also coded as retrospective detections. Additionally, we recorded rejections of accurate information as another dependent variable.

Materials

Post-Interview Questionnaire. The post-interview questionnaire was adopted from Sauerland *et al.* (2013). Participants were first asked whether they had noticed anything strange during the interview in session 2. Then they were misinformed that there had been two conditions they could have been assigned to with equal chance. In condition 1, the statements that they had been presented with in session 2 were identical to the ones that they

had given in session 1. In condition 2, some of the statements had been altered. Participants were asked which condition they thought they were in. If they checked condition 2, they were asked how many times they noticed an alteration for sure and how many times they found something odd. Finally, participants had to indicate which of the six statements presented in session 2 specifically they thought had been altered. The answers to these questions were used as an indication of retrospective detection and rejection of accurate information.

Statement Alterations

Prior to session 2, the experimenter made three alterations in participants' alibi statements. These could involve three different alteration types, namely the replacement of existing information (e.g., change "brown hair" to "blonde hair"), omissions (change "blonde, curly hair" to "blonde hair"), or additions (change "blonde hair" to "blonde, curly hair"). When making the alterations, the experimenter adhered to the following rules: 1) The first statement always remained unaltered in order to familiarize participants with the interview procedure. 2) The three alterations referred to two to three of the following six categories: location, action, person, timing, object, or conversation, depending on the content of participants' statements (for similar approaches, see Gabbert *et al.*, 2003, 2004; Paterson *et al.*, 2009). Locations refer to places such as stairs, elevators, or the cafeteria. Actions refer to actions performed by the participant or others. Person details refer to persons' appearance, clothing, and identity. Timing refers to the time of day, durations, and sequence of events. Object refers to items such as bags, tables, PCs, etc. Conversation refers to the content of conversations (even when this content revolves around actions, objects, persons etc.). Prior to session 2, the experimenter read the participants' statements and identified whether they had referred to persons, objects, locations, reported conversations, etc. Following this assessment and following the rules outlined above, the experimenter selected three statements for alteration. Examples of alterations performed in each category can be found in Table 1.

Insert Table 1 about here

Inter-coder reliability. Two coders independently coded the alteration categories for 19 randomly selected participants (i.e., 21.1% of the total sample). Cohen's κ was .83, $p < .001$ for alteration type, and .94, $p < .001$, for alteration category.

Procedure

The experiment consisted of two sessions. In session 1, participants signed an informed consent form which notified them that the aims of the study could only be revealed upon termination of the experiment. Next, participants walked about in the building for 15 minutes by themselves. They were instructed to remember every place they went to, everything they did and everyone they talked to as precisely as possible. During that period, participants in the two innocent conditions were asked to put an envelope, which was provided to them by the experimenter and which contained gift certificates, into a specific pigeonhole in a corridor located in the building. Participants in the guilty condition were asked to steal an envelope from that same pigeonhole.

Upon participants' return, the experimenter asked if they had gone to the pigeonhole and disclosed that she had received a phone call and that something valuable was missing from the pigeonholes. In the innocent conditions, the experimenter asked the participants, if they remembered seeing anyone or anything suspicious that could be of importance. She listened attentively and then proceeded with the next part of the experiment. Participants in the guilty-modification condition were not asked questions at this point.[1]

Subsequently, all participants were told that a written statement was required that would be forwarded to the police. They received instructions to write down their alibis for the past 15 minutes, including where they had gone to, what they had done, how long it had

taken them, whom they had met, what these people looked like, what they had talked about, etc. Participants in the innocent-truthful condition were asked to include their trip to the pigeonhole and everything they had noticed on that corridor. Participants in the innocent-modification and guilty-modification conditions were asked to omit the fact that they had been near the pigeonholes. Simulating a real alibi situation, it was at participants' discretion whether they would additionally insert details that were untrue (commissions). For innocent-modification participants, the experimenter motivated her request to leave out the pigeonhole details by saying that she did not want the police to become suspicious of them. Participants in the guilty-modification condition were told that it was their task not to arouse any suspicion, and to omit the fact that they had been by the pigeonholes. When the participants finished writing their reports, they worked on a filler task while the experimenter checked whether the report included sufficient body for asking six questions in session 2. If reports were too brief, participants were asked to provide additional information. This occurred in five cases. Finally, participants were dismissed.

