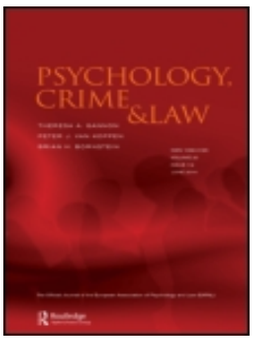

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Feeling guilty: little effect on false confession rate

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ABSTRACT

In two experiments, we tested the hypothesis that guilt feelings would elevate the probability of making a false confession. In Experiment 1 ($N = 146$), a confederate induced guilt feelings by asking participants to cheat on a task. The experimenter then falsely accused participants of having pressed a forbidden key, causing a computer crash. In Experiment 2 ($N = 108$), a confederate was punished every time participants could not answer a quiz question. The confederate later cheated in a game and asked participants to take the blame. In Experiment 1, 100 participants (68.5%) falsely confessed to pressing the key. In Experiment 2, 39 participants (36.1%) falsely confessed to cheating. Guilt manipulations had no effect on false confession rates. When exploring the effect of guilt feelings, five of eight tests were statistically non-significant. As yet, there is insufficient evidence to argue that guilt feelings are a major determinant of false confessions.

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Most people think it is unlikely that they would confess to a crime they did not commit (Kassin, 2017). Yet, high profile legal cases suggest the opposite. In Europe, the proven false confessions in the case of the German farmer Rudi Rupp (Friedrichsen, 2011), the Dutch Putten Murder case (Wagenaar, 2002), and the Swedish case of Thomas Quick (Raståm, 2013) caused a sensation. In the United States, about 25% of DNA exoneration cases involved false confessions (https://www.innocenceproject.org/; cf. Kassin, 2017; Kassin & Gudjonsson, 2004).

Well-studied dispositional and situational factors that may increase the risk of a false confession include young age (Drizin & Leo, 2004), mental impairment (Gross & Shaffer, 2012), high levels of suggestibility and compliance (Gudjonsson, 2003; Kassin & Gudjonsson, 2004), pressuring interrogation strategies, sleep deprivation, and long interrogation duration (Drizin & Leo, 2004; Kassin et al., 2010). One possible impact factor that has received little attention thus far is feeling of guilt (e.g. Gudjonsson, 2003). This is surprising, because feelings of guilt are known to increase compliant behavior, a risk factor for false

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confessions (Carlsmith & Gross, 1969; Freedman et al., 1967; Konoske et al., 1979). In one study, guilt feelings were induced by having participants think they had delivered painful shocks to a confederate in response to inaccurate answers. In the next phase of the experiment, guilty participants were more likely than innocent participants to comply with the confederate's request to call people and ask them to sign a petition (Carlsmith & Gross, 1969). Another study induced guilt feelings by manipulating participants to tell a lie: Before the experiment, participants waited in a room where a confederate joined. In the guilty condition, the confederate engaged in a conversation and described the test that the participant was going to take. When the experimenter took participants to the testing room, they told them that it was important that they had not heard about the test before. All guilty participants, except one, lied and said that they had not. When participants were later invited to participate in another study without being paid, guilty participants were more likely to comply than innocent participants (Freedman et al., 1967).

Another line of research suggests that people may punish themselves in order to reduce feelings of guilt, when other opportunities for compensation are lacking (Bastian et al., 2011; Inbar et al., 2013; Nelissen & Zeelenberg, 2009). In one study, three different conditions were tested: pain + guilt, no pain + guilt, pain + no guilt (Bastian et al., 2011). Participants in the two guilt conditions wrote about a time when they behaved unethically, whereas participants in the pain + no guilt condition wrote about an everyday interaction. Participants in the two pain conditions immersed their hand into an ice bucket for as long as they could; participants in the no pain + guilt condition immersed their hand into warm water. Before and after this task, feelings of guilt were assessed. Participants in the pain + guilt condition immersed their hands longer in the ice water than pain + no guilt participants and experienced a significant reduction in guilt feelings, compared to the participants in the no pain + guilt condition. These findings suggest that people were willing to undergo an aversive experience when feeling guilty.

The link between feelings of guilt, compliant behavior, and self-punishment is relevant in the context of both true and false confessions. For example, norm transgressions might lead to an internal feeling of guilt. We know that experiencing 'internal pressure' related to guilt feelings plays a role when providing a *true* confession (Horgan et al., 2012; Houston et al., 2014; Narchet et al., 2011; Sigurdsson & Gudjonsson, 1996b). In contrast, participants who *falsely* confess perceive more external than internal pressure (interrogative pressure, severity of the consequences; Horgan et al., 2012). However, consider the situation where suspects are interrogated about a crime of which they are innocent, but guilty of another crime, committed earlier (Sigurdsson & Gudjonsson, 2001). Indeed, self-report studies suggest that such situations are common and false confessions occur often among people with a criminal background. In one study, male false confessors reported 2.25 times more often that they had committed burglary in the past than non-false confessors (Gudjonsson et al., 2009). In self-report studies conducted in prisons, the vast majority of alleged false confessions were not related to the current offense (Gudjonsson & Sigurdsson, 1994: 100%; Sigurdsson & Gudjonsson, 1997: 95%).

