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The Discrimination of Innocents Exposed to Crime Details using an Autobiographical Implicit Association Test*

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The purpose of this study is to verify whether it is possible for participants to discriminate between innocent and guilty suspects when they are exposed to criminal information utilizing an autobiographical implicit association test (aIAT). A total of 49 college students were randomly assigned to guilty group, innocent-aware group, or innocent-unaware group. Participants performed an aIAT to detect suspects after performing either mock crime or control task. It was verified that innocent suspect and guilty suspect exposed with crime information could be distinguished through D-score and reaction time, converted to symbolize strength of the association between guilty sentences, innocent sentences, and truth sentences. As a result of the analysis, guilty group showed significantly higher D-score than both innocent-aware group and innocent-unaware group. guilty group also showed faster response time in true-guilty condition than true-innocent condition. This shows that the association of true-guilty conditions is stronger than that of true-innocent conditions. On the other hand, the innocent-aware group showed a faster response time in the true-innocent condition than the true-guilty condition, and innocent-unaware group showed no significant difference between the two conditions. Through this, it was confirmed that innocent suspects exposed to criminal information can be discriminated according to the aIAT pattern, which has a faster reaction rate to the truth and innocence union than the guilty group. This study confirmed that suspects exposed to criminal information can be effectively discriminated using aIAT, and further suggests the usefulness and potential of aIAT in the field of lie detection.

Key words : lie detection, autobiographical Implicit Association Test, mock crime, leakage, suspect discrimination

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What if an innocent citizen is mistaken for a suspect during the lie detection process just by knowing the details of a crime? This mistake has been mistaken frequently. Detecting lies play a crucial role during crime investigations and criminal trials because discriminating suspects from innocents is crucial for the public and social safety. It is important to detect the truth within the testimonies, as most suspects accused of guilt try to lie about their criminal behavior. If the deception is not precisely distinguished, the innocents can be punished unfairly or guilty criminals can avoid punishment. This can lead to citizens no longer trusting the judicial agency's procedures, and ultimately lead to seriously undermining public safety and legal order.

Review and limitations of existing lie detection technique

It cannot be overemphasized enough the importance to accurately discriminate between innocent and guilty suspects exposed to criminal information. Psychophysiological Detection of Deception exams (PDD) are mainly used in lie detection tests to achieve the goal of accurate discrimination between innocent and guilty suspects (Honts, 2004). PDD is a method of detecting lies by using the physiological responses of respondents such as heart rate, breathing, skin conduction response, and event-related potential (ERP) as a measurement, and is actively used in actual investigations (Honts & Schweinle, 2009; Yocom, 2007). There are several methods of questioning techniques that belong to this method, and the representative methods are the Comparison Question Test (CQT; Offe & Offe, 2007) and the Concealed Information Test (CIT; Verschuere, Ben-Shakhar, & Meijer, 2011).

The CQT is based on a comparison of physiological responses to crime-relevant questions and control questions. Critics of the CQT, however, have argued that this method is not based on scientific principle, and relies on improper and unstandardized control questions, which enhance the risk of false positive errors (Ben-Shakhar & Elaad, 2003; Ben-Shakhar & Furedy, 1990; Iacono & Ben-Shakhar, 2019). In contrast to the CQT, the CIT has been shown to be a reliable lie-detection method that is intended to establish the existence of a specific autobiographical memory trace (Lykken, 1974). The CIT is based on the assumption that suspects who possess knowledge about specific crime related details will be physiologically more reactive when confronted with these details than when confronted with comparable items not related to the crime (Klein Selle, Verschuere, Kindt, Meijer, & Ben-Shakhar, 2016). It is enforced on the basic premise that the subject, not the perpetrator, must not know the criminal information because the CIT only evaluates whether guilty knowledge is encoded within mind of the interviewee (Verschuere et al., 2011).

