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Bachelor thesis

Detection of Deception

The Application of the Guilty Knowledge Test within a Mock Crime Paradigm

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Abstract

The purpose of this experimental study was to find out if the Guilty Knowledge Test (GKT) could be proven as a relevant instrument for detection of deception. In order to do that, researchers applied the GKT within a mock crime paradigm. By using a 3×2×2 mixed participants` design, the focus lay on three variables: condition, time and trial type. The condition was split into the guilty, the informed innocents and the uninformed innocents. The variable time was included by splitting each of the three conditions into time delay (TD) and no time delay (NTD**).** The third variable, trial type, was either split into the guilty trials, which were relevant to the mock crime or the innocent trials, which were irrelevant to the mock crime. Due to loss of data in the uninformed innocent condition, the design that should have been used originally was changed into a 2×2×2 mixed participants `design. Results that are disclosed in this article are based on that new design.

The experiment was conducted within two stages. Participants from the NTD-conditions had to take part in both stages within one whole session. TD-participants took part in the first stage of the experiment and were instructed to return to the testing environment for stage two five days later. Researchers wanted to investigate, whether the participant`s Skin Conductance Response (SCR)-specifically the quantity of SCRs- was influenced by being assigned randomly to one of the six conditions.

Results indicated no significant effect for condition or time in respect to SCR-quantity. However, researchers found a significant effect for trial type (innocent vs. guilty trials). In addition, a significant interaction effect was discovered: In the informed innocent condition participants showed lower SCR-quantities within the TD-condition on innocent trials.

Based on these results, researchers are fairly confident about the GKT and its future implementation within a judicial setting. Of course, there were no main effects for the factors that were tested, but the items used on the GKT in this present study were generated diligently enough, in order to find a difference between guilty and innocent trials. This difference conveniently identifies the state of the art GKT as a possible instrument to detect discrepancies in the suspects' behavior towards crime relevant and crime irrelevant items.

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1. Introduction

1.1 Detection of Deception

Regarding research in the area of lie detection, it becomes more and more crucial to develop scientific techniques, which accurately can determine whether a person is lying or whether a person is telling the truth. Nowadays, advances in the field of detection of deception make it possible to acquire valid data when measuring physiological responses of potential offenders. Unfortunately, these advances are no guarantee for the judicial system to be a hundred percent infallible, which was revealed in a comparative study among death penalty cases between China and the United States (Na Jiang, 2013). In this study, the author scrutinizes a number of wrongful convictions, which led to innocent people being sentenced to death. The author also notes that especially in China the methods for gathering crime evidence are scientifically questionable: Torture and inhumane treatment can be considered as quite inappropriate methods when it comes to extracting information from the suspect. In this case, the threatening situation alone might be enough reason for a person to confess the commitment of a crime, even when he/she might be innocent. These confessions of people who are actually innocent seem distressing, because the "evidence" will not only be relevant to the conviction of small misdemeanors. As shown above, it might become a question of life or death. This makes the development of valid methods for gathering evidence only that much more important: Innocent people need to be given the chance to hold on to their truth and to be proven right. This can only be done by administering tests that have scientific value and that are based on actual facts.

In order to be able to detect deception (*and* truth), several techniques have been developed. Those include the Controlled Question Test (CQT) which was invented by John Reid in the 1940s (Verschuere, Shakhar, Meijer, 2011) and the Guilty Knowledge Test (GKT) -also called the Concealed Information Test- which was devised by David Lykken in 1959 (Verschuere et al., 2011). Both types of tests measure physiological responses that are elicited by crime relevant and crime irrelevant stimuli. Both tests will be explained in the upcoming paragraphs (see 1.2 & 1.3).

This study investigates the significance of the GKT as a means to detect deceptive behavior. By analyzing the Skin Conductance Response (SCR) -here the focus will lie on determining the quantity of SCRs on crime relevant items (guilty trials) vs. crime irrelevant items (innocent trials)- we wish to identify the GKT as a valuable instrument that can be used in the field of lie detection.

Also the GKT needs to be established as a reliable device to provide assistance to innocent suspects, who need to be proven innocent before the law. Furthermore, this study will accentuate the importance of time, which elapses between the commitment of a crime and the final administration of the GKT. How much of a reliable instrument is the GKT when administering it to the suspect directly after committing the crime? What effects will time have on the suspect's memory and consequently, on his/her physiological responses to crime relevant vs. crime irrelevant items?

The testing procedure will take place within an artificial laboratory setting in which we will generate a mock crime, a paradigm that will be based on the same paradigm that was used by Nahari and Shakhar (2011) and, which was proven to be one of the most valid paradigms for testing deception (Shakhar & Elaad, 2003). The test design will be a 3×2×2 mixed participants` design, which replicates the same three conditions from the above-mentioned study: the guilty participants, who will be instructed to commit the mock crime, the informed innocents, who in our study will be informed indirectly by watching a video about the mock crime, and the uninformed innocents, who will also watch a video on content not related to the crime. Every condition will also be investigated with regard to the second variable- time- meaning that participants within one condition will be split into the "no time delay" (NTD) and the "time delay" (TD) condition. The NTD-participants will take part in the study within one whole session: They will either commit the mock crime (guilty participants) or watch a video (informed innocents and uninformed innocents) and be introduced to the GKT directly afterwards. The TD-participants, on the other hand, will encounter the same first part of the test procedure as the NTD-participants only they will be introduced to the GKT five days later. In addition, we will distinguish between crime relevant and crime irrelevant items, thus, the type of item will also be considered as another variable.

Currently, the most widely used approach within law enforcement is to administer the CQT (Shakhar & Elaad, 2003). Although this form of lie detection test is used throughout the world, it must be pointed out that the CQT is not based on scientific facts, which is why the present study will focus on the GKT. Nevertheless, it initially seems important to first give some background information on the former, because to fully understand the application of the GKT in *this* study, requires a certain knowledge about the detriments of the CQT. This segment will be followed by a detailed description of the GKT in its form, its application, its underlying mechanism, its drawbacks in relation to real-life settings and finally, its advantage as against the CQT. The description of the GKT will be completed by a brief discussion about the relation between encoding relevant items from a crime scene and answering questions on

the GKT later.

1.2 Background Information on the CQT

In this test, the suspect will be confronted with two types of items: the relevant and the control items. A typical relevant item could be a provocative question that directly asks about the perpetration in question, e.g. "Did you shoot Fred Ery on March 28th?" (Lykken, 1991). A typical control item could involve a question such as "Before you were 26, did you ever intentionally injure any person with a weapon?" (Lykken, 1991). Ultimately, this whole test procedure is based on the assumption that innocent people will be more disturbed by the control items than by the relevant items, because to them, those relevant items are not provided with any meaning and do not induce any emotional distress. The guilty suspects, on the other hand, will not be able to repress their agitation towards the relevant items, whereas the reaction to the control items will not be as intense. One reason for that might include that for a person with a criminal record the control items, like the one previously mentioned, might not elicit a strong reaction, because with a criminal history, it could be most likely to already have injured another person with a weapon.

Unfortunately, this premature conclusion about guilt or innocence makes the CQT extremely fallible, which was also addressed by Lykken (1991): What will happen to the innocent person who might have a strong reaction to both types of items? It seems quite logical that an innocent suspect, who knows that he/she possibly might be convicted of murder, will experience a great deal of stress whilst answering questions, especially questions, which postulate an ability to be violent. Thus, the conclusion about a suspect to be guilty or not seems to be based on a rather one-dimensional way of analysis. Lykken (1991) describes this kind of fallibility as a "bias against innocent suspects." As a matter of fact, he states that the validity of the test is not significantly better than chance, something he came to find in a small-scale meta-analysis on the validity of the CQT (Lykken, 1991). Consequently, an innocent suspect has a 50:50 chance to be convicted of a crime he/she did not commit, whereas a guilty person has the exact same chance of being cleared of all charges. Therefore, Lykken (1991) concludes that the CQT will too often result in false positives (innocent people who will be convicted) and in false negatives (guilty people who will be cleared of their charges and who are free to go). Another negative aspect of the CQT, which seems quite unscientific, is that most of the assumed validity of this test derives from the analysis of confessions of "guilty" people, which were made *after* taking part in the CQT. During a follow-up conversation with the "guilty" suspect, the examiner will make clear that the

polygraph is a hundred percent reliable and that the examinee`s delinquency seems absolutely obvious. He/she is identified as guilty and cannot deny anything anymore. Lykken (1991) mentions that in that type of situation examinees are actually urged to make a confession, because it might still be possible to negotiate the magnitude of punishment. This does not seem like a scientific approach to determining whether a person is guilty or innocent. An innocent person, who by mischance has been identified as guilty, will experience feelings of despair and simultaneously will try to prevent even worse things from happening. This might be a reason why people, who get themselves into that kind of predicament, will be more likely to confess something they did not even do, in order to simply achieve the best possible outcome.