In situations where innocent suspects are interrogated but guilty of another crime, guilt feelings may transfer and affect the suspect's behavior during the interrogation. In an attempt to reduce feelings of guilt, even innocent suspects' tendencies to comply and to undergo self-punishment may be elevated, thereby increasing the risk of false confessions. The actual perpetrator constitutes one possible source of guilt feelings. In extreme

cases, innocent suspects may confess to a crime, because they feel guilty towards the perpetrator and want to protect her/him. Indeed, the *Negative State Relief Model* suggests that people help others in order to reduce their own internal negative state (Cialdini et al., 1973). There is evidence that people who feel guilty because they harmed another person or witnessed the harm, are more likely to engage in altruistic behavior than those who did not harm another person (Cialdini et al., 1973; Darlington & Macker, 1966; Rawlings, 1968). Furthermore, transgressions against valued partners in close relationships are strongly associated with guilt feelings (Baumeister et al., 1994) and can motivate people to behave in ways that maintain the relationship and engage in reparative actions (e.g. confessing; Gudjonsson, 2003; McCann, 1998). Thus, it might well be the case that a combination of guilt feelings and closeness towards a person in need increases the probability of taking the blame.

Self-reports suggest that blame taking may occur at a high rate, both in the general and the criminal population (Gudjonsson & Sigurdsson, 1994; Sigurdsson & Gudjonsson, 1996a; Volbert et al., 2019; Willard et al., 2015). Three experimental studies specifically investigated situational impact factors on blame-taking behavior. In two studies using a case vignette methodology, participants indicated they would rather take the blame for a close than a casual friend (Willard et al., 2016; Willard & Burger, 2018). However, these studies measured intended, not actual behavior (Baumeister et al., 2007). Another experimental study measuring actual behavior found that adolescents (59%) were more likely to take the blame than adults (39%; Pimentel et al., 2015). In a modified version of the cheating paradigm (Russano et al., 2005), all participants witnessed a confederate cheat while solving two tests individually in a room together. While the participant and confederate were working on the second test, the experimenter entered the room and informed them that the first test had revealed cheating. The experimenter instructed the confederate to wait in an adjacent room and left the room. While the confederate prepared to exit the room they became upset and asked participants to take the blame because of an academic probation status. Then, the confederate quickly left the room making it impossible for participants to respond. Next, the experimenter interrogated participants and prepared a self-incriminating statement admitting to the cheating for participants to sign. The experiment ended with either a signed false confession and the debriefing or just the debriefing. Most confessors (69%) indicated that they wanted to protect the confederate.

Meanwhile, ideas about the false confession-promoting properties of guilt feelings are speculative as empirical data are largely lacking. With this in mind, we tested the effect of feelings of guilt on false confessions (Experiment 1) and blame-taking behavior (Experiment 2). In Experiment 1, we attempted to induce guilt feelings by means of a confederate who prompted participants to cheat on a problem task (Russano et al., 2005). In the next phase of the experiment, we falsely accused participants of having pressed the forbidden SHIFT key, causing the computer to crash (Kassin & Kiechel, 1996). We expected participants in the guilt induction condition to be more likely to falsely confess to hitting the SHIFT key than participants in the no-guilt induction condition. In Experiment 2, we administered the Relationship Closeness Induction Task to create closeness between participants and the confederate (Sedikides et al., 1999) and a situation where blame-taking behavior might be plausible (Willard et al., 2016; Willard & Burger, 2018). After the closeness induction, the confederate had to eat hot sauce every time participants could not answer a quiz question. To induce guilt feelings, one group of participants had to

answer difficult questions, leading to more wrong answers and punishment (guilt induction condition). Following Pimentel et al. (2015), the confederate cheated in a Gambling Game (Wright et al., 2015) and asked participants to take the blame. We expected participants who were induced to feel guilty to be more likely than participants in the no-guilt induction condition to comply with this request.

Experiment 1

Method

Participants

A total of $N = 156$ participants participated in exchange for course credit or a 5-euro gift voucher. Ten participants were excluded because they were familiar with the *ALT key paradigm*, as established in the exit interview. The remaining 146 participants (111 female, $M_{age} = 21.15$ years, $SD_{age} = 2.56$) were mostly students (96.6%). All participants were proficient in English and were tested in English. Both studies were approved by the standing Ethical Committee.

Design

Participants were randomly assigned to one of two guilt induction groups (*yes* vs. *no*).[1] We had expected that most participants in the guilt induction condition would comply with the confederate's request. However, 44 participants did not (non-cheaters). Non-cheaters and participants assigned to the no-guilt induction condition did not differ on the PFQ2 subscale *guilt* (see below), $t(74) = -0.34$, $p = .732$, $d = 0.08$, the feeling of guilt item in the exit interview, $t(74) = -0.62$, $p = .536$, $d = 0.14$, or the false confession rates, $\chi^2(1, N = 76) = 0.63$, $p = .428$; $\phi = -0.09$. Therefore, we collapsed them into one group. In the guilt induction condition ($n = 70$), following a request from a confederate, participants cheated in the first part of the experiment, whereas participants in the no-guilt induction condition[2] ($n = 76$) worked on their own, as requested by the experimenter. The dependent variables were whether or not participants confessed by means of signing a written self-incriminating statement and internalization of this confession.

