How Incidental Confidence Influences Self-Interested Behaviors: A Double-Edged Sword

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ABSTRACT

The present research investigates how incidental confidence influences self-interested behaviors. It is well established that being in a psychological state of lower confidence causes people to experience psychological aversion that they are motivated to reduce. We study the transfer effect of confidence; people strive to compensate for lower confidence in one domain by obtaining higher status in other unrelated domains. Prior research has linked money with status and suggested that money can increase confidence. Building on this research, we proposed and showed in four experiments that lower incidental confidence increased self-interested behaviors that brought financial gains. Drawing on research on competitive altruism, we also predicted and found that when altruism, rather than money, was seen as the primary source of status, the effect of incidental confidence reversed such that lower incidental confidence decreased self-interested behaviors. Data ruled out alternative explanations and provided consistent evidence for the proposed compensatory mechanism. We also discussed theoretical and practical implications of the present research. Copyright © 2017 John Wiley & Sons, Ltd.

KEY WORDS  confidence; self-interested behavior; prosocial consumption

The daily news shows the prevalence of self-interested behaviors and dishonesty: Fraud costs the global health care system $260 billion annually, employee fraud costs US companies $40 to $50 billion annually (Crossen, 1993), and the last Wall Street meltdown cost the US government $7 trillion to bail out Wall Street firms (Lenzner, 2012), just to name a few. Furthermore, 56% of American business people say that they have experienced pressure to behave unethically to achieve company goals (Chen & Tang, 2006). When reading the news, one can easily find examples of politicians, sports stars, business executives, students from top schools, and others who have found numerous ways to profit by behaving unethically (Netter, 2010). The current research adds to the literature on self-interested behaviors by investigating a hitherto unexplored, but ubiquitous, determinant—incidental confidence.

People make decisions and take actions based not only on what they like or believe, but also on their confidence in their likes and beliefs. For example, lower confidence can decrease charitable giving (Tsai & McGill, 2011), increase delays in purchasing (Greenleaf & Lehmann, 1995), and decrease the amount of money bet on sports games (Levin, Chapman, & Johnson, 1988; Tsai, Klayman, & Hastie, 2008). People who are less confident in their ability or skill are less willing to engage in competition (Camerer & Lovallo, 1999).

However, most studies of consequences of confidence have examined how characteristics of a focal event influence confidence in judgments of the same event and subsequent decisions about the event (Yates, 1990). It is curious whether changes in confidence in one domain can influence people’s behaviors in other unrelated domains. We add to this line of work by investigating such transfer effect of incidental confidence on self-interested behaviors, an important area that has received little attention from researchers studying confidence. Specifically, we propose that lower incidental confidence can increase or decrease self-interested behaviors, when money or altruism, respectively, is the primary means for compensating for lower confidence.

Our work makes three contributions to extant research on confidence and self-interested behaviors. First, our work identifies confidence as an important antecedent of self-interested behaviors. Second, whereas the bulk of past research has examined the relationship between confidence and subsequent decision making or behaviors in the same domain, the present research advances this area of study by examining how incidental confidence influences decision making unrelated to the origin of confidence. Third, prior research has focused primarily on hypothetical decision making related to confidence. A question remains as to whether and how confidence may affect consequential decision making when real money is at stake. Our inclusion of financial consequences in two out of four experiments provides a conservative test of the effects of incidental confidence. Taken together, the present research provides a more comprehensive examination of the processes in which people strive to compensate for lower incidental confidence in the context of self-interested behaviors.

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The authors thank Katherine Burson and Chenbo Zhong for their helpful comments. Financial support from the Social Sciences and Humanities Research Council of Canada and the Magna Professorship in Management Fund at the Rotman School of Management is gratefully acknowledged.

CONCEPTUAL FRAMEWORK

What motivates self-interested behaviors and even clear transgressions such as stealing? Self-interested behaviors

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are considered by many researchers balancing acts between wanting to do good and wanting to profit from doing bad (Eisenberg & Shell, 1986). How does incidental confidence tilt the balance and increase selfish or selfless behaviors?