However, at actual crime scenes, test subjects are often exposed to criminal information through the investigation process and the media (Bradley, Barefoot, & Arsenault, 2011; Hong, Kim, Ji, & Kim, 2015; Verschuere & Meijer, 2014). In this case, the CIT cannot differentiate guilty suspects from innocent suspects who are informed about guilty knowledge (e.g, witnesses or people who are exposed to crime information through media). That is, leakage of crime-relevant information might put the innocent suspects in great danger because knowledge of the critical items might be sufficient for producing differential responses to these items. Because of its characteristics, the CIT has a limitation in that it can only be used in situations in which the innocent suspect was not exposed to the guilty knowledge (Ben-Shakhar, 2012; Gamer, Gödert, Keth, Rill, & Vossel, 2008; Podlesny, 2003). Despite the obvious effectiveness of the existing prosecution method, there are some limitations in discriminating innocent groups exposed to criminal information.

It is clear that psychophysiological responses are a useful measure for detecting lies, but there are points in that they are greatly influenced by external stimuli and personal characteristics. These problems include innocent suspects fearing to be mistaken as criminals, high traits-tendencies such as anxiety or psychopathy (DePaulo, Epstein, & LeMay, 1990; Poter, ten-Brinke, Baker, & Wallace, 2010; Riggio, Salinas, & Tucker, 1988; ten-Brinke, MacDonald, & Poter, 2012). The various countermeasures used during the test to avoid the fact that you lie can also contribute to lowering the accuracy of the results. This is due to the characteristics of PDD, and it can be seen that PDD detects changes in sympathetic nervous system reactions or electrical activity of the brain that occur through emotional changes rather than detecting the lies themselves (Luck & Hillyard, 1994; Lykken, 1981; Orne, 1975; Saxe, 1991). Because the emotions that appear when you lie may differ from person to person, there are false negatives in which the person who is lying tells you to tell the truth, and false positives in which the person telling the truth tells you to lie. It is likely to make an error (Happel, 2005). These traits can be particularly fatal weaknesses for innocent groups exposed to criminal information we want to discriminate.

The results of verifying the difference in physiological responses between the innocent group and the rest of the groups exposed to criminal information using equipment such as polygraphs and event-related potentials through the principles of psychophysiological examination are quite mixed. Studies using polygraph showed that there were significant differences in respiratory and skin conduction responses compared to innocent groups, regardless of whether or not they were exposed to criminal information, but there were no significant differences between exposed innocent and

unexposed innocent groups (Ben-Shakhar, Gronau, & Elaad, 1999). On the contrary, however, an analysis of differences in skin conduction responses and heart rates showed conflicting results that there was no significant difference in skin conduction responses and heart rates between guilty groups and innocent groups exposed to criminal information (Gamer et al., 2008). Studies using ERP suggest that innocence groups exposed to criminal information have a significantly lower P3 amplitude, a large, positive-going potential that appears near 300ms after the innocent group exposed to criminal information, in the relevant questions than guilty groups, so that CIT using ERP are more likely to discriminate between innocent groups exposed to criminal information. (Hong et al., 2014; Jang, Kim, Cho, & Lee, 2013), however, some studies have found significant differences in P3 amplitude between crime-related and unrelated questions in innocent groups who know crime information, exposing them to crime through CIT. Discrimination of innocent groups reported difficulties (Winograd & Rosenfeld, 2014). It is questioned whether this existing lie detection technique can discriminate innocent groups exposed to criminal information.

aIAT, a new lie detection technique

Autobiographical Implicit Association Test (aIAT), which has recently been introduced as a simple and promising lie detection tool is a new method proposed in order to make up for this weakness (Agosta, Ghirardi, Zogmaister, Castiello, & Sartori, 2011; Satori, Agosta, Zogmaister, Ferrara, & Castiello, 2008). The aIAT is novel variant of the implicit association test (IAT), which might be used to detect whether the examinee has a specific memory for some critical information like the CIT (Greenwald, McGhee, & Schwartz, 1998). More specifically, the aIAT is possible to evaluate which of two contrasting autobiographical events is true for given individuals. The effectiveness of aIAT has been suggested by the results of lie detection studies using aIAT (Agosta et al., 2011; Agosta, Pezzoli, & Sartori, 2013; Satori et al., 2008;). The web-based aIAT have also been studied to verify its effectiveness in detecting lie, but it is unclear whether aIAT can discriminate innocent groups exposed to criminal information (Verschuere & Kleinberg, 2017).