Materials

Problem tasks. The problem tasks were taken from Russano et al. (2005). The team tasks and the individual tasks both consisted of three problems. As a team, the participant and confederate solved word riddles and had to calculate the age of two siblings. Individually, they calculated how many women and men were on a bus, solved a riddle, and counted triangles.

Harder personal feelings questionnaire (PFQ2). The PFQ2 (Harder & Zalma, 1990) contains 22 items that measure proneness to shame and guilt. We were only interested in the guilt subscale (six items) that we used as a manipulation check. Specifically, we were interested in the state rather than trait guilt feelings after the problem solving tasks. We therefore adapted the questionnaire by asking participants to answer the questions with reference to how they felt in that particular *moment*. Items were rated on a scale

from 1 (*definitely do not feel*) to 4 (*definitely feel*). Examples of *guilt* items are *regret* and *feeling you deserve criticism for what you did*.

Guilt induction. A modified version of the *cheating paradigm* was used to induce feelings of guilt (Russano et al., 2005). First, participants and a confederate were instructed to work together on the three team problems. Afterwards, they had to solve three problems individually. The experimenter emphasized that working on their own was crucial for the results. In the no-guilt induction condition, the confederate solved both problem tasks by herself, whereas in the guilt induction condition, the confederate asked participants to help her with the second problem.

SHIFT key paradigm. This task was based on the *ALT key paradigm* (Horselenberg et al., 2003; Horselenberg et al., 2006; Kassin & Kiechel, 1996). Under the pretense of a 'reaction time task', participants were seated in front of a computer and typed letters as they were presented on screen. The letters had to be typed with the two forefingers as fast and accurate as possible. Prior to starting, participants were informed that pressing the SHIFT key would cause the computer to crash because of a bug in the program and that their data would be lost if they pressed it. Letters located close to the SHIFT key were presented at a rate of 67 per minute. After 60 seconds, the computer 'crashed' and a blue screen appeared accompanied by an alarming sound. The last letter presented was the A (located above the SHIFT key) and the computer only crashed if the A or Z was pressed, that is, we could be sure that participants did not press the SHIFT key. The experimenter then asked participants if they had pressed the SHIFT key, acted upset and ostensibly attempted to fix the computer.

Exit interview. Participants were asked if they had followed the instructions of the individual tasks (*yes* or *no*) and if they had felt guilty after completing the individual tasks. The guilt question was answered on a scale from 0 (*not at all*) to 7 (*very much*). Participants also indicated if they were familiar with the *ALT key paradigm*. Additionally, confessors were asked why they had confessed to pressing the SHIFT key (*I felt guilty*; *I wanted to compensate for my mistakes earlier*; *I pressed the SHIFT key*; *other*).

Procedure

A cover story informed participants that the researcher was interested in their ability to solve problems and their reaction times in a computer task. Participants were paired with a confederate who acted as another participant. The experimenter and the confederate roles were counterbalanced. Participants and the confederate signed the informed consent and provided demographic data. Then, participants worked together on the team tasks and afterwards on the individual tasks. While the pair worked on the tasks, the experimenter was not in the room. In the guilt induction condition, the confederate illicitly asked participants if they could help her with the second individual problem. When the experimenter re-entered the room and asked whether the pair had really worked individually when they were supposed to, the confederate responded 'Yes, of course we worked individually'. The experimenter then replied 'Thank you very much. Otherwise I cannot use the data'. The lie of the confederate and the statement of the experimenter were meant to increase feelings of guilt in participants in the

guilt induction condition. The experimenter then stated that the confederate had to complete another task and asked her to wait outside until she would receive further instructions. Participants filled out the PFQ2, followed by a handgrip task and the ego depletion task. Participants in the ego-depletion condition had to solve difficult calculations for eight minutes while being distracted with auditory interfering stimuli through headphones. Participants in the no ego-depletion condition solved easy calculation without interfering stimuli (Otgaar et al., 2012). Before and after the ego depletion task, participants had to squeeze a handgrip as long as possible until a coin that was placed in between fell out. The time until the coin fell out was used as an indicator for self-control (Muraven et al., 1998). Participants also filled out the Brief Mood Introspection Scale (Mayer & Gaschke, 1988) before and after the ego depletion task to rule out that an effect of ego depletion was caused by mood differences. This first part of the Experiment lasted about 15 minutes.