The compensatory mechanism for confidence

In the absence of confidence, people often experience a state of psychological aversion that they are motivated to reduce (Kahneman, Slovic, & Tversky, 1982; Payne, Bettman, & Johnson, 1992). The lack of confidence in the correctness of one’s belief, for example, can be mitigated by factors such as seeking agreement between one’s own judgment and the consensus of a group with whom people identify (Festinger, 1954; Koriat, 2013; Schuldt, Chabris, Woolley, & Hackman, 2015). Presumably, knowing that other people share one’s opinion provides social validation for that opinion (Fazio, 1979) and increases confidence in the correctness of that opinion (Formala, DeSensi, Clarkson, & Rucker, 2009). Similarly, people often seek and recall information favorable to themselves so they can increase their confidence in their ability or judgment (Wills, 1981). For example, people regularly compare themselves to others who are worse off (Baumeister & Bushman, 2008; Svenson, 1981).

Prior research has focused on conditions in which people seek to increase confidence in their ability or opinion being judged. What would happen if the situation does not allow people to improve their ability or judgment in the same domain? The major premise of our study is that the motivation to compensate for lower confidence need not be confined to the same domain from which this (lower) confidence originates. That is, it can have a transfer effect on subsequent decisions in domains unrelated to the origin of confidence. Our conjecture is inspired by prior research suggesting that people tend to compensate for lower confidence due to poor performance in a particular domain by seeking to excel or gain higher status in other areas (Coon, 1994). For example, a student who has poor writing skills may compensate for his or her lower confidence in writing by excelling in mathematics. Similarly, an individual who lacks cooking skills might compensate for lower confidence in cooking by excelling in baking. In the context of our study, the desire to compensate for lower confidence may cause people to seek status. Such status motives can increase self-interested behaviors that generate financial gains or encourage selfless behaviors, depending on whether money or altruism is a more prominent source of status.

Confidence boosters: Money versus altruism

On the one hand, money is one of the most prominent resources and can serve as an important signal of status (Kemper, 1991). Money, being a valuable resource, brings about a state of self-sufficiency and provides a feeling of confidence that problems can be solved and needs can be met (Vohs, Mead, & Goode, 2006; Zhou, Vohs, & Baumeister, 2009). Money also increases the confidence that one can obtain positive outcomes and avoid negative outcomes (Johnson & Krueger, 2006). We therefore propose that the motive to compensate for lower confidence can trigger self-interested behaviors that help people obtain status-enhancing resources such as money.

On the other hand, altruism can be a powerful signal of status when selfless behaviors are observable to others (Roberts, 1998). Although status can be achieved by force, we focus on status that is achieved through prestige, freely conferred deference (Henrich & Gil-White, 2001). For example, public displays of self-sacrifice for group interests or even strangers in the group can increase the self-sacrifier’s status and the likelihood of being selected as a leader in that group (Gurven, Allen-Arave, Hill, & Hurtado, 2000; Hardy & Van Vugt, 2006; Milinski, Semmann, & Krambeck, 2002). In fact, people across historical periods and diverse cultures are known to compete for status by trying to be seen as more altruistic—a concept known as competitive altruism (Hawkes et al., 1993; Roberts, 1998; Van Vugt, Roberts, & Hardy, 2007). For example, in the Native American Kwakiutl tribal practice of potlatching, tribal chiefs compete to give away their possessions in order to gain status (Cole & Chaikin, 1990; Murdock, 1970). Similarly, Griskevicius, Tybur, and Van den Bergh (2010) found that when shopping in front of others, people primed with status-enhancement motives are more likely to purchase costly green products to signal their willingness and ability to bear the cost of prosocial consumption. However, people’s preference reverses in a private shopping context (e.g., online shopping) such that status-enhancement motives increase preferences for the more economical non-green products over the green products. The authors attributed the reversal to low signaling value of unobservable prosocial consumption.

Taken together, we hypothesize that lower incidental confidence can increase or decrease self-interested behaviors, depending on whether money or altruism, respectively, is considered the primary source of status that can compensate for lower confidence. This proposed compensatory mechanism is illustrated in the following hypotheses:

**H1:** Lower incidental confidence increases self-interested behaviors when money is the primary signal of status that helps compensating for confidence.