This dilemma demands another, scientific approach to the detection of deception.

1.3 The GKT

Lykken`s reaction to the fallibility of the CQT was the development of the GKT. Within the context of detecting deceptive behavior, the main idea behind using the GKT is to find out whether a suspect holds knowledge on crucial details about a crime. Of course this knowledge can only exist if the suspect is guilty. By implementing the GKT into crime investigations, how can we anticipate the pitfalls of a possible bias against the innocent?

In order to be able to explain the generation of multiple-choice questions for the GKT in respect to the already mentioned relevant and irrelevant items, I will use the example of a murder weapon, which hypothetically was used by the offender to commit the crime.

The GKT normally consists of several multiple-choice questions about a specific crime. The different items of those questions are made up out of one single crime-relevant item and several other irrelevant items, which, nevertheless, are equivalent to the relevant item in all respects (Elaad, Ginton, Jungman, 1992). Consequently, if the murder weapon was a particular kind of knife (the relevant item), the other irrelevant items might include weapons such as a gun, a hammer or a brick, objects that could fulfill the same purpose as the object that was actually used. The relevant item is assumed to only be recognized by the guilty suspect, who became familiar with the item in question during committing the crime. In this case, a possible GKT-question could be formulated the following way: “Which weapon was used when X was murdered?”

At this point it is important to mention that the GKT-questions have to be generated specifically for one crime scene only. In order to create these questions, investigators will have to take a close look at this crime scene, analyze which stimuli from the environment

might be suitable to make up a GKT-question and later generate those in form of explicit multiple-choice questions. The suitability of a stimulus for a GKT-question is important considering that it must be salient enough to the offender. Only a significant item, which seems crucial to the sequence of actions that are executed can successfully be encoded into the offender`s memory.

While the suspect is answering the multiple-choice questions on the GKT, his/her electrodermal activity (EDA) is measured. In the present study, this electrodermal measuring technique is utilized by applying a small current in form of a sensor to the suspect`s fingers (ring and index finger). In the face of emotional distress-an emotional state a guilty suspect would experience when asked about the murder weapon- the sympathetic nervous system is activated. This in turn will modulate the activation of eccrine sweat glands, which will cause the suspect to sweat (Dooren, de Vries, Janssen, 2012). The sweat will serve as a weak electrolyte, an adequate conductor that will increase the conductance of the applied current (Poh, Swenson, Picard, 2010). This way, the suspect`s physiological responses can be measured parallel to answering the questions on the GKT. A distinguishable SCR could suggest a high arousal on the side of the suspect, because he/she might have encountered the relevant item before and is now trying to avoid a typical stress response. As will be mentioned in the following section of this article, it is exactly this inhibition that causes the experience of even more stress. This stress probably can be disguised verbally by claiming not to know anything about the murder weapon that was used during the crime, but when it comes to measuring the suspect's physiological response we can expect the truth to be revealed much more easily.

The underlying mechanism of the GKT is referred to as the "Orienting Response" (OR), a term first coined by Ivan Pavlov in 1927 (Verschuere et al., 2011). The whole concept of the OR-mechanism was developed further by Sokolov, who later described it as a "specific behavioral act directed towards extraction of information from the environment" (Sokolov, 1990). Zvi, Nachson and Elaad (2012) state that this specific behavioral act is induced by encountering novel stimuli and reacting to them. People are constantly trying to make sense of their environment and simultaneously try to attribute meaning to it. Thereby, people are able to build mental models, which are created by their own personal experience. These mental models are expanded as soon as people are confronted with new sensory information (Sokolov, 1963, as cited in Zvi, Nachson &Elaad, 2012). Within this mental model, the incoming information has to be matched with already existing representations. If the information is encountered multiple times, the OR will be inhibited, a process named

habituation (Verschuere et al., 2011). If a stimulus does not fit the established mental model, it will be perceived as a novel stimulus, which, therefore, will elicit an OR. Furthermore, Zvi, Nachson and Elaad (2012) hypothesize that in addition to a stimulus' novelty also the personal significance of a stimulus already encountered before should produce an OR. How does this insight seem relevant to the GKT and the possible detection of deceptive behavior?

Verschuere, Crombez, Koster and De Clercq (2007) argue that the underlying mechanism of the GKT cannot be explained by an OR to novel stimuli alone. Considering the OR in relation to personally significant stimuli, it might be expected that the more personally significant the item actually is, the more habituation would have taken place. This would naturally result in a reduced or absent OR. However, it is exactly those personally significant items, which are important during measuring physiological responses when the suspect answers questions on the GKT. An offender certainly will act highly reactive to the murder weapon when asked about it on the GKT (or when recognizing it from pictorial stimuli), although he/she already encountered it before. That is why Verschuere et al (2007) mention inhibition as another important factor that has to be considered during measuring physiological responses when answering questions on the GKT. They assume that guilty suspects will try to inhibit their emotional arousal if they come across an item that is crime-relevant, e.g. the murder weapon. An attempt to inhibit the natural response to the memory of the relevant item-which could be agitation towards the depiction of the actual murder weapon-in turn, increases the physiological response. Ironically, the guilty suspect experiences a high amount of stress, because he/she is trying to inhibit the stress response, which is elicited by the remembered relevant item in the first place. Thus, it seems like the OR-mechanism takes on a dual role: It is not only the recognition of novel stimuli that causes the mechanism to emerge; it is also the recognition of personally significant items that can cause this physiological response, something that in the context of detection of deception comes into effect when the guilty suspect is administered the GKT-questions. In the following paragraph I will try to convey a full understanding of the GKT by also mentioning a few drawbacks that are involved when applying the test.

Firstly, the application of the GKT as an instrument to detect deception is quite sumptuous meaning the expense of time and money without which the preparation of a specifically suitable GKT would not be possible. As mentioned earlier, the GKT questions have to be generated to one crime only. This implies that law enforcement will have to invest in the education of specially trained experts, who know which stimuli from a crime scene seem important enough to be integrated into the multiple-choice questions on the GKT

(Shakhar, 2012). The cost-benefit ratio does not have a lot to commend to introduce the GKT as a regularly used device for detection of deception. This might be a reason for the judicial system to rely on the CQT instead of the GKT, which is only used regularly in Japan (Verschuere et al., 2011).

Another aspect, which needs to be taken into account, is that the application of the GKT in real-life investigations might become quite difficult when administering the test to a guilty suspect, who committed the crime in question weeks ago. Naturally, in real life, the guilty person is not captured immediately after committing the crime. This also means that the guilty suspect will not instantly be asked questions about stimuli from the crime scene like it would be the case in the context of a laboratory study (e.g. within a mock crime paradigm). The question arises, whether the memory of this one crime will consolidate enough in order to elicit a salient physiological response to relevant items of the GKT weeks later. On that note, it also needs to be considered in how far the guilty suspects can be selective of their memories; being a full time criminal, we could expect that an offender might frequently commit similar crimes. When captured and questioned on a specific crime that was committed a while ago, the offender might not remember details from one particular crime scene (Carmel, Dayan, Naveh, Raveh, Shakhar, 2003). Those are exactly the kinds of problems, which cause the external validity of this test to be very low (Shakhar, 2012). In the context of an artificial laboratory study, variables like the stimuli from the "crime scene" or the time that elapses between the commitment of a "crime" and GKT-questioning can be manipulated. In fact, when using a mock crime paradigm, the relevant stimuli that later will be integrated into the multiple-choice items are very often tested on their salience and memorability before the actual testing procedure (Honts, Raskin, Kircher, 2002), a form of pretesting that was also utilized within this study. Therefore, it appears to be very challenging to generalize the outcome of the laboratory testing procedure to realistic crime investigations (Shakhar, 2012). This poses the problem of determining whether the GKT not only can be applied within laboratory settings, but also within real-life settings.