Next, participants took part in a 'reaction time task' (i.e. the *SHIFT key paradigm*). Following the crash of the computer, the experimenter accused participants of pressing the SHIFT key. She acted upset and tried to press the ESC key to fix the computer and when this did not work, the experimenter asked again: 'Are you a 100% sure you did not press the SHIFT key because I have no idea what else could have caused this crash?' She then asked participants to reschedule because the data were lost. Therefore, she could not reimburse participants at this time; this would only be possible if they returned. The experimenter voiced concern because she now needed 'to tell the professor' about the invalid measurement; she therefore needed a written statement from participants. The experimenter handwrote a statement for participants to sign: 'I hit the SHIFT key and caused the computer to crash. Data were lost and I will return for another session and will then receive course credit/the voucher'.

If participants did not confess, they were debriefed, followed by the exit interview. If participants did confess, the experimenter left the room to fetch her agenda and left the door open. The confederate would then enter the room and asked participants: 'What happened? I saw the experimenter left the room quite upset'. The answer was coded for signs of internalization of the false confession regarding the computer crash. Answers that began with 'I pressed the SHIFT key' or 'I crashed the computer' were rated as internalization of the false confession (Kassin & Kiechel, 1996). When the experimenter re-entered the room, she debriefed participants and conducted the exit interview.

Results and discussion

We conducted a post hoc power analysis using GPower (Faul et al., 2007) with a power of .80, $\alpha = .05$ and $N = 146$ because our a priori analysis included two factors (guilt induction and ego depletion). It revealed the smallest detectable effect size of $\phi = .23$.

Manipulation check

The two groups (guilt induction: *yes* vs. *no*) differed significantly in the PFQ2 subscale *guilt*, $t(142) = -4.19$, $p < .001$, $d = 0.70$ (no-guilt: $M = 7.28$, $SD = 1.91$; guilt: $M = 9.00$, $SD = 2.96$) and the exit interview guilt question $t(144) = -9.12$, $p < .001$, $d = 1.51$ (no-guilt: $M = 0.26$, $SD = 0.90$; guilt: $M = 2.56$, $SD = 1.98$). This indicates that the guilt induction was successful.

Planned analyses: false confessions, internalization, and guilt

Overall, 100 of the 146 (68.5%) participants falsely confessed to pressing the SHIFT key by signing the self-incriminating statement and 31.0% of the confessors ($n = 31$) showed signs of internalization upon the confederate's question. Table 1 shows the frequency and percentage of the false confessions rates across both experiments. Confessors indicated that they signed the self-incriminating statement because they felt guilty (8.0%), wanted to compensate for earlier mistakes (3.0%), or wanted to help the experimenter (26.0%). The majority thought they had in fact hit the SHIFT key (22.0%) or were unsure about it (32.0%). This finding speaks to the plausibility of having hit the SHIFT key and is in line with the 31.0% of the confessors who showed signs of internalization. Just a few participants actually indicated that they falsely confessed because they felt guilty. Table 2 shows confessors' reasons for signing the confession statement across both experiments.

Contrary to our hypothesis, the false confession rate did not differ as a function of guilt induction, $\chi^2(1, N = 146) = 1.19$, $p = .276$, $\phi = -.09$. In the no-guilt induction group, 64.5% of participants confessed, in the guilt induction group 72.9%.

Exploratory analyses: false confessions and feelings of guilt

Upon inspection of the data, it became apparent that some participants in the no-guilt induction group felt guilty, whereas some of those who were induced to feel guilty did not. To address this issue, we examined if *feelings* of guilt (rather than guilt per se) predicted confessions (no confession = 0, signed confession = 1). We conducted four logistic regression analyses; one with guilt feelings from the PFQ2 subscale as predictor and one with the guilt question posed in the exit interview as predictor, separate for each guilt induction condition. For the guilt induction group, the PFQ2 subscale guilt did not predict the false confession rate, Wald $\chi^2(1, N = 70) = 0.31$, $p = .576$, $b = .05$. The guilt question from the exit interview revealed a statistically significant effect, Wald $\chi^2(1, N = 70) = 4.25$, $p = .039$, $b = .32$ and 72.9% of the cases were classified correctly. More specifically, if a response to the guilt question was increased by one unit, the probability that a person from the guilt induction condition falsely confessed was increased by 38.0%. For the no-guilt induction group, we found no significant effect of guilt feelings, Wald χ^2s$(1, Ns = 76) \leq 0.58$, $ps \geq .448$, $bs \leq .06$.

To summarize, our planned analyses did not reveal a significant effect of guilt on the false confession rate. When exploring the effect of guilt feelings, only one out of four tests was significant with a small effect size (95% CI [1.02, 1.87]; Chen et al., 2010). One reason why we did not find a significant effect of feelings of guilt could be that the guilt induction was not strong enough. Indeed, almost half of the participants

Table 1. Frequency and percentage of false confessions for Experiment 1 and 2.

	False confession rates		
Condition	Experiment 1 *n* (%)	Experiment 2 *n* (%)	Across experiments *n* (%)
Guilt induction	51 (72.9%)	19 (38.0%)	70 (58.3%)
No-Guilt induction	49 (64.5%)	20 (34.5%)	69 (51.5%)
Across conditions	100 (68.5%)	39 (36.1%)	

Table 2. Confessors' reasons for signing the confession statement for Experiment 1 and 2.