The principle of aIAT is to use the indirect measure of the strength of an association between always true sentences and sentences describing autobiographical events. The aIAT includes stimuli belonging to four categories. Two categories are logical categories and are represented by sentences that are always true events (e.g., “I'm in front of the computer”) or always false events (e.g., “I'm at the beach”) for the respondent. Two other categories are alternative categories of autobiographical events (e.g, guilty related “I stole the car” vs. innocent related “I didn't stole the car”). Only one of the

two categories is true. This is accomplished by requiring the respondent to complete two critical blocks of categorization trials, each of which pairs a different potentially autobiographical event with true events. Because pairing of a truly autobiographical event with always true events should facilitate responses, the specific pattern of reaction times in the two blocks indicates which autobiographical event is true and which is false. That is, the paring of always true events with a truly autobiographical event shows more facilitate responses than the paring of always true events with a false autobiographical event.

This provides a lie detection method that is highly adaptable to many scenarios, including those where possibly innocent suspects are also aware of all the critical details of a crime, because it is not the recognition of a relevant item that matters, but the association between the critical items and inducers with similarly true or false contents (Lukács, Gula, Szegedi-Hallgató, & Csifcsák, 2017). Therefore, the aIAT could discriminate between the guilty suspect and the innocent-aware or the innocent-unaware suspect.

Study purpose

The purpose of current study is to investigate whether an innocent suspect exposed to crime information through aIAT can be discriminated from guilty suspects and innocent participants using a mock crime paradigm. Thus, we investigated differences among the guilty group and the innocent-aware group and the innocent-unaware group using the aIAT. We hypothesized that there would be differences in the aIAT responses among three groups. That is, we predicted that the guilty group would be faster in the block that associated guilty events with always true events than in the block that associated innocent events with always true sentences, whereas the innocent-aware and the innocent-unaware group would exhibit the opposite pattern.

Method

Participants

Participants were recruited from an online bulletin board on a university website. All participants were told that they would be recruited for psychological experiments on crime and lies and that they would be paid $5 for their participation. Total 49 undergraduate students (24 males and 25 females; mean age: 22.56 ± 2.36) were recruited for the experiment. They were randomly assigned to one of three groups: 15 to the guilty group, 18 to the innocent-aware group, and 16 to the innocent-unaware group. All participants were provided with informed consent and were informed that they can terminate the experiment

at any time prior to participation in the current study.

aIAT

The computerized task consisted of seven separate blocks of categorization trials (Jung & Lee, 2009) (see Table 1). In each trial, a stimulus was presented at the center of a computer monitor, and participants were requested to classify the stimulus as quickly and accurately as possible, by pressing one of two labeled keys. Stimuli were sentences of variable length, each describing a potentially autobiographical fact. In Block 1 (20 trials; logical discrimination), participants were instructed to classify sentences as true or false. They pressed the 'D' key if the sentence was true (e.g., "Im in front of the computer") and the 'K' key if the sentence was false (e.g., "I'm at the beach"; the true and false sentences were the same for all experiments). In Block 2 (20 trials; initial autobiographical discrimination), participants were instructed classify sentences as guilty or innocent. They pressed the 'D' button if the sentence was of the guilty type (e.g., "I have stolen the money", "I have wrote out a fake receipt") and the 'K' button if the sentence was of the innocent type ("I did not steal the money", "I did not wrote out a fake receipt"). In Block 3, 4 (65 trials; double categorization), participants were instructed to press the 'D' key if the sentence was of either the true or the guilty type and the 'K' key if the sentence was of either the false or the innocent type. In Block 5 (30 trials; reversed autobiographical discrimination), participants were instructed to press the 'D' key for sentences of the innocent type and the 'K' key for sentences of the guilty type. In Block 6, 7 (65 trials; reversed double categorization), participants instruct to press the 'D' key for true and innocent sentences and the 'K' key for false and guilty sentences. Reminder labels in the form of category names remained on the monitor for the entire duration of each block. An error signal

Table 1. Sequence of trial block in the autobiographical implicit association test (aIAT)