**H2:** Lower incidental confidence decreases self-interested behaviors when altruism is the primary signal of status that helps compensating for confidence.

**OVERVIEW OF STUDIES**

Next, we report four experiments that examine the effects of lower incidental confidence on self-interested...
behaviors. All the experiments consisted of two tasks, the first manipulating confidence and the second measuring self-interested behaviors. We tested the effects of incidental confidence on self-interested behaviors including money allocation decisions (Studies 1A and 3) and prosocial consumption (Studies 1B and 2). In Studies 2 and 3, we manipulated source of status—monetary gains versus altruism—directly to demonstrate the proposed compensatory mechanism.

STUDY 1A

Study 1A tested hypothesis 1 that lower incidental confidence would increase self-interested behaviors that generate monetary payoffs using a one-shot dictator game, a task commonly used to demonstrate self-interested behaviors involving monetary consequences (Camerer, 2003). In the dictator game, each participant (initiator) received a pot of money and divided it between himself or herself and an anonymous participant (recipient). The amount of money that the initiators kept should reflect the extent to which they wanted to obtain financial gains because this could only be accomplished by being more selfish when allocating the money. In this context, the more money the initiators kept for themselves, the higher their standing would be in terms of the financial payoff in comparison with their recipients. We expected lower incidental confidence to increase the amount of money that participants would keep for themselves.

Method

Participants, design, and stimuli

One hundred forty-two (36.60% female; age = 34.21) American adults recruited from an online panel completed this computerized study and received a small monetary compensation each. We had a target sample of 75 participants per cell and managed to recruit 142 participants. This target was set based on two criteria. First, we followed the rule of \( N = 50 \). Second, we used the average cell size of relevant prior research as a benchmark. According to prior research, the priming task that was used to manipulate incidental confidence in the current experiment had an average cell size of \( N = 21.58 \) for laboratory experiments (Gal & Rucker, 2010; Tormala, Rucker, & Seger, 2008; Wan & Rucker, 2013) and 42.75 for a web experiment (Gal & Rucker, 2010). Because it was the first time to test our hypothesis in a Web experiment, we decided to target a cell size of 75.

Study 1A employed a two-level single-factor (incidental confidence: lower versus higher) between-subjects design. There were two supposedly unrelated tasks. The first task manipulated incidental confidence, and the second one was the main task where participants completed the one-shot dictator game. We used the second task to measure any effect that incidental confidence might have on self-interested behaviors.

Procedure

We first manipulated incidental confidence by asking participants to list five events in which they felt confident (higher confidence) or doubtful (lower confidence) a procedure adapted from existing research (Gal & Rucker, 2010; Petty, Briñol, & Tormala, 2002; Tormala et al., 2008; Wan & Rucker, 2013). Specifically, participants in the higher- (lower) confidence condition were asked to list five events where they felt a great deal of confidence or certainty (doubt or uncertainty). They were told that the experiences should reflect confidence in their thoughts, decisions or predictions, or ability to do something.

Next, participants allocated $3.00 in the one-shot anonymous dictator game. Participants were assured that their identity would be kept confidential. As in standard dictator games, we informed participants of the rules of an anonymous dictator game that included one initiator and one recipient. We told them that they had been randomly paired with another person (in actuality, this was not the case) and that they had been randomly assigned to the initiator’s role. Each initiator was endowed with $3.00 to divide between himself or herself and the recipient by moving a slider to indicate how much money he or she decided to keep (left anchor = $0.00, right anchor = $3.00, in $.01 increments). The initiator kept whatever he or she did not offer; the recipient could choose to accept or reject the offer, but the recipient’s choice affected only his or her own payoff, not the initiator’s (Camerer, 2003).

Pretest

One may suggest that a state of lower confidence is likely to be accompanied by a state of lower power or lower self-esteem. Thus, we conducted a pretest for the confidence manipulation task \((N = 46)\) to address the potential issues of power and self-esteem. Participants completed the confidence manipulation task that would be used in the main study. Two independent judges, who were unaware of our hypotheses, counted the number of events related to state of power, self-esteem, and confidence in participants’ own thoughts, decisions, predictions, or ability based on the definitions of the constructs taken from the literature. Specifically, power is defined as “asymmetric control over valued resources in social relations” (Magee & Galinsky, 2008) and self-esteem as “general feeling of self-worth, or a generalized feeling of self-acceptance, goodness, worthiness, and self-respect” (Wylie, 1979).