	Reasons for confessing	
	Experiment 1 *n* (%)	Experiment 2 *n* (%)
Unsure about pressing the SHIFT key	32 (32.0%)	
Help the experimenter	26 (26.0%)	
Help the confederate		11 (28.2%)
Pressed the SHIFT key	22 (22.0%)	
Felt guilty	8 (8.0%)	6 (15.4%)
Compensate for earlier mistakes	3 (3.0%)	
Do something in return		10 (25.6%)
Less severe consequences		3 (7.7%)
Was not important		9 (23.1%)
Other reasons	9 (9.0%)	4 (10.3%)

(44.5%) who indicated some guilt feelings when asked if they felt guilty after completing the individual tasks in the exit interview, did so on a very low level (endorsing *1* or *2* on a scale from *0* to *7*). On the other hand, there were participants in the guilt induction condition who did not feel guilty at all (i.e. they ticked *0*, *not at all*). It is possible that feelings of guilt decreased during the delay between guilt induction and exit interview or that participants perceived their assistance to the confederate as *helping*, not cheating behavior.

On a general level, a weakness of the *ALT (SHIFT) key paradigm* concerns the plausibility of having pressed the forbidden key (Horselenberg et al., 2006; Russano et al., 2005). In line with this notion, 31.0% of our confessors indicated internalization directly after they had confessed and 54.0% indicated in the exit interview that they were either unsure whether they had pressed the SHIFT key or thought they had done so. This shows that many participants were not aware that their confessions were false.

In Experiment 2, we used a stronger guilt induction and eliminated any ambiguity regarding participants' involvement of the event they were accused of. For the guilt induction, we used an adapted version from Rawlings (1968) who induced guilt in participants by making them responsible for a confederate's punishment (electric shock). Participants answered easy or difficult quiz questions and for every wrong answer, the confederate had to eat 'hot sauce' as a punishment (Lieberman et al., 1999). In the second part of the experiment, the confederate cheated in a Gambling Game (Wright et al., 2015) and asked participants to take the blame. An important adaptation of Experiment 2 concerns the direct link between feelings of guilt and the person who made the request to take the blame. We expected participants with guilt induction to be more likely to take the blame for the confederate than participants in the no-guilt induction condition.

Experiment 2

Method

Participants

A total of $N = 108$ (86 females; $M_{age} = 21.14$; $SD_{age} = 1.93$) undergraduate students participated in exchange for course credit or a 5-euro gift voucher. Participants were proficient in English and tested in English.

Design

Participants were randomly assigned to one of the two conditions (guilt induction: *yes* vs. *no*).[3] Participants in the guilt induction condition answered the difficult questions ($n = 50$) and participants in the no-guilt induction condition answered the easy questions ($n = 58$). The dependent variable was whether or not participants took the blame for the confederate.

Materials

The relationship closeness induction task. To create closeness between participants and the confederate, that is, a situation where blame-taking behavior is probable, we administered the Relationship Closeness Induction Task (Sedikides et al., 1999). The task consists of three lists of questions such as: 'What is one strange thing that has happened to you since you've been at the University?' and 'Is it difficult or easy for you to meet people? Why?'

A manipulation check consisting of four questions on closeness, similarity, degree of liking, and likelihood of future friendship measured how close participants felt to the confederate (Sedikides et al., 1999). Example items are 'How close do you feel to the participant with whom you are working on this study?' and 'How much do you like the participant with whom you are working on this study?' (1 = *not at all*; 9 = *very close/similar/much*).

Guilt induction. We induced guilt by means of an adapted version of Rawlings (1968). Participants were led to believe they were randomly assigned to one of the two roles: *Punisher* and *receiver*. In fact, participants always assumed the role of *punisher* and answered either easy or difficult quiz questions. Every time participants gave a wrong answer, the confederate would receive a punishment, namely she would have to eat 'hot chili sauce' (which was in fact sweet chili sauce, i.e. not extremely hot; Lieberman et al., 1999). To increase participants' guilt feelings, the confederate complained about the hot sauce in the guilt induction condition. In the no-guilt induction condition, the confederate acted neutral when she had to eat hot sauce.

Quiz. Two quiz versions were used: a difficult and an easy one. Both quiz versions contained 10 open-ended questions. Examples for easy questions include 'What color do you get if you mix red and white?' and 'In which country is Krakow located?' Examples for difficult questions are 'How many stars are on the flag of New Zealand?' and 'What is the official currency in Nepal?' Participants with difficult questions had significantly more wrong answers than participants who received the easy questions, $t(104) = 19.62$, $p < .001$, $d = -3.91$ (guilt induction: $M = 8.09$, $SD = 1.24$; no-guilt induction: $M = 2.82$, $SD = 1.43$). Thus, in the guilt induction condition, the confederate had to eat hot sauce on average about eight times, whereas this happened on average only two to three times in the condition without guilt induction.