Because the same experimenter conducted both sessions, the following procedure was adopted to ensure her blindness to the testing condition during the interview in session 2. Immediately after termination of session 1, all information about the envelope and the crime scene was deleted from participants' reports in the innocent–truthful condition. As a result, participants’ reports in this condition could not be distinguished from the other two conditions. Drawing from the source monitoring framework and from research on memory for repeated events (Johnson *et al.*, 1993; Means and Loftus, 1991), at least two days and four testing sessions with other participants were scheduled between each participant’s testing sessions. This was done to undermine the experimenter's memory for the individual testing sessions in general and the condition a participant had been assigned to. Shortly before session 2, the experimenter made three alterations in the reports. Note that these alterations

were not made at the same time as the editions to the reports described above. Rather, alterations were made at least two days and four testing sessions later.

Three days following session 1, participants returned to the lab for a memory test concerning the time period during which they had been walking about the university building in session 1. A deviation of one or two days was allowed to account for participants' class schedules, weekends etc. (*M* = 2.8 days, *SD* = 0.9, *Mdn* = 3, range: 2-5 days). No more mention was made of the theft or the police. Participants were asked one question about each of six statements they had made in their reports. Three questions contained the alterations and three questions contained non-altered information. Following the order of participants' reports, the experimenter read out the first statement and then asked a question (e.g., "Last time you wrote: 'While walking up the stairs I stopped on each floor to read the experiment advertisements that were hanging on the black boards.' Could you name some of the studies you read about?"). Following the participants' answers, the experimenter noted down the answer and then proceeded to the next statement. Participants' responses to the altered statements were used as indications of detection. Note that rejections of accurate information did not occur at this stage. Upon conclusion of the interview, participants completed the post-interview questionnaire, the answers of which served as measures of retrospective detection of alterations and rejections of accurate information. The debriefing occurred via email after data collection had been completed.

Results

Preliminary Analyses

First we tested, whether the different experimental conditions differed in terms of delay between sessions and word count of participants' reports. This was not the case, *F*s(2,

87) ≤ 0.61, *p*s ≥ .543. On average, session 2 took place 2.8 days after session 1 (*SD* = 0.9) and participants' alibi reports contained 302.2 words (*SD* = 180.5).

Although we strived for an equal distribution of alteration types and categories across conditions when altering the alibis, this was not always possible, because it was dependent on the content of participants' statements. Therefore, we tested whether the distribution of the three alteration types and the six alteration categories types was approximately equal across conditions. Fisher's exact test was used for cross-tables with cell *n*s smaller 5. The distribution of the three alteration types across conditions was approximately equal for information replacements, additions, and omissions, χ^2(*N*s = 90) ≤ 6.09, *p*s ≥ .177, Cramer's *V*s ≤ .21. Most alterations were information replacements (*n* = 217), while additions (*n* = 43) and omissions (*n* = 10) were performed at a lower rate.

The distribution of alteration categories did not statistically differ across conditions for location, action, conversation, person, and timing alterations, χ^2(*N*s = 90) ≤ 6.64, *p*s ≥ .118, Cramer's *V*s ≤ .20. However, object alterations were not distributed equally across conditions, χ^2(4, *N* = 90) = 7.82, *p* = .050, Cramer's *V* = .20. Analyses of the 2 x 2 contingency tables revealed that object details were altered more often in the two innocent conditions compared to the guilty-modification condition, *p*s ≤ .036, whereas there were no differences between the former two, *p* = 1.00. In order to prevent that our findings could simply be attributed to this asymmetry concerning the number of object alterations and to decrease the differences between the groups, we deleted two cases from our data file. More specifically, we deleted the first innocent-truthful case and the first innocent-modification case in the data file in which an object alteration had been performed. Following these deletions, the distribution of object alterations no longer differed across conditions, χ^2(4, *N* = 88) = 7.03, *p* = .077, Cramer's *V* = .20. Rerunning all analyses with this sample led to the

same pattern of results, with no exception. We therefore describe the analyses based on the full sample.

Given the substantial proportion of psychology students in the sample (63.3%), we tested whether the results differed for psychology vs. non-psychology participants. This was not the case for any of our dependent variables (concurrent detection: $\chi^2(2, N = 90) = 3.85$, $p = .171$, Cramer's $V = .22$; retrospective detection: $\chi^2(3, N = 90) = 2.10$, $p = .568$, Cramer's $V = .15$; rejection of accurate information: $\chi^2(1, N = 90) = 0.26$, $p = .720$, *phi* = .05. Hence, the data were collapsed across field of study.

Description of Concurrent and Retrospective Detection Data

Concurrently, 25 (9.3%) of the 3 × 90 = 270 alterations were detected. Seventy participants, that is, more than three-quarters, detected *none* of the alterations, 15 participants detected one alteration, and five participants detected two. No participant detected all three alterations. In retrospect, 84 (31.1%) of the 270 alterations were detected. Forty-four participants (48.4%) detected none of the alterations, 18 participants detected one alteration, 18 participants detected two alterations, and 10 participants detected all three alterations.