Elaad et al. (1992) made an attempt to gather information concerning the external validity of the GKT by determining the validity of dependent variables, such as the Respiration Line Length (RLL) and the Skin Resistance Response (SRR) within a real-life setting. They came to find that the SRR field efficiency is less than reported in laboratory studies. The reason might be the guilty suspect's level of arousal, which seems to be guaranteed in real life, because of fear of conviction. The guilty suspects within a laboratory setting might be too aware of the fact that they are not actually guilty, which causes their level

of arousal not to be as high. Therefore, it could be assumed that measurements of the SCR, which will be used in the present study-specifically it`s quantity on crime relevant vs. crime irrelevant items- could be influenced by the missing arousal of the "guilty" suspect. Moreover, Elaad et al. (1992) attained a large false-negative error in their study. This, they mention, seems to be the main shortcoming of the GKT within field settings. In real life, as was already stated before, stimuli from the crime scene cannot be manipulated in a way so that the guilty suspects will remember them enough in order to have a salient physiological response. It seems quite reasonable that criminals will forget a lot of details from the crime scene due to their state of over arousal. In the end, their strong excitement will attenuate the natural consolidation process meaning that they will not recognize the relevant items on the GKT. Unfortunately, the overall detection rate for guilty as well as innocent people is considerably lower than was reported in other experimental studies (Elaad et al., 1992).

In this regard, Carmel et al. (2003) give two reasons for the GKT`s failure within a field setting that give hope to future investigators, who do not want to give up on the idea of the GKT to be a valid instrument for the detection of deception. Carmel et al. (2003) came to find that the number of GKT items used in the study by Elaad et al. (1992) was rather small. However, the GKT will gain its validity if more multiple-choice items are generated. This way, test administrators can keep the false positives and false negatives to a minimum. The second reason for the GKT having failed within a real-life setting could be that the GKT was administered *after* a CQT (Carmel et al., 2003). This does not seem to be a good way to detect deception, because the CQT could cause a habituation process to the similar items on the GKT. While the CQT will cause the aspired physiological responses (and will again be proven as a valuable instrument), the relevant items of the GKT only will elicit an attenuated physiological response.

From this, it follows that it might be advisable to look at the GKT much more positively. When avoiding the mistakes in application, investigators actually could discover the GKT to be much more reliable. Besides, the "bias against the innocent" (Lykken, 1991) does not seem to apply to the GKT when compared to the CQT. Shakhar (2012) mentions studies on the GKT (e.g. Nahari & Shakhar, 2011), which in general demonstrate that innocents, although informed of the crime by public sources such as mass media, could be distinguished from the guilty suspects. Those informed innocents, who also will be analyzed in our study, indeed show higher physiological responses to relevant items, but those responses are still not as strong as in the guilty suspects (Nahari & Shakhar, 2011).

So far, the GKT has been described in connection to its form, its application, its underlying mechanism, its drawbacks and its advantage as against the CQT. Now it is important to get back to the central question of the present study, which among other things is concerned with the amount of time elapsing between the commitment of the crime and the actual testing procedure:

What effects will time have on the suspect's memory and consequently, on his/her physiological responses in terms of the SCR-quantity to crime relevant versus crime irrelevant items?

Gamer, Kosiol and Vossel (2010) for example, examined the influence of encoding processes on memory within a GAT setting. GAT stands for Guilty Action Test. This form of testing is based on the fact that people can recall items better when they needed to perform an action with them. This was first referred to as the *enactment effect* by Cohen in 1989. Gamer et al. (2010) argue that the way in which items are encoded can immensely influence the physiological response pattern of the guilty suspect, who later will be administered the GKT. With the aid of a mock crime paradigm, they investigated three conditions in relation to a time delay between the commitment of the "crime" and the GKT administration. The time delay that was used in this study was two weeks. The three conditions were the same as those, which will be investigated in this present study: the guilty suspects, the informed innocents and the uninformed innocents. They also added the detail of the items (central vs. peripheral) as a second variable. While items that are central to the crime, like the murder weapon, can be remembered relatively stable over time, peripheral items that only happen to be on the crime scene but do not take on an active role within the crime (e.g. a plant) will probably not be remembered as long. Gamer et al. (2010) found a significant interaction effect between time and type of detail in the guilty suspects group. Whereas guilty suspects could remember central items of the mock crime procedure even after two weeks, they showed forgetting of peripheral items, which was similar to the informed innocents. In contrast, the informed innocents could not remember the central items as long as the guilty suspects. This could be justified with the earlier named enactment effect. Guilty suspects were confronted with items that were crucial to the prepared mock crime scene. Their encoding process might have been supported by their actions which they were instructed to perform. This in turn caused a stronger physiological response when answering questions on the GKT, even when it was administered two weeks later. The innocent participants were not actively involved with those

central items, which works against encoding those items deeply for later retrieval. Connecting these findings on the enactment effect to this study, we could expect more and stronger SCRs from the mock crime participants, because they were instructed to actually carry out the actions involving all the crime relevant stimuli. Taking into account the knowledge we have about encoding crucial information about the crime scene and it`s connection with the intensity of the SCR, what could we expect when analyzing our data?

In this study, the focus will lie on the difference in SCR-quantity in relation to the crime relevant vs. the crime irrelevant items of our GKT. Additionally we will consider what effects time will have on this dependent variable. Therefore, I hypothesize that participants from all three conditions (guilty, informed innocents and uninformed innocents) will show a difference in reactivity on the crime relevant vs. the crime irrelevant items of the GKT in terms of the dependent variable just mentioned. Secondly, I assume that participants within the time-delay conditions will show a different reactivity to the crime relevant vs. crime irrelevant items when compared to participants, who will be administered the GKT directly after committing the crime (guilty suspects) or after being informed of the crime indirectly (informed innocents). Lastly, I assume that there will be an interaction between condition, time and trial type when it comes to comparing crime relevant (guilty trials) and crime irrelevant (innocent trials) items.

2. Method

2.1 *Participants*

Seventy participants (29 females and 41 males) took part in our experiment. Participants of which 29 were Dutch, and 41 were German were randomly approached on the university`s campus meaning that the study not only includes undergraduate or graduate students of the Twente University (UT) but also people who live outside the context of the UT and who simply happened to be on the campus. Their mean age was 22.86 (*SD* = 3.59) years (range 18-41). Successful recruitment of participants was accomplished by approaching them directly on campus and convincing them to take part in an interesting study, which would be rewarded with chocolate. In addition, we created flyers and posters. These were placed by the entrance of the university`s own supermarket and within several socially well attended areas around the campus (lecture halls, cafeteria, restrooms, etc.). The study was approved by the university`s ethics committee. All participants had to sign an informed consent indicating their voluntary participation in the experiment. Simultaneously, participants were made aware of the fact that they were allowed to withdraw from the experiment at any time. They also were

ensured that their data would be processed anonymously.

2.2 *Apparatus*

The experiment was conducted within two stages, a testing procedure that asked for two separate rooms, one for committing the mock crime and for watching one of the videos and another for administering the GKT. Both set ups are going to be described in the following section.

For the first stage of the experiment, we arranged a room to look like a typical office by using utensils such as folders, pens, tea cups, plants, etc., which were placed on the desk next to the computer`s keyboard. When conducting the experiment for the mock crime condition, a blue envelope and a 50 euro bill were placed on the desk, visible to the participant. Within the office, the light was turned on so that the participants would be under the impression that the office worker could return to his/her room at any time. For the informed and uninformed innocents, the room was prepared in almost the same manner except for the envelope and the 50 euro bill, which were replaced by a laptop so that the participants could watch one of the videos.