Gambling Game. The Gambling Game was an adapted version taken from Wright et al. (2015). Two individuals are each seated in front of a computer. Both have a pile of fake money and in between them a shared 'bank'. The aim is to win as much money as possible by placing bets on ten sequentially presented multiple-choice questions. After choosing

one answer, participants have to type the amount of money they want to bet. Afterwards, feedback appears on the screen either saying 'Correct! Please take your winnings from the bank' or 'Incorrect. Please return your money to the bank'.

Arnett Inventory of sensation Seeking. The Arnett Inventory of Sensation Seeking (Arnett, 1994) was used to increase the believability of the cover story. It consists of 20 statements about sensation seeking and risk taking behavior. Participants indicated to what extent a given statement described them on a four-point scale from A (*describes me very well*) to D (*does not describe me very well*). Example items are 'I would like to travel to places that are strange and far away' and 'I like the feeling of standing next to the edge on a high place and looking down'.

Exit interview. Participants indicated on a scale from 1 (*not at all*) to 7 (*very much*) whether they had felt guilty after the quiz, whether they liked the confederate, whether they felt uncomfortable when the confederate was punished, and whether they felt they needed to apologize for the punishment of the confederate. Additionally, participants answered three questions about feelings of reciprocity. Finally, confessors indicated why they had taken the blame for the confederate by choosing one of the following options: (a) *I felt guilty because I had caused the participant to be punished earlier*; (b) *I didn't think it was important*; (c) *I felt like I had to do something in return for the participant*; (d) *other*.

Procedure

The cover story led participants to believe that the study examined the influence of unfair punishment on risk taking behavior. In the reciprocity condition, the confederate offered participants a pen before they had to fill out the informed consent. First, participants and the confederate worked on the Relationship Closeness Induction Task questions for 10 minutes and filled out the referring manipulation check questions. Prior to the quiz, participants were told that the quiz (i.e. guilt induction) was about unfair punishment. After the quiz, the experimenter offered a cookie to the confederate. In the reciprocity condition, the confederate shared the cookie with participants. Then, participants filled out the PFQ2. This first phase of the experiment lasted about 10 minutes.

In the next part, participants played the Gambling Game under the pretext of measuring risk taking behavior. The experimenter left after explaining the game. While playing, the confederate secretly took too much money from the bank. When the experimenter re-entered the room to distribute the Arnett Inventory of Sensation Seeking, she took the piles of fake money, excused herself to 'count the money', and left the room. When she re-entered after a few minutes, she announced that the amount of money did not match the amount indicated on the computer and that someone must have cheated; the participant who had cheated would not receive the reimbursement immediately and would have to return for another session. Furthermore, she would have to question both participants individually to find out who cheated. She instructed the confederate to follow her to another room and walked out. While packing up, the confederate confessed to the participants that she had taken too much money from the bank and asked participant to take the blame for her. This plea was accompanied by the following story: she was scheduled to go on foreign exchange to Rome in two days. As a precondition, she needed to collect all research participation credits before her departure;

otherwise the faculty would ban her from the exchange program. Due to the travel schedule, she would not be able to return for a new session. Then, the confederate quickly left the room leaving no opportunity for participants to respond.

The experimenter returned to interrogate participants. The procedure was based on Pimentel et al. (2015). First, the experimenter asked 'Did you cheat in the Gambling Game?' and waited for a response. If participants did not confess, the experimenter continued with 'People can get really self-conscious when they know that psychologists are going to evaluate them. It is not uncommon for people to cheat in such a situation. This is quite understandable'. If no confession followed, the experimenter said 'If it was you, you can just sign the statement and that will be it. Yes, you will not receive your course credit, but there won't be any serious consequences. This won't go on your record and no one outside of the study will know about it. If it was the other participant, she can probably not go to Rome. Are you sure it was not you?' At last, if participants still had not confessed, the experimenter said 'If neither of you sign the confession statement, my supervisor has to launch an official investigation'. If participants took the blame, they had to sign a handwritten statement. The debriefing and the exit interview followed.

Results and discussion

We conducted a post hoc power analysis using GPower (Faul et al., 2007) with a power of .80, $\alpha = .05$ and $N = 108$ because our a priori analysis included two factors (guilt induction and reciprocity). It revealed the smallest detectable effect size of $\phi = .27$.

Manipulation check

The two guilt induction groups (*yes* vs. *no*) differed significantly on the PFQ2 subscale guilt, $t(105) = 2.11$, $p = .037$, $d = 0.41$ (no-guilt: $M = 12.72$, $SD = 3.92$; guilt: $M = 14.36$, $SD = 4.13$) and the feeling of guilt question in the exit interview, $t(106) = 3.72$, $p < .001$, $d = 0.72$ (no-guilt: $M = 3.50$, $SD = 1.91$; guilt: $M = 4.84$, $SD = 1.81$). This indicates that the guilt induction was successful. The manipulation check of the Closeness Induction Task indicated that participants felt close to the confederate ($M = 5.56$, $SD = 1.57$), felt similar ($M = 5.81$, $SD = 1.60$), liked the confederate ($M = 7.28$, $SD = 0.97$), and thought they could be friends in the future ($M = 6.55$, $SD = 1.40$; 1 = *not at all*; 9 = *very close/similar/much*). We averaged the means to form a composite index: $M = 6.30$, $SD = 1.10$. This mean indicates a close relationship level when comparing it to another study where a distant condition was included (close: $M = 5.39$, distant: $M = 4.05$; Sedikides et al., 1998).