Block	No. of trials	Function	'D' key	'K'key
1	20	Practice	True sentence	False sentence
2	20	Practice	Guilty sentence	Innocent sentence
3	25	Test	True + Guilty sentence	False + Innocent sentence
4	40	Test	True + Guilty sentence	False + Innocent sentence
5	30	Practice	Innocent sentence	Guilty sentence
6	25	Test	True + Innocent sentence	False + Guilty sentence
7	40	Test	True + Innocent sentence	False + Guilty sentence

Table 2. Sentences of the autobiographical implicit association test (aIAT)

Category	Sentence
True	1. I am in the lab now. 2. I am looking at the screen now. 3. I am experimenting now. 4. I am now in the psychology and laboratory. 5. I am in front of the computer now. 6. I am looking at the monitor now.
False	1. I am hiking now. 2. I am on the beach now. 3. I am eating now. 4. I am playing soccer now. 5. I am shopping now. 6. I am playing basketball now.
Guilty	1. I stole money. 2. I forged the receipt. 3. I manipulated the ledger. 4. I committed a crime. 5. I stole money from the teaching room. 6. I stole the money and removed the evidence.
Innocent	1. I did not steal money. 2. I did not falsify the receipt. 3. I did not manipulate the ledger. 4. I did not commit a crime. 5. I didn't steal money from the classroom. 6. I have never tried to destroy the evidence.
Guilty	1. I went into the psychology department's teaching room to steal money. 2. I looked for USB to get rid of the evidence. 3. I stole the money. 4. I took out the seal to remove the evidence. 5. I stole money from the psychology department's teaching room. 6. I stole the money and removed the evidence.
Innocent	1. I did not go to the psychology department's teaching room to steal money. 2. I wasn't looking for USB to get rid of the evidence. 3. I never stole money. 4. I did not take out the stamp to get rid of the evidence. 5. I have never stolen money from the psychology department's teaching room. 6. I have never tried to remove evidence.

appeared after an incorrect response. True-false sentences and guilty-innocent sentences were presented in alternation in Blocks 3, 4 and 6, 7. Half of the participants were administered the blocks in the order just outlined, whereas for the other half, the order of Blocks 3, 4 and 6, 7 was reversed (and the order of Blocks 2 and 5 was reversed accordingly). The comparison of interest was between average RT in Block 3, 4 and average RT in Block 6, 7.

Procedure

The procedure of this study used a mock crime paradigm in a form similar to the author's previous studies. Participants read and signed a written consent to participate in the experiment upon arrival. The experimenter informed participants of the details of their mission. They were informed that they would take part in an experiment on detecting deception and instructed to try not to be judged as guilty. Then, they were randomly assigned to one of the three groups: guilty, innocent-aware, and innocent-unaware.

The mission for the guilty group was to enter the teaching assistant's office, steal money ($50) in a white envelope, then falsify an account book file in the black USB to cover up for stealing the money. After, they were to write out a fake receipt using a black pen, and then stamp a purple seal on the fake receipt without getting caught. The mission for the innocent-aware group was to go to the teaching assistant's office, ask someone for permission to bring eight items, including crime-relevant and crime-irrelevant stimuli, as an errand for the assistant. There was no specific mission for the innocent-unaware group. The innocent-unaware group just stayed in the laboratory for about 15 min doing nothing.

After each mission was completed, participants were asked if they had successfully completed their mission. All subjects were told that they were suspected in money theft and that they would have opportunity to demonstrate their innocence in a lie-detection test. the guilty group was exposed to crime-relevant knowledge, but individuals in this group knew the difference between crime-relevant and crime-irrelevant stimuli. While the innocent-aware group was exposed to crime-relevant knowledge, but individuals in this group could not differentiate between crime-relevant and crime-irrelevant stimuli. The innocent-unaware group was not exposed to crime-relevant knowledge at all.

The interview instructions for the guilty group were as follows. They had to convince that they are innocent to the interviewer. They were told that if they fail to convince the interviewer or make confession. They were told that if they did not persuade the interviewer or make a confession, they might not receive the full amount of the fee. They were told to hide the fact that they committed a crime no matter what. The interview instructions for the innocent

groups were as follows. They had to convince that they are innocent to the interviewer and did not committed a crime. They were told that if they fail to convince the interviewer about their innocence or lie about what they did, they might not receive the full amount of the fee.