Stage two of the experiment took place within a laboratory setting: another single room which was only equipped with the apparatus itself and two chairs, one for the participant to sit in front of the computer and one for the researcher to give further instructions on the experiment. During this second part of the experiment the EDA was measured. By applying a small current to the fingers, we hoped to get distinct SCRs that could be amplified within the voltage system. As was mentioned in the paragraph on the application of the GKT, the participant`s sympathetic nervous system is activated in the face of emotional distress causing the "suspect" to sweat. The sweat serves as a weak electrolyte, an adequate conductor that increases the conductance of the applied current. Furthermore, we used one computer in order to present the participants with the multiple-choice questions of the GKT. These visual presentations were supported by auditory stimuli, which were offered through the headphones that were placed next to the computer screen for the participant to use. A laptop was used for recording the participant`s EDA. Those recordings were only visible to the researcher him-/herself.

2.3 *Design*

The present experiment was based on a 3×2×2 mixed participants` design. The first variable is the condition. Participants were randomly assigned to one of the three conditions, which were

the guilty suspects who would take part in the mock crime, the informed innocents who would watch a video of someone committing that same mock crime and the uninformed innocents who would watch a video about the university`s campus, a content which did not have any connection to the stimuli that we offered to the participants of the first two groups. The second variable is time: Participants from all three conditions were either placed within a NTD-condition or a TD-condition. The NTD-participants took part in the experiment within one session: They first completed stage one of the experiment (participating in the mock crime or watching one of the videos) which was directly followed by stage two of the experiment, the administration of the GKT. The TD-participants completed stage one of the experiment and were asked to come back for stage two of the experiment five days later. The third variable is the type of item meaning that we would distinguish between crime relevant items (guilty trials on the GKT) and crime irrelevant items (innocent trials on the GKT). The dependent variable will be the overall quantity of SCRs in relation to the crime relevant vs. crime irrelevant items.

In summary, we created six different conditions to which the participants were assigned randomly. Each condition ideally should include 15 participants, something that unfortunately could not be achieved in this study, because of technical difficulties, which caused some of the participant's data to get lost. Thus, the mock crime condition altogether consists of 33 participants of which 17 belong to the NTD, and 16 belong to the TD condition. The informed innocents consist of 31 participants of which 16 took part in the NTD, and 15 took part in the TD condition. Lastly, the uninformed innocents, due to loss of data, consist of six participants who were all purposely assigned to the TD condition, because the factor time seemed to be one of the most crucial elements of our study. This outcome influences the design we wanted to use originally, something that will be discussed in paragraph 2.5 on the analysis.

2.4 *Procedure*

As was mentioned earlier, the experiment was conducted in two stages. These will be elaborated within the upcoming paragraphs:

Stage 1

All the participants first had to sign an informed consent, which indicated that they could withdraw from the experiment at any time. Moreover, they were given the information that their data would be processed anonymously. After participants signed the informed

consent, they were instructed to fill out demographic data such as age, gender, nationality, etc. This demographic form was also marked by a code of the participant, which had to be filled in by the researcher him-/herself. The code provided information about the number of the overall participants and about the condition the participant was assigned to randomly.

After filling in their demographic data, participants were given written instructions that in form of chronological steps specifically described the task they had to fulfill. In addition, participants received verbal instructions, which clarified that the written instructions did not have to be learned by heart, and that we actually wanted them to take the form with them in order to ensure the correct execution of the experiment. Participants were given the chance to read the instructions carefully so that a full understanding of the task was guaranteed. Later participants were encouraged to ask questions about the procedure. Participants who asked questions which, when answered, would influence the outcome of the experiment were assured to receive a full debriefing *after* stage two of the experiment was completed. When the participant indicated a full understanding of his/her task, we sent them off to find the office in which stage one of the experiment would take place. If participants were obviously unsure about finding the room, we informed them that it was located on the same floor as they are right now. They were also assured that if any further difficulties occurred, they would be given another hint.

Until this point of the experiment, the conditions did not differ in terms of their testing procedure. The difference in testing procedure will be explained in the following two sections.

Guilty participants

After entering the office, the participant had to approach the desk on which a blue envelope and a 50 euro bill were placed. Participants were instructed to take advantage of the situation and to put the money into their pockets (or into any kind of non visible place close to their body, something that was specifically asked for within the instructions). They then had to take the blue envelope, which would later be given to one of the researchers. This action simply served as a distractor task next to the actual task they had to carry out. That way we made sure to give participants an actual reason for entering the office. After exiting the office, participants had to walk downstairs to the lockers next to the building`s reception. The written instructions included a four-digit code that had to be used in order to open locker number 23. Inside the locker, participants had to deposit the money (for a possible later pick up) and return to the researchers with the envelope.

After that procedure had been carried out, one of the researchers took care of returning

the 50 euro bill and the envelope to the office so that the next participant would find the room in the original state.

Informed Innocents and Uninformed Innocents

After entering the office, the participant had to approach the desk where the laptop was placed. Participants were first asked to take a seat in front of the laptop and to take a look around the office in order to get familiar with the environment. Then they were instructed to push the play button of the video and to watch it carefully. Participants of the informed innocent condition could watch the video on the same crime that had to be committed by the guilty participants for five minutes. Participants of the uninformed innocents got to watch a control video, which promoted the university`s campus facilities. Participants from both conditions were asked to stay in the office until one of the researchers picked them up.

Stage 2

In the second stage of the experiment, participants from all three conditions were administered the GKT. When the participant entered the room, he/she was directed to take a seat in the chair, which was located in front of the computer screen. Then the participant was instructed to put on the headphones. While the participant was making him-/herself comfortable, the experimenter asked if the participant was left or right-handed, because the EDA had to be measured on the non-dominant hand. The experimenter applied both electrodes, one on the index and another on the ring finger of the participant. Because SCR-measurements could be falsified by movement very easily, the participant was reminded to keep the movement of the hand to a minimum. Simultaneously, the experimenter suggested several positions of the hand that would make it easy for the participant to relax and to be able to concentrate on the task. As soon as the electrodes were attached, and the participant was instructed to move as less as possible, the experimenter started to record the EDA. The EDA was only visible to the experimenter him-/herself so that the participant would not be distracted by looking at his/her physiological response. When the whole set up was complete, the experimenter started the GKT on the computer screen. Then participants were given several verbal instructions to make it easier for them to take the test: First of all, they were told about a test that would consist of six multiple-choice questions. It was made clear that all questions would revolve around the same stimuli, which were just encountered in the office (or which were encountered in the office five days ago). After the question was presented on

the screen, the participant would be confronted with five different answers to that question. Each answer would be presented on the screen individually. Accordingly, participants were told that the questions and answers appearing on the screen should be read very carefully. They also were instructed to listen to the questions and answers, which werespoken out aloud to them by a recorded voice through their headphones. Finally, when being offered the five different answers, participants were instructed to answer each item with a loud and clear “no”.

Admittedly, until this point of the experiment, the participant received plenty of information. If we put ourselves in the participant`s position, all of this information would certainly seem a little confusing. That is the reason why the participant was given the chance to go through one sample question that would exemplify the form of the real items, which would be presented during the actual test. It was made clear that this item was only generated to make the participant comfortable with taking the test. At the same time, the participant was told about the possibility of starting the whole test one more time in order to be able to go through the sample question once again. By offering that, we ensured that the participant did not feel overburdened while taking the test where the real items would be presented.

After the sample item was viewed on the screen, the participant was encouraged to ask questions. As in stage one of the experiment, those questions were only answered if they did not influence the outcome of the experiment. When everything was explained to the participants and when we were absolutely sure about their full understanding of the testing procedure, we told them that the test would last eight minutes, and that we would leave the room for them to be undisturbed.

At the end of the test, participants were shown written instructions on the computer screen, which assured them that one of the experimenters would enter the room in a short while. After nine minutes, we returned to the room, took off the electrodes of the participant`s fingers and stopped the recording of the EDA. The data were stored on the laptop. Participants were then asked, if they wanted to receive a debriefing on our experiment. When they agreed, participants were given information on the GKT and on what we wanted to achieve with implementing this form of testing within law enforcement. Participants also were debriefed on the condition that they were assigned to. Everyone, but especially the TD-participants needed to know why it seemed useful to us for them to come back to the testing environment five days later.