We coded each event related to lower (higher) confidence as negative (positive) one point (range of individual scores: \( \text{score}_{\text{low-conf}} = -5.00 \) to 0.00; \( \text{score}_{\text{hi-conf}} = 0.00 \) to 5.00). The same method was used to code the scores for power and self-esteem. The results confirmed that most of the events were related to lower confidence or higher confidence, depending on the condition \((M_{\text{low-conf}} = -3.46 \) versus \( M_{\text{hi-conf}} = 4.23; t(1, 46) = 421.54, p < .01\)). Very few events were related to power and self-esteem (the range of all \( M = -.10 \) to .10). The results confirmed that the experiences listed in the recall task were related to confidence but not power or self-esteem.
**Results**

*Attention check*

Prior to the confidence priming task, participants saw an attention check item (Oppenheimer, Meyvis, & Davidenko, 2009). The study was terminated automatically for participants who failed the attention check. In total, twenty-one participants were excluded from the analysis for dropping out of the study. Excluding these participants left us with 121 valid data points.

*Protocol analysis*

We examined participants’ responses in the confidence manipulation task by asking two independent judges, who were unaware of our hypotheses, to evaluate each participant’s responses. Specifically, the judges assigned a score to each event (1 = related to confidence in participant’s own thoughts, decisions, predictions, or ability; 0 = unrelated to confidence), and thus, the score for each participant ranged from 0 to 5. For example, statements such as “I felt highly confident in my job as a server. I was highly skilled and rarely made mistakes” or “I always feel doubtful about finishing my exam paper on time” received one point each. The scores between the two judges were highly correlated ($\alpha = .99$) and so we took average of the scores from the judges to form a measure of confidence.

Consistent with our intended manipulation, 93.40% participants listed at least one event for which they felt either high or low confidence about their judgments or certain ability. Most of the events were related to lower confidence or higher confidence, depending on the condition ($M_{\text{low-conf}} = -4.04$ versus $M_{\text{hi-conf}} = 4.67$; $t(119) = 35.50, p < .001$; negative value indicates events related to lower confidence and positive value higher confidence). These results confirmed that participants complied with the instructions in the priming task.

*Amount of money kept*

As predicted, participants in the lower-confidence condition behaved more selfishly; they kept more money for themselves than participants in the high-confidence condition ($M_{\text{low-conf}} = $2.31, $SD = .64$ versus $M_{\text{hi-conf}} = $2.04, $SD = .72$; $t(119) = -2.19, p = .03$). Further, Cohen’s effect size value ($d = .40$) suggested a moderate practical significance. Similar results were observed when we excluded the eight participants who did not list any event related to confidence as mentioned in the protocol analysis ($M_{\text{low-conf}} = $2.33, $SD = .62$ versus $M_{\text{hi-conf}} = $2.05, $SD = .72$; $t(111) = -2.21, p = .03, d = .41$). Study 1A supported hypothesis 1 that lower incidental confidence increased self-interested behaviors that involved real monetary consequences.

**STUDY 1B**

In Study 1B, we expanded the research to a different type of self-interested behavior: prosocial consumption that involved a trade-off between money (cost of product) and altruism. Specifically, we asked participants to choose between a non-green product and a pro-environment green product.

One may suggest that the effect observed in Study 1A can be attributed to negative affect because a state of lower confidence can generate negative mood and even anxiety. To address the potential issue concerning negative affect, we measured mood and anxiety and controlled for them in the analyses. To rule out the possibility that some form of mood regulation might be involved, we included a measure of the anticipated happiness that participants expected to receive from acquiring the product.

**Method**

*Participants, design, and stimuli*

Eighty-two students (56.10% female; age = 19.52) from the University of Toronto participated and received a course credit each. We had a target of 50 participants per cell and were able to recruit 82 participants (95 students signed up for the study and 13 of them did not show up). Given the greater homogeneity among university students compared with the online panel from Study 1 we expected smaller variance from the student samples and concluded that our actual sample size was reasonable.