All participants came back to the psychology laboratory and moved to the next room for the aIAT task. After the experiment, recall and recognition tests were conducted to determine ho well-participants remembered the crime-relevant and crime-irrelevant stimuli. The test consisted of 12 single-selection questions (four questions of crime-relevant stimuli, four questions of crime-irrelevant stimuli, four questions of neutral stimuli), and participants were asked to mark an X in the appropriate answer (i.e., 1: the stimuli you stole during the experiment, 2: the stimuli you did not steal during the experiment, and 3: you do not remember the stimuli or do not know the answer). Therefore, the correct answer was different for each group. One point was given if the answer was correct, if not then 0 points were given adding up to the total score of 12 points. all participants were asked to perform a recognition test, were debriefed about the experiment and payment procedure, and were given $5 as a reward. In addition, they were each asked not to share any information with anyone who might participate in the experiment in the future.

Table 3. stimuli list

crime-relevant stimuli	crime-irrelevant stimuli
black USB	silver USB
purple legal seal	unofficial seal
white envelope	purple postcard
black pen	pencil

Data analysis

Two dependent measures were considered: mean Reaction Time (RT) in the double-categorization blocks and the D-score (Greenwald, Nosek, & Banaji, 2003). RTs shorter than 150ms or longer than 10,000ms were discarded. The difference in average RTs between Block 3 + 4 and Block 6 + 7 was used to identify autobiographical events that were true for the respondents. If RT was faster in the true-guilty conditions, guilty sentences were true for the respondent, whereas if RT was faster in the true-innocent conditions, innocent sentences were true for that respondent.

The D-score includes a penalty for incorrect responses and expresses the IAT effect (the difference in performance between the two double-categorization blocks) in terms of the standard deviation of the latency measures. We calculated the D-score by subtracting the mean RT for the two blocks associating guilty and true sentences from the mean RT in the two blocks associating innocent and true sentences and then dividing the difference by the inclusive standard deviation of the four blocks. Guilty participants were expected to have positive

D-score, whereas innocent participants were expected to have negative D-score. One-way analysis of variance (ANOVA) have been used to evaluate whether the group 3 (guilty, innocent-aware, innocent-unaware) differed significantly. D-score, and Two-way analysis of variance (ANOVA) have been used to evaluate whether the 3 group (guilty, innocent-aware, innocent-unaware) × 2 condition (true-guilty, true-innocent) differed significantly reaction time pattern. Statistical analysis was performed with SPSS 15.0 for windows (SPSS inc., Chicago, USA).

Results

Sample Characteristics

There were no significant gender differences among the three groups, $x^2(2) = 3.45$, $p = 0.18$. In addition, there were no significant age differences among the three groups, $F(2, 46) = 1.42$, $p = 0.25$.

Recognition Test

The number of correctly remembered items in the recognition test was 11.17 out of 12 details ($SD = 0.59$) for the guilty group, 11.80 ($SD = 0.41$) for the innocent-aware group, and 11.74 ($SD = 0.56$) for the innocent-unaware group. The one-way ANOVA on the number of correctly recognized items revealed no significant effect of the factor group, $F(2,48) = 0.13$, $p = 0.88$, indicating that participants in all groups remembered the crime-relevant and/or crime-irrelevant stimuli well-according to each group's mission and did not differ in their recognition rates.

D-score (IAT effect)

There was a statistically significant difference between groups as determined by one-way analysis of variance (ANOVA) [$F(2, 46) = 4.72$, $p < .01$, $\eta^2 = .17$] (Fig. 1). A LSD post-hoc test revealed that the guilty group was statistically significantly higher than the innocent-aware group ($p < .01$) and the innocent-unaware group ($p < .05$). There were no statistically significant differences between the innocent-aware group and the innocent-unaware group ($p = .057$.). Results showed that there were significant differences between the guilty group and the other innocent groups.