2.5 *Analysis*

The EDA-data were imported to MatLab and converted into SPSS Statistics version 20. Our data were analyzed in respect to the three hypotheses. The 3×2×2 mixed participants` design was changed into a more utilizable 2×2×2 mixed participants` design meaning that we eliminated the third condition-the uninformed innocents who only consisted of six participants within the TD-condition- because they were not adding any value to our data. In fact, when including this condition during our SPSS-analysis with repeated measures, it worked against the significant interaction effect that we found when analyzing our data with the changed design. Furthermore, we applied a logarithmic transformation to both of the trial type variables (innocent and guilty trials) in order to adjust them to a normal distribution. This seemed more practical to us, because the tests we used during our analysis assume normally distributed data, such as the two-sample t-test, which we applied so that we could analyze the mean SCR-quantity of uninformed innocents in relation to trial type. This was an important step in determining, whether mock crime participants and informed innocents only showed higher SCR-quantities on guilty trials, because they were confronted with them (directly or indirectly) or whether our guilty trials were too salient in comparison to the innocent trials. When the analysis with repeated measures showed an interaction effect between condition, time and trial type, we investigated where this effect specifically came about. In order to do that, we applied the function "split file" so that we could scrutinize both of the conditions- mock crime participants and informed innocents- apart from each other. Subsequently, we performed a one-way ANOVA analysis for each of the four possibilities with the variable time as a fixed factor. When a significant difference was found in the informed innocent condition between NTD and TD on innocent trials, we turned to the descriptive statistics so as to be able to draw our final conclusion.

3. Results

When examining the data on SCR-quantity in connection to guilty vs. innocent trials (see Table 1), we see a quite noticeable difference concerning the total mean of SCR-quantity: In comparison to the innocent trials (m = 0.364), participants from both conditions are more reactive to the guilty trials (m = 0.456), a general discrepancy that is also revealed when looking more closely at the NTD- and TD-conditions. Mock crime participants, for example, show a higher SCR-quantity within the TD-condition on the guilty trials (m = 0.5) as well as on the innocent trials (m = 0.423). In contrast, informed innocents show the reverse pattern

meaning that their overall SCR-quantities are higher within the NTD-condition on guilty trials (m = 0.469) as well as on the innocent trials (m = 0.449).

		Guilty Trials			Innocent Trials		
		M	**SD**	**N**	**M**	**SD**	**N**
Mock Crime	NTD	0.431	0.364	17	0.308	0.277	17
	TD	0.5	0.38	16	0.423	0.321	16
	Total	0.456	0.367	33	0.364	0.3	33
Informed Innocents	NTD	0.469	0.237	16	0.449	0.326	16
	TD	0.422	0.382	15	0.275	0.298	15
	Total	0.446	0.311	31	0.364	0.32	31
Total	NTD	0.45	0.305	33	0.376	0.305	33
	TD	0.462	0.377	31	0.351	0.314	31
	Total	0.456	0.339	64	0.364	0.307	64

Table 1. Means and standard deviations of SCR-quantity on guilty and innocent trials

In order to test the three hypotheses, we executed a repeated measures analysis by using trial type (innocent vs. guilty) as the within-subjects variable and both factors -condition and time- as the between-subjects variables. When testing for differences in SCR-quantity on innocent vs. guilty trials within both conditions, we found no significant effect, F (1, 43) = 0.059, p = 0.81. Concerning the second factor- time- participants from the NTD-conditions and TD-conditions showed no difference in SCR-quantity on innocent vs. guilty trials, F (1, 43) = 1.838, p = 0.182. However, we found a significant effect for trial type, F (1, 43) = 17.957, p = 0.00, η_p^2 = 0.295 (see Figure 1). We also discovered a significant interaction effect between trial type, condition and time, F (1, 43) = 8.433, p = 0.006, η_p^2 = 0.164 (see Figure 2). Analysis of the component interaction by using one-way ANOVA indicated that participants within the informed innocent condition showed lower SCR-quantities in the TD-condition than in the NTD-condition when reacting to innocent trials, F (1, 24) = 5.349, p = 0.03.

Trial type

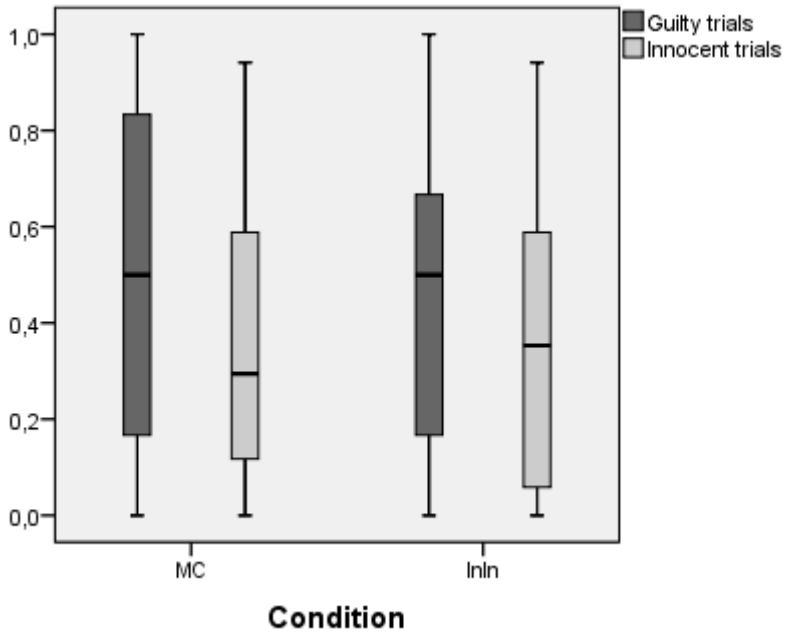

Figure 1. Mean SCR-quantity on guilty and innocent trials within both conditions

Interaction effect

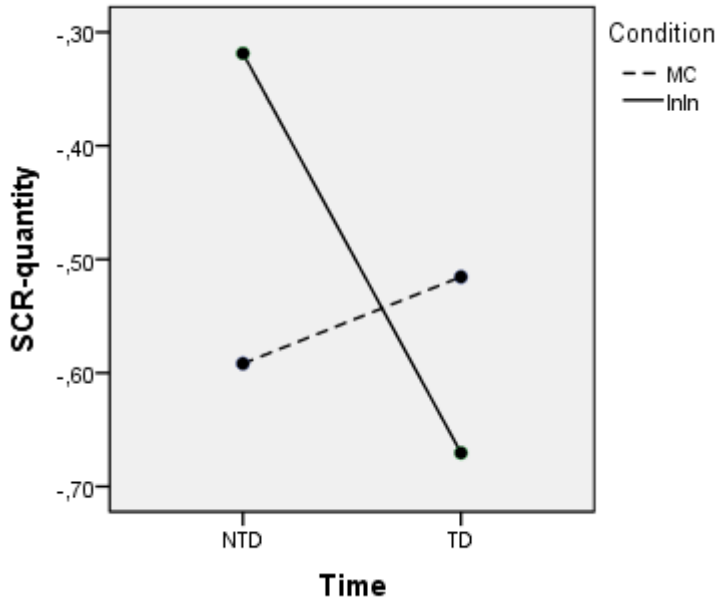

Figure 2. Interaction effect showing that informed innocents score lower in the TD-condition when reacting to innocent trials

4. Discussion

Within the current study, we tried to investigate, whether time would have an influence on participants` general quantity of SCRs in relationship to the crime relevant (guilty trials) vs. the crime irrelevant items (innocent trials), which were generated on our GKT. Results of this study indicate no differences in SCR-quantity in the two conditions when reacting to innocent vs. guilty trials. But with the addition of NTD and TD, we can see that within the TD-condition, mock crime participants showed higher SCR-quantities in reaction to crime relevant items when compared to the informed innocents, who remembered items better within the NTD-condition. These results are congruent with our previous expectations: When we received feedback from interested participants within the informed innocent conditions- NTD as well as TD- they told us about their inability to remember most of the crime relevant stimuli, which they were confronted with indirectly during watching the video about the mock crime. This led us to expect that mock crime participants, opposed to informed innocents, would remember items better, because they were confronted with the crime relevant items directly, something that was previously explained by the enactment effect (Cohen, 1989).