Planned analyses: false confessions and guilt

Of the 108 participants, 39 (36.1%) falsely confessed to cheating in the Gambling Game by signing the written statement. Contrary to our expectations but in line with Experiment 1, the false confession rate did not differ as a function of guilt induction, $\chi^2(1, N = 108) = 0.14$, $p = .704$, $\phi = -.037$. In the no-guilt induction condition, 34.5% of participants confessed, in the guilt induction condition 38.0%. Table 1 shows the frequency and percentage of the false confessions rates across both experiments.

Confessors indicated most of the time that they signed the self-incriminating statement because they *wanted to help the confederate* (28.2%). A significant minority indicated that they wanted to *do something in return* (25.6%), and only 15.4% of the confessors said that

they *felt guilty*. Similar to Experiment 1, many participants indicated that they wanted to help. In Experiment 1, helping behavior was directed at the experimenter, whereas in Experiment 2, helping behavior was directed at the confederate. Relative to Experiment 1, more confessors in Experiment 2 indicated feeling guilty as a reason for falsely confessing, mean percentages being 15.4% and 8.0%. This might be an indicator that our guilt induction was more successful than in Experiment 1. Furthermore, none of the participants was unsure about the accused behavior or thought that they had done it. Table 2 shows confessors' reasons for signing the confession statement across both experiments.

Exploratory analyses: false confessions and feelings of guilt

Like in Experiment 1, we examined the effect of *feelings* of guilt (rather than guilt) using logistic regression. For the guilt induction group, the PFQ2 subscale guilt had a significant effect on the false confession rate, Wald $\chi^2(1, N = 50) = 7.42$, $p = .006$, $b = .27$ and 62.0% of the cases were classified correctly. More specifically, if the PFQ2 subscale guilt increased by one unit, the probability that a person in the guilt induction condition falsely took the blame increased with 31.2%. For the guilt question from the exit interview, the effect was also statistically significant, Wald $\chi^2(1, N = 50) = 5.13$, $p = .023$, $b = .49$, and 62.0% of the cases were classified correctly. More specifically, if the guilt question from the exit interview was increased by one unit, the probability that a person in the guilt induction condition falsely took the blame was increased by 63.6%. Both tests revealed small effect sizes (95% CI [1.08/1.07, 1.60/2.51]; Chen et al., 2010). For the no-guilt induction group, we did not find a significant effect of guilt feelings, Wald χ^2s$(1, N\text{s} = 58) \leq 0.19$, $p\text{s} \geq .662$, $b\text{s} \leq .03$. Thus, of the four tests of the effect of guilt feelings on blame taking, two were statistically significant. However, both had small effect sizes and only involved the guilt induction condition.

General discussion

In two experiments, we examined the effect of guilt manipulation and feelings of guilt on participants' willingness to falsely confess to a transgression. We expected the guilt induction conditions to be associated with higher false confession rates, compared with the no-guilt induction control conditions. In Experiment 1, participants in the guilt induction condition cheated in an individual task by helping a confederate. Later, participants were accused of pressing a forbidden key in an unrelated task. In Experiment 2, participants in the guilt induction condition answered a difficult quiz and the confederate received a punishment for every wrong answer. The confederate later asked the participants to take the blame for her cheating in an unrelated gambling task. Contrary to our prediction, guilt manipulations in both experiments had no statistically significant effect on the false confession rate. When exploring the effect of *feelings* of guilt on the false confession rate, five of eight tests were statistically non-significant. To our knowledge, this is the first study that tested the influence of guilt and feelings of guilt in an experimental setting.

One possible reason for this unexpected finding concerns the strength and effective period of the guilt induction. Although our guilt induction was more effective in Experiment 2 compared with Experiment 1 (PFQ2: $M = 14.36$ vs. $M = 9.00$), we did not create extreme feelings of guilt (possible range: 6–24). It may well be the case that only excessive

feelings of guilt – that for practical and ethical reasons cannot be induced in the lab – elevate false confession rates. Results from our exploratory analyses leave open the possibility that a combination of actual guilt and feeling guilty can increase false confession rates. Furthermore, participants performed other tasks (ego depletion task and Gambling Game) between guilt induction and accusation, so that guilt feelings may have decreased as the experiment progressed.