Reaction Time

In order to statistically examine the reaction time pattern, we conducted 3 (group: guilty/ innocent-aware/ innocent-unaware) × 2 (condition: true-guilty/ true-innocent) mixed ANOVA. There was a statistically significant difference between the groups in regards to mean latencies [significant main effect for Group,

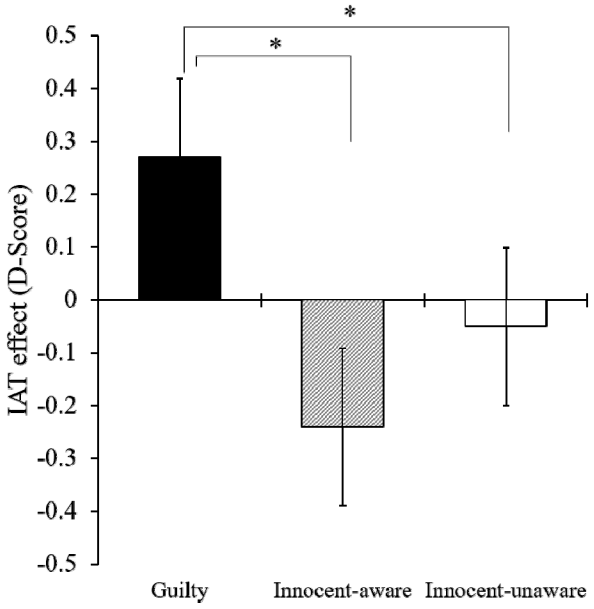

Figure 1. The differences in the D-score between three groups

(guilty, innocent-aware, innocent-unaware). Error bars reflect standard errors. Note. *p < .05, D-score by subtracting mean RT for the two blocks associating guilty + true sentences from mean RT in the two blocks associating innocent and true sentences and then dividing this difference by the inclusive standard deviation of the four blocks.

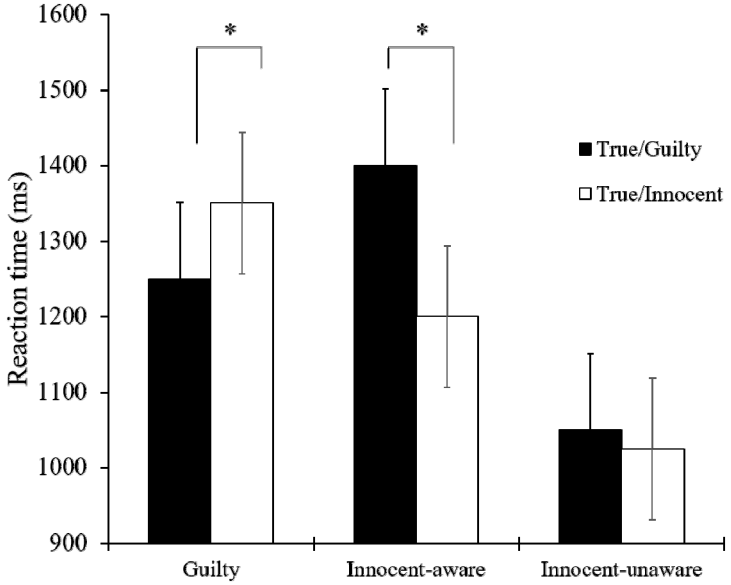

Figure 2. The differences in reaction time between three groups

*(guilty, innocent-aware, innocent-unaware). Error bars reflect standard errors. Note. *p < .05*

Table 4. Mean and standard deviation (SD) of D-score and RT

		Guilty	Innocent-aware	Innocent-unaware
D-score		.27(.36)	- .24(.64)	- .05(.342)
Reaction Time	True/Guilty	1259.10(98.22)	1405.05(95.10)	1079.76(89.66)
	True/Innocent	1369.55(76.89)	1215.09(74.44)	1053.67(70.10)

$F(2, 46) = 3.55$, $p < .05$, $\eta^2 = .13$]. A LSD post-hoc test revealed that the guilty group and the innocent-aware group were significantly higher than the innocent-unaware group ($p < .05$). There was no difference between the guilty group and the innocent-aware group ($p = .144$.). And there was no difference between true-guilty conditions and true-innocent conditions. [No significant main effect for condition ($p = .054$)]. Also, mean latencies were lower for the congruent than for the incongruent blocks in the guilty group and the innocent-aware, although they did not differ in the innocent-unaware group [significant interaction effect for Group × Condition, $F(2, 46) = 4.39$, $p < .05$, $\eta^2 = .16$] (Fig. 2). That is, in the guilty group, true-guilty conditions were faster than true-innocent condition, whereas in the innocent-aware group, true-innocent conditions were faster than true-guilty conditions.