Table 2 gives an overview of the mean detection rates in each alteration category across experimental conditions. For example, in the innocent-truthful condition, location alterations were performed 19 times, of which only one (1/19 = 0.05) was detected.

Note that small *n*s prevent us from running inferential analyses comparing detections as a function of alteration category and group. On a descriptive level, it is noticeable that altered person details were detected relatively well across groups. The same was true for the retrospective (but not concurrent) detection of object details. Of note, of the 20 timing alterations, only one was detected. However, the small sample sizes in some alteration categories shall prevent us from any far-reaching conclusions. For example, the 11% object alteration detection rate in the guilty-modification condition is attributed to a single detection.

Insert Table 2 about here

Impact of Experimental Condition on Concurrent and Retrospective Detection

To analyze whether the experimental condition had an impact on detection rates, we ran two separate ANOVAs with condition as independent factor and concurrent and retrospective detection as dependent variables. We found a significant effect for concurrent detection, $F(2, 87) = 4.49$, $p = .014$, $\eta_p^2 = .09$. Post hoc comparisons showed that the guilty-modification condition differed significantly from the two innocent conditions, $ps \leq .024$, whereas the innocent-truthful and innocent-modification conditions did not differ from each other, $p = .572$. More specifically, guilty-modification participants had a lower concurrent detection rate ($M = .03$, $SD = .19$) than innocent-truthful ($M = .35$, $SD = .66$, $d = 0.66$) and innocent-modification participants ($M = .43$, $SD = .63$, $d = 0.86$). Hence, depending on the experimental condition, participants only detected between 1.2% and 14.4% of the alterations concurrently. Notably, only one alteration was detected in the guilty-modification group.

No significant effect of condition was found for retrospective detection, $F(2, 87) = 0.48$, $p = .622$, $\eta_p^2 = .01$. Across conditions, participants detected $M = 0.93$ ($SD = 1.07$) of the three alterations in retrospect (innocent-truthful: $M = 0.94$; innocent-modification: $M = 1.07$; guilty-modification: $M = 0.79$). That means that in retrospect, participants still detected only between 26.3% and 35.7% of the alterations.[2]

Rejection of Accurate Information

The rejection of accurate information occurred nine times (once in nine different participants) and did not differ as a function of experimental condition, $\chi^2(2, N = 90) = 0.67$, $p = .717$, Cramer's $V = .09$. All of these rejections occurred in retrospect.

Discussion

Our results can be summarized as follows. First, suspect participants, regardless of their innocence status were largely blind to alterations in their alibi statements when interviewed a few days following their reports. In no condition did detection exceed 36%. In one condition (guilty-modification) detection was in fact as low as 1% during the interview. Second, alteration detection rates were impaired in the guilty condition, relative to the two innocent conditions. This effect, however, only presented itself during the interview. The effect became non-significant following disclosure that the alibi statement may have contained alterations.

Contrary to the latter finding, we had predicted level of detection to be influenced by alibi truthfulness, based on the cognitive load approach (Vrij *et al.*, 2006, 2008, 2011). This approach assumes that cognitive load is increased when being untruthful. Some of the relevant mechanisms include suppressing the truth while activating one's adopted version of events, monitoring one's demeanor, and the interviewer's reactions. Accordingly, both modification groups should have been worse at detecting our alterations than the truthful group. Instead, only the guilty-modification group was outperformed by the innocent-truthful group. In fact, the innocent-modification group tended to perform slightly better than the innocent-truthful group, without reaching statistical significance. This indicates that the innocent-modification group was certainly not at a disadvantage, in comparison to the innocent-truthful group. Hence, the idea that modifying one's alibi imposes cognitive load per se was not supported by the data. Furthermore, the finding that the three experimental groups did not differ in their retrospect ability to detect alterations indicates that the group differences observed during the interview may not have been caused by memory differences (cf. Sagana *et al.*, 2014a, 2014b, 2016).

Two explanations for the findings are conceivable. The first one refers to memory distrust. Memory distrust is characterized by difficulties in distinguishing information that

has been generated internally from information that has been suggested by external sources (Gudjonsson *et al.*, 1999). The memory distrust literature differentiates between state and trait memory distrust. State memory distrust can vary as a function of interrogative stress (van Bergen *et al.*, 2008). Furthermore, individuals scoring high on trait memory distrust have been shown to accept more misinformation alterations (i.e., they exhibit a lower detection rate) than those scoring low on memory distrust (van Bergen *et al.*, 2010). Although we did not employ pressuring or stressful interrogative techniques, it is possible that participants in the guilty condition felt more interrogative stress than participants in the innocent conditions. As a consequence, their memory distrust level may have increased, causing reduced levels of detection. This idea could be tested by collecting memory distrust data in future studies.