Another explanation for our failure to detect a link between guilt and false confessions might be the absence of 'internal pressure' in the sense that participants did not feel guilty for the transgression of which they were accused. Thus, guilt feelings may not have been transferred to the interrogation situation, making it impossible for guilt feelings to affect confession behavior. This could also explain why other studies found that feelings of guilt affected true but not false confessions (Horgan et al., 2012; Houston et al., 2014). Finally, it is possible that guilt feelings alone do not impact the probability of a false confession. Rather, guilt feelings may interact with other risk factors, as suggested by research and documented cases (e.g. Russano et al., 2005; Schell-Leugers, 2014). Plausible candidates for such an interaction include a close relationship to the perpetrator or low IQ. Especially in blame-taking cases to protect someone else, the relationship between the blame-taker and the person in need is crucial (Gudjonsson et al., 2007; Willard et al., 2015, 2016; Willard & Burger, 2018).

The present studies investigated false confessions with two different research paradigms. The differences in methodology are reflected in the false confession rates. The overall confession rate in Experiment 1 (69%) was substantially higher than in Experiment 2 (36%).[4] This is most likely due to the plausibility of pressing the SHIFT key (see also Horselenberg et al., 2006; Klaver et al., 2008). Indeed, more than half of the confessors indicated that they were unsure whether they had pressed the forbidden key or thought they had actually done so. In Experiment 2, participants were always sure that they did not cheat. These overall confession rates correspond well with findings from previous research. The confession rates in Experiment 1 are similar to those in the original *ALT key* study from Kassin and Kiechel (1996, p. 69%). The blame taking rates in Experiment 2 are comparable to those reported for adult participants in Pimentel et al. (2015, p. 39%).

When interpreting the results of this work, it is important to keep several limitations in mind. First, creating a close relationship between participants and the confederate in Experiment 2 is different from close relationships that have grown over years in real life. Taking the blame and therefore helping can be seen as a result of a cost–benefit analysis that can have a different outcome when feeling guilty towards a friend than towards a stranger (Foa & Foa, 1975). Feelings of guilt may have an effect when participants have the opportunity to repair a close relationship through falsely taking the blame compared with a casual relationship that does not have the same value and is therefore not 'worth' repairing it (see also Baumeister et al., 1994). Future research could test individuals in a context of close relationships and might manipulate relationship closeness to test its effect on blame-taking rates.

A second limitation concerns the consequences our participants would face if they confessed or took the blame. Obviously, these consequences were less severe than those innocent suspects face in real life (i.e. losing research credit or voucher and participating again vs. a possible penalty, guilty verdict, or prison sentence). Indeed, our confession rate would probably drop if the consequences were more severe and are likely elevated in our experiments compared with real life (Horselenberg et al., 2006). Yet, while the

experimental approach may not be suited to determine the false confession rate in real life, it is a valid means for assessing the impact of situational variables on those rates.

A third limitation is that university students likely differ from police suspects. For examples, people with low intelligence are overrepresented in offender populations (Lynam et al., 1993) and false confession cases (e.g. Gudjonsson, 2003). It would be informative to conduct studies within these populations to study whether feeling guilty has an impact on their false confession rate. Arguably, these populations are more vulnerable than our participants.

False confessions occur for many different reasons and can lead to wrongful convictions. This work represents a first step to investigate guilt feelings as a risk factor. Furthermore, we included a particularly potent form of false confessions in Experiment 2: blame-taking behavior. Self-report studies suggest that blame taking may occur at a high rate, especially amongst friends and relatives, making it an important phenomenon to study. Although the current findings suggest little impact of feelings of guilt on false confession rates, this may be specific to situations with relatively weak guilt feelings or blame taking for strangers. Future research might focus on creating stronger guilt feelings and investigate whether they may act as a potent precursor of false confessions as real life cases suggest (Gudjonsson, 2003). Our results do indicate, though, that when there is a relationship between guilt feelings and false confessions, it is a complex one. Given our findings and those of others (Baumeister et al., 1994), it is safe to conclude that the old Freudian idea that people who feel guilty desire punishment and for that reason tend to falsely confess is unlikely to be true.

Notes

1. We also manipulated ego depletion as a second factor but the manipulation check suggested that the ego depletion manipulation was not successful: the two groups did not differ in the amount of time participants performed a hand-grip task (Muraven et al., 1998), $ps \geq .756$. Likewise, we found no significant effect of ego depletion or interaction with guilt status, $ps \geq .721$. Therefore we will not discuss this factor.
2. For simplicity, we use guilt induction vs. no-guilt induction as condition labels, although 'non-cheaters' who were asked to cheat are part of the no-guilt induction condition.
3. We also manipulated reciprocity as a second factor. In the reciprocity condition, the confederate offered the participant a pen and a cookie. However, the manipulation check suggested that the manipulation was not successful: the groups did not differ in their answers to three manipulation check items (a) *Did you feel like you owed the other participant?*; (b) … *like the other participant was concerned about you*?; (c) … *like the other participant watched out for you?*, $ps \geq .531$. We also found no significant effect of reciprocity or an interaction effect with guilt induction, $ps \geq .331$. Therefore, we will not discuss this factor.
4. This difference was statistically significant, $\chi^2(1, N = 254) = 26.73$, $p < .001$, $\phi = .32$.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Data availability statement

Datafiles can be found on Dataverse.NL, the open-data platform of Dutch Universities: https://doi.org/10.34894/YRLQZ0.

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