In summary, the results of this study indicate that the IAT scores of the guilty group were higher than the innocent-aware group and the innocent-unaware group, which means that implicit memory tests can be used to distinguish between guilty and innocent groups. These results indicate that there was a strong association between sentences referring to each group's experiences and true statements. The guilty group showed a stronger intensity of the truth-guilty memory association than the truth-guilty memory association, whereas the innocence group exposed to crime-related stimuli showed a stronger intensity. This suggests that, like the results from the D-score, aIAT can distinguish between guilty and innocent-aware groups.

Discussion

The purpose of this study was to confirm through aIAT whether innocent suspects exposed to criminal information could be discriminated from guilty suspects and innocent suspects. Specifically, the manipulation of exposure to criminal information through the mock crime paradigm was classified into three groups: guilty group, innocent-aware group, and innocent-unaware group. And aIAT was performed to compare the response patterns according to sentences and D-score between the three groups.

As a result of the study, we found that aIAT may distinguish guilty suspects from innocent suspects.

The main finding in this study was that there was a clear difference in aIAT D-score between the three groups. The innocent-aware group, that is, an innocent group that did not commit a crime but was exposed to guilty knowledge, had distinctive different results from the guilty group despite having criminal information. In other words, in the innocence-aware group, it means a significant difference between the reaction time between an always true sentence and an autobiographical sentence related to guilty and the reaction time between an always true sentence and an autobiographical sentence related to innocent, and a significant difference the negative D-score. Despite their possession of crime-related information, they are accompanied by a solid implicit attitude toward innocence, not guilty. As a result of using an individual's implicit attitude toward a crime fact rather than a physiological characteristic that can be greatly influenced by external factors, this suggests that using aIAT is not mistaken for simply having a memory of a crime.

Interestingly, in the guilty group, it showed positive D-score, and the result showed that the reaction time between an always true sentence and an autobiographical sentence related to guilty faster than the reaction time between the always true sentence and the autobiographical sentence related to innocent. Along with supporting the hypothesis of this study, it revealed that the association between true and guilty is stronger than the association between true and innocent in the guilty group. They have an autobiographical memory related to their guilty, making it difficult to associate the true with the reaction to the sentence that claims innocent. The results of this study indicate that despite attempting to pretend to be innocent by expressing lies, they failed to appear innocent. This is a result of clearly showing the characteristics and advantages of aIAT, and it is difficult to deliberately interfere with the search for implicit association.

The last thing to note is the results of the innocent-unaware group. The innocent-unaware group showed a negative D-score that was clearly distinguished from the guilty group, and did not show a statistically significant difference in the reaction time between an always true sentence and an autobiographical sentence related to guilty and the always true sentence and the autobiographical sentence related to innocent. Our reasoning about these results is the weak implicit attitude due to the absence of information. The innocent-unaware group may not have a significant difference in attitude toward innocent and guilty sentence, as there is no knowledge of criminal information. Indeed, there are claims that similar results occur when the relevant memory for the test item is not available in the aIAT (Vargo, Petróczi, Shah & Naughton, 2014). These test characteristics may

have led to a distinct pattern of results in the three groups.

It is reasonable to infer that aIAT is a very simple method to use and is an effective method for detecting deception when the research is put together. Regardless of the knowledge leak of criminal information, the suspect's attitude can be identified by the individual's attitude toward the crime. aIAT can be implemented for a short period of time and can be easily used by anyone because it does not require any special training for the user in handling inspection techniques (Satori et al., 2008). In addition, since it does not require cutting-edge equipment and is highly mobile, it can be effectively used for polygraph detection while saving time and money in the actual field. Therefore, this tool is worth assisting in discriminating innocent suspects exposed to criminal information when using other lie detection techniques in forensic scenes (e.g. CQT using a lie detector, CIT using an event-related potential). In fact, there is one study that showed the effectiveness of detection by combining the principles of P300-CIT and aIAT (Hu & Rosenfeld, 2012).