The second explanation refers to social aspects of the interrogation situation. It is possible that guilty participants did covertly detect similar numbers of alterations as the innocent groups, but, in an attempt not to arouse any suspicion, decided to maintain a low profile during the interview. In an attempt to appear consistent (and hence credible; Granhag *et al.*, 2013; Hartwig *et al.*, 2007), guilty participants may have elevated their threshold for rejecting information provided by the interviewer, compared to innocent participants. An approach to testing these ideas could be by collecting confidence measures and by asking participants to explain discrepancies between their concurrent and retrospective detection rates at the end of the study. Reasons might include that they did not notice the alterations during the interview, that they were not sure (enough) of being confronted with an alteration, or that they consciously withheld detections for tactical reasons. A combination of all three is conceivable, but remains to be tested empirically. We realize that previous studies on suspects' strategies during interviewing did not report *a Keep a low profile* strategy as described above (Hartwig *et al.*, 2007; Strömwall *et al.*, 2006; Strömwall and Willén, 2011).

However, this is most likely to be attributed to the fact that none of these studies looked into repeated interrogations of suspects and their strategies for dealing with misinformation or other deceptive techniques in repeated procedures. This opens a new area for investigation.

The greatest conceivable harm coming from deceptive and inducing interrogation techniques is a false confession (Gohara, 2005; Gudjonsson and MacKeith, 1990; Kassin and Gudjonsson, 2004; Kassin *et al.*, 2010a, 2010b). However, such practices can also be harmful in other ways. In particular, suspects who accept alterations in their reports or interrogation protocols are at risk of being perceived as inconsistent and hence inaccurate and deceptive (Berman and Cutler, 1996; Brewer and Hupfeld, 2004; Brewer *et al.*, 1999; Culhane and Hosch, 2012). Thus, techniques that undermine statement consistency simultaneously undermine credibility, even in innocents.

Two practice- and policy-related recommendations can be derived from the above. First, researchers and trainers should educate law enforcement officers and other legal practitioners about the natural occurrence of memory related, non-deceptive inconsistencies in successive statements (see Krix et al., 2015). Second, as long as "people appear to value consistency above all else when it comes to an alibi" (Strange *et al.*, 2014, p. 83), it should be another aim to avoid procedures that undermine the credibility of suspects, *both* innocent and guilty ones, by evoking inconsistencies.

The interpretation of the current results is limited by the fact that participants were not explicitly required to lie. Relatedly, we do not know the ground truth of participant's alibi reports and therefore cannot assess in how far each participant did or did not lie. It is possible that our predictions related to the cognitive load approach were unsupported because of this. Recall that participants were instructed to omit the fact that they were at the crime scene and that it was left at their discretion whether or not they would also add untruthful details (i.e., make additions) to their alibis. It is possible that guilty participants by coincidence more

often chose to add such untruthful details, thereby imposing higher cognitive load on themselves than innocent participants. This seems unlikely, though, given the repeated finding that one counter-interrogation strategy of guilty suspects is to stay close to the truth and to only lie about the incriminating details (Hartwig *et al.*, 2007; Strömwall and Willén, 2011). It should be noted that all non-truthful participants were required to lie at least once: because they excluded their passing the pigeonholes, they had to partly make up the sequence of their walking route. Furthermore, both deception by omission and deception by addition (Stone *et al.*, 2012) should impose a pertinent level of cognitive load when monitoring and matching the memory of an event with one's modified report of the event. To test the role of deceptive omissions and additions in the context of alibis in future studies, omissions and additions could be varied across different experimental conditions.

Another limitation of the study is that the same experimenter conducted both sessions. Although every effort was made to ensure her blindness (e.g., by deleting information from the alibis that would reveal the condition), it cannot be ruled out that she recognized some of the statements. Furthermore, it seems unlikely that our participants fully believed our cover story stating that their statements would be forwarded to the police. As a consequence, their motivation to guide all attention to their statements and hence notice possible alterations may have been limited, compared to suspects in real cases. On the other hand, real suspects may be limited in their cognitive resources because they are likely to experience the interrogation situation as much more stressful than the participants in the current study. While stress at encoding can have positive effects on performance, stress during retrieval is known to have negative effects (see LaBar and Cabeza, 2006, for a review). Regardless of a possible effect of the laboratory setting on the current blindness rates, this should not have affected the impact of our experimental manipulations on blindness and therefore should not affect the general findings of the current study. Finally, allowing three different types of alterations

(information replacements, additions, and omissions) adds a certain noise to our results. Future studies may choose to allow for only one alteration kind or to experimentally manipulate type of alteration.