Our results seem similar to Nahari`s and Shakhar`s experimental study on the role of memory for crime details (2011). They did not find any significant difference in SCRs between conditions, but this also changed when they considered NTD- and TD-conditions more closely: Within the TD-conditions, they discovered a difference in SCR-measures between mock crime participants and informed innocents. In fact, mock crime participants showed stronger SCRs when confronted with crime relevant items than informed innocents, which seems logical, because, as stated before, mock crime participants had to actively take part in a mock crime, whereas informed innocents were only confronted with crime relevant items indirectly.

Another study by Gamer (2010) also supports our findings: He compared two conditions- the guilty and the informed innocents- amongst two different tests: The GKT, as it was used in this study, and the Guilty Actions Test (GAT), which is another form of knowledge based test. The difference between the former and the latter format lies in the wording of the multiple-choice questions. While the GKT relies on passivewording- for example “What was stolen from the crime scene?”- , the GAT formulates active questions such as “What did you steal from the crime scene?” His results for both tests showed no difference in SCRs in the two tested conditions.

Moving on, results of our study further indicate no significant effect for the factor time in relation to guilty vs. innocent trials. These findings contradict the results from Gamer et al. (2010), who also used a 2×2×2 mixed participants `design representing the same between-participants `variables- condition and time- and the same within-participants` variable- trial type. The only difference lay in the naming of those trial type variables: We decided to differentiate between "guilty trials" and "innocent trials". Gamer et al. (2010) on the other hand, made a distinction between "central items" vs. "peripheral items". With a time delay of two weeks, they found a main effect for time and an interaction effect for time and trial type.
This difference between results of our study and the results of the previously named study makes us question, whether we investigated a time delay, which simply was not long enough in order to find a significant difference between the NTD- and TD-conditions. What exactly happens to our memory within five days (our study), one week (Nahari and Shakhar, 2011) or two weeks (Gamer et al., 2010)?

If we consider the issue of memory within the context of our research, it is necessary to clarify that participants within the TD-condition were exposed to plenty of stimuli within the five days before the GKT-administration. If attention is directed to new incoming information, which is considered to be important-maybe if one of our participants was listening to an interesting lecture-, this information will strongly interfere with the already existing knowledge, for instance knowledge about the mock crime from our study. This is what Müller and Pilzecker called retroactive interference (RI) (1900, as cited in Dewar, Cowan, Sala, 2007), a theory that has been proven as a valuable paradigm within the field of memory research throughout the years. RI can be understood as one of the multiple alternatives to "decay theory", which was first introduced by Herman Ebbinghaus in 1885 (Dewar et al., 2007). Here he stated that forgetting occurred as a function of time meaning that we gradually forget about information we encountered in the past. Referring to this, Dewar et al. (2007) argue that forgetting does not happen within a vacuum. Our TD-participants for example did not take part in the first stage of our experiment and then were directed to an empty white room to wait for the GKT to be administered five days later. Of course, participants were engaging in their everyday- lives like normally functioning people would do. Hence, the more logical explanation for memory decay would be the interference of new knowledge with already existing knowledge. Connecting these insights to our study, forgetting about crime relevant and crime irrelevant items might not be a function of time. Maybe it becomes a function of all of the stimuli, which our participants are exposed to during their everyday-lives. What if we do not only need to manipulate the actual time

between stage one and two of the experiment, but the environmental factors that influence our participants?

Although we did not find any significant effects for condition nor time, we did find an immensely significant effect for trial type: Participants from both conditions, including the time variable, showed higher SCR-quantities on guilty trials when compared to innocent trials. These results lead us to the question if our guilty trials were too salient in contrast to the innocent trials. If participants showed a higher responsiveness on the guilty trials within all conditions- thus, also the uninformed innocents-, it would strongly influence the way we had to look at the validity of our GKT. That is the reason why we included the uninformed innocents within this part of our analysis. In this regard, our findings indicate that uninformed innocents showed higher SCR-quantities on innocent trials, a consequential finding, because participants from this condition were not confronted with crime relevant stimuli at any time. This outcome reassures us that our GKT-items were generated correctly.

In addition, we found an interaction effect among condition, time and trial type. Specifically, we found that within the informed innocent condition participants, who took part in a TD-procedure showed lower SCR-quantities on innocent trials than participants, who took part in a NTD-procedure. Here, our findings contradict the results of Nahari`s and Shakhar`s (2011) experimental study, who did not identify any interaction between those three variables. However, Gamer et al. (2010) also found a significant three way interaction between both of the between-participants` variables and the within-participants` variable. How could we explain the irregularities in our results? In our study, TD-participants were administered the GKT after five days. Nahari and Shakhar (2011) administered their GKT after seven days and did not find any interaction. Gamer et al. (2010) used a time delay of 14 days and found an interaction. Can we assign these outcomes to total randomness or could we still be missing one crucial point within the manipulation of our variables? In this context, it seems interesting for future research to investigate all of the three examined conditions throughout multiple time delays. In order to enable the implementation of the GKT within a real-life setting, we need to know about the effects that time has on the suspects `performance on the GKT.

What do our findings tell us about the practical implications of the GKT? Can the GKT be used as an instrument in detecting deception or should we still be careful with our assumptions regarding its usefulness within a judicial setting? Especially, when it comes to determining the difference of guilty people versus innocent people- who by mischance were informed about crime relevant details- it becomes crucial to be able to tell the difference

concerning their blameworthiness. Of course, we need to act with caution when interpreting the results from this current study. After all, we used a mock crime paradigm and applied the GKT within an artificial laboratory setting. Although this type of paradigm was proven to be the most valid in order to detect deception (Shakar, 2012), we still need to remind ourselves that it will never be possible to fully generalize outcomes from this laboratory setting to reality. As was mentioned before, the time which elapses between the commitment of a crime and the administration of the GKT poses a fundamental problem: In our study, we instructed participants to return to the testing environment five days later. In real-life investigations, criminals are much more unpredictable. We simply cannot guarantee if the criminal will be caught within 48 hours, within a week or even within a year. What if specially trained crime-investigators generate the best multiple-choice questions for the GKT, but the test can never be administered?

Furthermore, if we are talking about full-time criminals, we might expect them to commit other similar crimes as well. What kind of physiological response could we expect of someone, who is confronted with the same stimuli- for instance the same murder weapon- over and over again? On these grounds, it could be possible that, when the criminal will finally get caught, he/she will not even show a clearly distinguishable response, because he/she is too habituated to the crime relevant stimulus. In general, all responses have to be considered prudently, because we do not know if an increase in physiological response on one single crime relevant item can actually be attributed to the crime in question. In other words, based on the presently existing evidence, the murderer of X can only be convicted for the murder of X. To sum up, it is important to put the results of this study into perspective. Because of the already low external validity of the GKT, it is only that much more important to gather an appreciable amount of participants within laboratory studies so that real-life investigations can benefit from these findings.

This brings us to the next point of discussion: the distribution of participants across all conditions. Based on Nahari`s and Shakhar`s study (2011), we primarily took all three conditions and split them into NTD- and TD-conditions. Based on such a complex design, it seems important to distribute the same amount of participants throughout all six conditions. Originally, we intended to gather at least 90 participants in order to be able to test 15 participants within each of the six conditions. Unfortunately, because of technical difficulties and time management, we were not able to achieve that. The target design (3×2×2) might have been much more successful, if we had had the time to fill the uninformed innocent condition (for TD as well as for NTD), because it could have been more likely to find a

difference in condition and/or time between the mock crime and the uninformed innocent participants. In the end, by changing the former design into our currently used design (2×2×2), we not only discovered an effect for trial type and an interaction effect among all three of the tested variables; we also made for and even distribution of participants among the conditions. Nevertheless, this is definitely one of the pitfalls that could be avoided in future research.