The limitations of this study are also worth mentioning. First, this study was conducted in accordance with the mock crime paradigm used in the existing lie detection study. However, since this study was conducted through mock crimes against college students, it may be difficult to generalize the effect of lie detection using aIAT in a real crime scene. Future studies will require replications in actual data interviews with criminals. Second, although it was reported that it would not be possible to receive a case fee if convicted, the laboratory experiment reported here is different from a field lie detection application where participants are expected to be very concerned about the results of their tests. the level of arousal or stress may differ from the actual communication or interview. Therefore, future studies require the use of a experimental paradigm with increased ecological validity. Third, in real life situations, people can be exposed to various criminal details such as criminal methods and the contents of evidence, in addition to crime-related items. Future studies require replications of these various criminal details beyond crime relevant stimuli. Finally, like other lie detection techniques, aIAT has the disadvantage that guilty suspects may cheat aIAT using countermeasures such as familiarity with IAT and prior experience. The study that reported the limitations of aIAT showed that the guily participants can fake the aIAT without prior experience with the aIAT and when a response deadline is imposed. (Verschuere, Prati, & De Houwer, 2009). Interestingly, however, studies have reported that aIAT can be forged, but also forged. Four experiments have detected attempts in faking the aIAT, and emphasized that resistance to counterfeiting may be an advantage of the aIAT (Agosta et al., 2011).

This study presents clear implications in the

area of polygraph detection. As a result of this study, aIAT suggests that innocent groups exposed to criminal information can be discriminated from guilty groups, which may further be used to assist with other lie detection techniques. Depending on the nature of the aIAT, which may be used to assess the existence of virtually any type of autobiographical memory, the possibility that it may be used to detect various kinds of deception, such as sex crimes and drugs, in other areas of the field of criminal psychology, as well as in the areas of lie detection present.

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범죄 정보 인식에 따른 용의자 변별을 위한 aIAT 활용

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본 연구는 자서전적 암묵적 연합 검사(aIAT)를 이용하여 범죄 정보에 노출된 무고한 용의자와 유죄 용의자를 변별할 수 있는지 모의 범죄 패러다임을 통해 검증하고자 했다. 총 49명의 대학생을 유죄 집단, 무죄-범죄 정보 노출 집단, 무죄-범죄 정보 비노출 집단에 각각 무선 할당하였다. 참가자는 모의 범죄 또는 통제 과제 수행 후 용의자 색출을 위한 aIAT를 수행하였다. 유죄 및 무죄 문장과 진실 문장 간의 연합의 강도를 환산한 D 점수와 반응 시간을 통해 범죄 정보에 노출된 무고한 용의자와 유죄 용의자를 변별할 수 있는지 검증하였다. 분석 결과, 유죄 집단은 무죄-범죄 정보 노출 집단과 무죄-범죄 정보 비노출 집단보다 유의하게 높은 D 점수를 나타냈으며, 진실-무죄 조건보다 진실-유죄 조건에서 빠른 반응시간을 보였다. 이는 진실-유죄 조건의 연합이 진실-무죄 조건의 연합보다 크다는 것을 보여준다. 반면, 무죄-범죄 정보 노출 집단은 진실-유죄 조건보다 진실-무죄 조건에서 빠른 반응시간을 보였으며, 무죄-범죄 정보 비노출 집단은 두 조건 간 유의한 차이가 없는 것으로 나타났다. 이를 통해, 범죄 정보에 노출된 무고한 용의자가 유죄 집단에 비해 진실과 무죄 연합에서 빠른 반응속도를 보이는 aIAT 패턴에 따라 변별될 수 있음을 확인했다. 본 연구는 범죄 정보에 노출된 용의자를 aIAT를 활용하여 효과적으로 변별할 수 있음을 확인하였으며, 나아가 거짓말 탐지 분야에서 aIAT가 지닌 유용성과 가능성을 제안한다.

주요어 : 거짓말 탐지, 자서전적 암묵적 연합 검사, 모의범죄, 범죄 정보 노출, 용의자 변별