In conclusion, our results add to the growing body of evidence demonstrating that people rarely notice alterations in their own statements or police interrogation protocols (Christianson *et al.*, 2007; van Bergen *et al.*, 2010). Strikingly, innocent and guilty participants are affected alike and detected less than one of three alterations. As a consequence, suspects in police interrogations, guilty or not, may be perceived as inconsistent as they do not notice alibi alterations. Police officers should use such tactics with caution because as shown, even truthful innocent suspects fail to detect alterations (Kassin, 2005; Kassin and Gudjonsson, 2004; Kassin *et al.*, 2010b). Future research should replicate and further assess the mechanisms underlying our findings.

As a final note, it should be clear that although there were differences in the degree of blindness to alterations between guilty and innocent participants, a lack of detection was by no means diagnostic of guilt. Rather, detection performance was weak across conditions, and even weaker in guilty participants. As such, the current study replicates earlier findings demonstrating that deceptive interviewing techniques are not only harmful to guilty, but also to innocent suspects (e.g., Perillo and Kassin, 2011; Sauerland *et al.*, 2015).

Implications for Practice

- Refrain from using deceptive interrogation techniques.
- Educate law enforcement officers and other legal practitioners about the natural occurrence of memory-related inconsistencies in repeated interviews.
- Refrain from using interrogation techniques that cause inconsistencies.

Footnotes

[1]Note that during the interview in session 2, participants were never asked questions about whether they had been or what they had seen in the vicinity of the pigeonholes. This rules out the possibility that memory-preserving effects of an initial retrieval attempt put the two innocent groups at an advantage during the interview (see Krix et al., 2014).

[2]Due to violations of normality, we also computed Kruskal-Wallis tests. This had no impact on the results (p = .009 for concurrent detection; p = .584 for retrospective detection).

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Table 1

Examples for Statement Alterations and Questions Asked During the Interview in Session 2

Alteration category	Original statement	Altered statement	Example question
Timing	I waited for *7* minutes.	I waited for *10* minutes.	Did you know any of the other people waiting?
Location	I walked straight to the library.	I walked straight to the library, *passing the cafeteria on my way*.	About how many people were there at the cafeteria?
Action	I went to the bathrooms to fill my water bottle and to take a look in the mirror.	I went to the bathrooms to take a look in the mirror.	Was there anyone else in the bathrooms?
Conversation	We briefly spoke about uni.	We spoke briefly.	How long did did you speak for?
Person	There was a female student with jeans and a *beige* jacket.	There was a female student with jeans and a *black* jacket.	What was the student doing?
Object	The pictures on the wall depicted people and nature	The pictures on the wall depicted people, animals and nature	What size were the pictures?

Table 2

Mean Concurrent and Retrospective Alteration Detection Rates as a Function of Experimental Condition and Alteration Category

Condition	Alteration category		Concurrent detection		Retrospective detection	
		n	*M*	95% CI	*M*	95% CI
Innocent-truthful	Location	19	.05	.01; .25	.21	.09; .43
	Action	18	.17	.06; .39	.39	.20; .61
	Object	17	.06	.01; .27	.41	.22; .64
	Conversation	9	.22	.06; .55	.33	.12; .65
	Timing	5	.20	.04; .62	.40	.12; .77
	Person	25	.12	.04; .30	.24	.12; .43
Innocent-modification	Location	21	.14	.05; .35	.29	.14; .50
	Action	9	.11	.02; .44	.44	.19; .73
	Object	15	.27	.11; .52	.47	.25; .70
	Conversation	19	.11	.03; .31	.32	.23; .64
	Timing	5	.00	.00; .43	.20	.04; .62
	Person	21	.14	.05; .35	.38	.21; .59
Guilty-modification	Location	17	.00	.00; .18	.18	.06; .41
	Action	18	.00	.00; .18	.17	.06; .39
	Object	8	.00	.00; .32	.50	.22; .79
	Conversation	16	.00	.00; .19	.19	.07; .43
	Timing	10	.00	.00; .28	.20	.06; .51
	Person	18	.06	.01; .26	.44	.25; .66
Total	Location	57	.07	.03; .17	.23	.14; .35
	Action	45	.09	.04; .21	.31	.20; .46
	Object	40	.13	.06; .26	.45	.31; .60
	Conversation	44	.09	.04; .21	.27	.16; .42
	Timing	20	.05	.01; .24	.25	.11; .47
	Person	64	.11	.05; .21	.34	.24; .47

Note. CI = confidence interval.