To name another possible limitation of this study, it seems important to revisit the original programming of the GKT: Crime relevant (guilty trials) as well as crime irrelevant items (innocent trials) were depicted on the computer screen for five seconds. After five seconds the item was replaced by a blank screen, which appeared for 10 seconds. Concerning this matter, it might be advisable for future research to inspect the duration of on-screen stimulus representation and the time intervals that are used between those items. For instance, would an SCR be more discriminative if the guilty or innocent items had been displayed two seconds longer? Or would it be possible to measure much more distinguishable SCRs if the time between items had been longer so that the participant would have been given a chance to relax long enough before encountering another item?

Anymore, we also came across a few other limitations that directly had to do with the testing procedure: When developing the testing procedure for the mock crime condition, we not only wanted to instruct the participants to steal some money, deposit it inside a locker and then leave the building. We wanted to establish a reason, which would make it logical for the participants to actually enter the prepared office and *coincidentally* discover the money and take advantage of the situation. This reason was generated by instructing participants to take the blue envelope and return it to us, the researchers. This action was supposed to serve as a distractor task that would make it possible for us to have some control about the testing procedure and hence, about what the participant was doing. Unfortunately, we did not consider implementing an equivalent distractor task when it came to developing the testing procedure for the informed and uninformed innocents. Participants within these conditions were only instructed to watch a video until the instructor would come for them. This does not make for a valid testing procedure, which can be controlled by the researcher. For all intents and purposes, we did not make sure that participants would actually watch the video. Of course it was explicitly mentioned within the instructions to push the play button and to watch the video and we also saw the participants watch the screen when we entered the office, but this is no guarantee for a standardized testing procedure for each participant. Were participants really watching the video or did they pass the time by doing something

completely different? In this respect, it might be advisable for future researchers to go the extra mile and to implement a video camera within the testing environment. By being able to observe the participant, we could have made sure that the instructions were followed correctly and afterwards we would not have had to speculate on the participant's behavior.

The implementation of a video camera and audio recording also became a point of discussion when revisiting the second stage of the experiment, the administration of the GKT: How can we be sure that participants were answering every single one of our GKT-questions with a distinct "NO"? What if participants were bored after the third question and got the idea to utilize a different reaction to the offered item? Related to the participant's unpredictable behavior within the laboratory setting, it is safe to assume that those countermeasure manipulations are also utilized within real-life settings by real-life criminals. To give a nearby example of such a manipulation, imagine a guilty suspect being administered specific GKT-questions. In order to escape a possible conviction, the suspect influences his/her physiological responses by, for example, biting the tongue when encountering a crime irrelevant item (innocent trial) on the GKT. This way, the natural orienting response that is elicited by a crime *relevant* item (guilty trial) might not be interpreted as an implication of guilt. Eventually, the appearing SCR on a crime relevant item is dismissed as an insignificant response resulting in successful concealment of guilty knowledge. In our case, those manipulations on the side of the participant might have influenced the overall outcome of our experiment. Summing up, for prospective research we need to make sure that testing procedures can be controlled by the researchers.

That EDA-measures could be falsified on purpose was revealed by a study on intentional retrieval suppression (Bergström, Anderson, Buda, Simons, Richardson-Klavehn, 2013). Participants had to take part in a complex crime simulation via computer where they, amongst other things, were confronted with superimposed objects, which were considered to be valuable, such as a golden watch. Participants had to imagine that they were burglars who were about to steal these objects. Later an electroencephalograph (EEG) was fixed to their head in order to be able to measure event related potentials (ERPs) when reacting to depictions of crime relevant items. Participants were divided into three different conditions: the guilty cooperative condition, which was instructed to think of as many details of the burglary as possible when confronted with a crime relevant item, the innocent control condition, where participants were supposed to imagine that they were questioned for a crime they did not commit (when confronted with crime relevant items) and the guilty uncooperative condition, which was instructed to think of as less details of the burglary as

possible. Participants within the last condition were obligated to try to suppress their memories as hard as they could. Bergström et al. (2013) found that if people were motivated to suppress their "criminal retrieval", ERPs that were related to memory would decrease significantly. This way, guilty uncooperative participants were able to escape detection. The study concludes that the outcome of brain measures of guilty knowledge might possibly be influenced by the suspect's intentional control, which ultimately influences the future usage of those measures within law enforcement. In this regard, is it possible to draw parallels between brain measures and EDA-measures like the one used in our study? Can countermeasure manipulations actually pose a serious problem when it comes to implementing the GKT into a legal setting? This certainly represents another decisive point which needs to be given more attention in future research.

In conclusion, the current study demonstrates no significant difference in SCR-quantity when analyzing the two fixed factors condition and time in relation to crime relevant vs. crime irrelevant items on the GKT. Regardless, we found a significant effect for trial type, which discloses that we can effectively declare the GKT as able to detect discrepancies in the suspects` behavior when presenting them with crime relevant and crime irrelevant items. Lastly, we found a three way interaction between all of the tested variables; condition, time and trial type.

Indeed, in this study, we are not able to make any definite statement about implementing the GKT as a valid instrument for detecting deceptive behavior, but we are still cautiously hopeful about making further advances in the development of scientific techniques, which can accurately determine a person`s guilt and innocence, respectively.

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6. Appendix

Informed consent, Dutch

Toestemmingsverklaring

Titel van het onderzoek: Detection of Deception

Verantwoordelijke onderzoekers: Matthijs Noordzij, Lisa Goller, Elias Waziri

In te vullen door participant

Ik begrijp dat mijn deelname op vrijwillige basis plaatsvindt. Ik heb het recht mijn toestemming op ieder moment weer in te trekken zonder dat ik daarvoor een reden behoef op te geven. Ik ben mij van het feit bewust, dat de onderzoekers mijn privacy zullen beschermen. Alle data die verzameld worden door de onderzoekers zullen volledig anoniem zijn.

Naam participant: …….

Datum: …….

Handtekening: …….

In te vullen door onderzoeker

Ik zal zowel mondelinge als schriftelijke instructies geven aan de participant. Ik zal gestelde vragen met betrekking tot het onderzoek, tot op zekere hoogte beantwoorden, zodat deze niet de uitkomst van het onderzoek kunnen beïnvloeden. Ik zal overige vragen met betrekking tot het onderzoek beantwoorden in de vorm van een debriefing, welke de participant aan het eind van het onderzoek zal ontvangen. Er zullen geen negatieve consequenties zijn voor de participant, wanneer hij/zij op elk moment tijdens het onderzoek wil stoppen.

Naam onderzoeker: …….

Datum: …….

Handtekening: …….

Informed consent, German

Einverständniserklärung

Name der Studie: Detection of Deception

Verantwortliche Forscher: Matthijs Noordzij, Lisa Goller, Elias Waziri

Vom Teilnehmer auszufüllen

Ich erkläre mich hiermit einverstanden, an dieser Studie mitzuwirken. Meine Teilnahme erfolgt freiwillig. Ich bin mir bewusst, dass ich die Möglichkeit habe, meine Teilnahme an dieser Studie jederzeit abzubrechen. Ich bin mir außerdem darüber bewusst, dass die Forscher meine Privatsphäre schützen und meine Daten anonym verarbeitet werden.

Name des Teilnehmers: ……..

Datum: ……..

Unterschrift: …….

Vom Forscher auszufüllen

Ich habe dem Teilnehmer sowohl mündliche als auch schriftliche Anweisungen gegeben. Eventuelle Fragen des Teilnehmers über den Ablauf der Studie werde ich so beantworten, dass sie die Ergebnisse auf keine Weise beeinflussen. Alle übrigen Fragen werden in Form einer Nachbesprechung beantwortet, die am Ende der Studie erfolgt. Sollte der Teilnehmer seine Teilnahme während der Studie abbrechen, entstehen ihm hierdurch keine Nachteile.

Name des Forschers: ……..

Datum: ……..

Unterschrift: ……..

Demographic data, Dutch

Demografische gegevens

Code participant (invullen door onderzoeker):

Nationaliteit:

Leeftijd:

Geslacht:

Beroep/faculteit:

Demographic data, German

Demografische Angaben

Teilnehmercode (vom Forscher auszufüllen):

Nationalität:

Alter:

Geschlecht:

Beruf/Ausbildung:

Instructions mock crime, Dutch

Bedankt voor deelname aan het onderzoek “Detection of Deception”.

De instructies die je worden gegeven, zullen exact moeten worden gevolgd. Probeer tijdens het uitvoeren van de instructies **niet** met iemand te praten. Mocht dit niet te vermijden zijn, probeer dan de interactie minimaal te houden.

Voel je je ongemakkelijk bij het uitvoeren van de stappen, dan ben je vrij om op elk moment het experiment af te breken.

Code voor de kluis: 5435

Je loopt naar kantoor C239a en klopt op de deur om te zien of iemand in het kantoor aanwezig is

Wanneer je niemand in het kantoor ziet, kijk je om je heen of iemand je ziet

Je opent de deur en loopt het kantoor binnen

Binnen in het kantoor vind je een envelop op het bureau

Naast de envelop ligt een bepaalde hoeveel geld

Neem de situatie waar en stop het geld in je zak (broek etc.) zodat dit niet door andere mensen gezien kan worden

Tevens neem je de envelop mee (andere mensen mogen dit zien) welke je later inlevert bij de instructeur

Neem de trap naar beneden naar de rode kluisjes, welke naast de receptie is gelegen. Wees voorzichtig, zodat je niet teveel aandacht trekt!!!

Zoek naar kluis met nummer 23

Heb je de kluis gevonden, type dan het button “C” en vervolgens de code. Druk dan de “sleutel” button om de kluis te openen

Leg alleen het geld in de kluis

Sluit de kluis, door dezelfde volgorde van buttons te gebruiken dan tijdens het openen

Ga terug via de trap naar B219 en lever de envelop in bij de instructeur

Einde experiment

Instructions mock crime, German

Herzlichen Dank, dass du an unserer Untersuchung „Detection of Deception" teilnimmst!

Die Anleitung, die du bekommst, muss genau befolgt werden. Bitte sprich während du die Aufgabe ausführst mit niemandem. Falls dies nicht zu vermeiden ist, reduziere die Interaktion auf ein Minimum.

Solltest du dich bei einem der auszuführenden Schritte unwohl fühlen, kannst du natürlich jederzeit mit dem Experiment stoppen.

Zahlenkombination für das Schließfach: 5435

Du läufst zu Büro C239a und klopfst an der Tür, um zu sehen ob jemand im Büro ist

Falls du niemanden im Büro sehen kannst, siehst du dich außerdem um, um zu schauen, ob dich jemand bemerkt

Du öffnest die Bürotür und betrittst den Raum

Im Büro findest du auf dem Schreibtisch einen Umschlag

Neben dem Umschlag findest du eine bestimmte Menge Geld

Bitte nutze die Situation aus und stecke das Geld in deine Hosentasche, sodass es für andere Personen nicht mehr sichtbar ist

Du nimmst außerdem den Umschlag mit (dieser darf von Anderen gesehen werden), um ihn später deinem Begleiter zu geben

Gehe die Treppe runter zu den roten Schließfächern, neben der Rezeption. Sei vorsichtig, sodass du nicht zu viel Aufmerksamkeit auf dich lenkst!!!

Suche nach dem Schließfach mit der Nummer 23

Wenn du das Schließfach gefunden hast, drücke die "C-Taste" und gebe den Code ein. Dann drückst du die "Schlüssel-Taste", um das Fach zu öffnen

Hinterlege nur das Geld im Schließfach

Schließe das Schließfach, indem du erneut die gleiche Prozedur ausführst wie beim Öffnen des Schließfaches

Gehe über die Treppen wieder nach oben zu Raum B219 und gib den Umschlag deinem Begleiter

Ende der Testprozedur

Instructions informed and uninformed innocents, Dutch

Bedankt voor deelname aan het onderzoek “Detection of Deception”

De instructies die je worden gegeven, zullen exact moeten worden gevolgd. Probeer tijdens het uitvoeren van de instructies niet met iemand te praten. Mocht dit niet te vermijden zijn, probeer dan de interactie minimaal te houden.

Voel je je ongemakkelijk bij het uitvoeren van de stappen, dan ben je vrij om op elk moment het experiment af te breken.

Ga naar kantoor C239a

Open de deur en loop het kantoor binnen

Ga op de stoel zitten achter het bureau en maak het jezelf comfortabel

Kijk rond in het kantoor

Voor je staat een laptop, waarop je een video te zien krijgt

Je zult 5 minuten naar deze video kijken

Druk op de startknop om de video af te spelen

Kijk aandachtig naar de video

Wanneer de video is afgelopen blijf je in het kantoor

De instructeur zal je ophalen wanneer de tijd om is

Instructions informed and uninformed innocents, German

Herzlichen Dank, dass du an unserer Untersuchung „Detection of Deception" teilnimmst!

Die Anleitung, die du bekommst, muss genau befolgt werden. Bitte sprich während du die Aufgabe ausführst mit niemandem. Falls dies nicht zu vermeiden ist, reduziere die Interaktion auf ein Minimum.

Solltest du dich bei einem der auszuführenden Schritte unwohl fühlen, kannst du natürlich jederzeit mit dem Experiment stoppen.

Gehe zu Büro C239a

Öffne die Tür und gehe in das Büro hinein

Setze dich auf den Stuhl hinter dem Schreibtisch und mach es dir bequem

Schaue dir das Büro genau an

Vor dir siehst du einen Laptop, auf dem du ein Video sehen wirst

Du hast 5 Minuten Zeit um dir das Video anzuschauen

Drücke die Start Taste um das Video abzuspielen

Schau es dir aufmerksam an

Nachdem du das Video gesehen hast, bleibst du im Büro

Du wirst von einem Begleiter abgeholt wenn die Zeit vorbei ist

Multiple-choice questions GKT, Dutch

Items voor de GKT

Waar vond het misdrijf plaats?

a. WC
b. Buiten
c. Kantoor
d. Cafeteria
e. IT-zaal

Welke kleur had de envelop, welke door de verdachte/door jou werd meegenomen?

a. Groen
b. Bruin
c. Rood
d. Blauw
e. Geel

Waar lag de envelop voordat hij door de verdachte/door jou werd meegenomen?

a. Stoel
b. Plank
c. Vensterbank
d. Buiten het kantoor
e. Bureau

Wat werd er precies gestolen op de plaats van het misdrijf?

a. I-pad
b. Geld
c. Juwelen
d. Sleutel
e. Telefoon

Wat was het nummer van de kluis, waar het item werd ingelegd door de verdachte/door jou?

a. 11
b. 43
c. X
d. 32
e. 46

Wat was de hoeveelheid geld wat is gestolen op de plaats van het misdrijf?

a. 100 Euro
b. 50 Euro
c. 200 Euro
d. 18 Euro
e. 400 Euro

Multiple-choice questions GKT, German

GKT-Items

Wo fand das Verbrechen statt?

a. Auf der Toilette
b. Draußen
c. Im Büro
d. In der Cafeteria
e. Im Computerraum

Welche Farbe hatte der Umschlag, der entwendet wurde?

a. Grün
b. Braun
c. Rot
d. Blau
e. Gelb

Wo war der Umschlag platziert, bevor er entwendet wurde?

a. Auf einem Stuhl
b. In einem Regal
c. Auf einer Fensterbank
d. Außerhalb des Raums
e. Auf einem Tisch

Was genau wurde vom Tatort entwendet?

a. Ein iPad
b. Geld
c. Schmuck
d. Ein Schlüssel
e. Ein Handy

Welche Nummer hatte das Schließfach, in das der Gegenstand gelegt wurde?

a. 11
b. 43
c. X
d. 32
e. 46

Welche Geldsumme wurde vom Tatort entwendet?

a. 100 Euro
b. 50 Euro
c. 200 Euro
d. 18 Euro
e. 400 Euro

Flyer


NO LIE CAN LIVE FOREVER
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