Study 1B employed a two-level single-factor (incidental confidence: lower versus higher) between-subjects design. The computerized study consisted of two ostensibly unrelated tasks. We used the first task to manipulate incidental confidence and the second task to measure self-interested behaviors. Specifically, participants viewed a print advertisement in the second task and chose between a green product and a non-green one. The green product was made of wood harvested from a responsible, pro-environmental source and cost $49.99. The non-green product was made of wood from an irresponsible source and cost $29.99. Other features (brand, design, quality, and appearance) were identical. Stimuli are available upon request from the authors.

We constructed the choice set this way to mirror the trade-off that individuals often encounter when deciding between a green option and a non-green option. Stores often carry both green and non-green products that have similar features and only differ in price and materials. For example, grocery stores offer fair-trade items and conventional items that have similar product features (taste, freshness, appearance, brand, etc.). Similarly, many furniture stores carry both Forest Stewardship Council (FSC) certified items and non-FSC certified items. The green options are usually more expensive than the non-green ones primarily because of the cost of materials, labor, and production.

*Procedure*

At the beginning of the study, we manipulated incidental confidence by asking participants to list five events in which they felt confident (higher confidence) or doubtful (lower confidence) as in Study 1A. We then measured positive mood and anxiety immediately after the manipulation.
of incidental confidence. Specifically, participants indicated how happy, pleased, anxious, nervous, and tense they felt on 7-point scales (1 = not at all, 7 = extremely). As a manipulation check, participants indicated how confident they felt by responding to a three-item scale “Between the following two descriptions, what description better fits your current feeling” (1 = unsure/don’t feel confident at all/feel very hesitant, 5 = sure/feel very confident/feel very determined).

Next, participants proceeded to the second task (main task) where they viewed a print advertisement featuring two file cabinets: one was a green product and the other was a non-green one. They then indicated which cabinet they preferred on a 7-point scale (1 = definitely X [the green product], 7 = definitely Y [the non-green product]). According to hypothesis 1, we expected participants to favor the less-prosocial option when they were primed with lower incidental confidence.

After the main task, participants rated their mood, anxiety, and confidence again. Finally, we measured mood-regulation to assess participants’ anticipated happiness. Specifically, we asked participants “to what extent do you think having the product of your choice would make you feel happy” (1 = not at all, 7 = extremely).

Results
Two participants failed to complete the confidence manipulation task and were excluded from the analysis. Excluding these participants left us with 80 valid data points.

Manipulation check and protocol analysis
We formed two confidence indices by averaging the ratings of the three confidence items administered immediately after the confidence manipulation task (Index-1-confidence: α = .81) and after the main task (Index-2-confidence: α = .87). Index-1-confidence was lower in the low-confidence condition than the high-confidence condition (Mlow-conf = 3.12, SD = .78 versus Mhigh-conf = 3.69, SD = .84; t(78) = 3.10, p = .003), confirming that our manipulation altered participants’ incidental confidence level as intended. However, Index-2-confidence did not differ across conditions (Mlow-conf = 3.32, SD = .87 versus Mhigh-conf = 3.45, SD = .95; t(78) = .68, p = .49).

As in Study 1A, we conducted a protocol analysis by asking two independent judges to evaluate each participant’s responses. We averaged the scores from the two judges (α = .99) to form a measure of confidence. Consistent with our intended manipulation, only one participant failed to list at least one event related to confidence in his or her judgments or certain ability. Most of the events were related to lower confidence or higher confidence, depending on the condition (Mlow-conf = −3.54 versus Mhigh-conf = 4.90; t(78) = 32.79; p < .001). These results once again confirmed that participants followed the priming procedure.

Mood, anxiety, and mood-regulation
We created two indices for mood by averaging the ratings for the mood items that were administered immediately after the confidence manipulation (α1 = .92) and after the main task (α2 = .94). We also created two indices for anxiety (α1 = .91; α2 = .93). When measured immediately after the confidence manipulation task, mood did not differ across conditions (Mlow-conf = 3.65, SD = 1.33 versus Mhigh-conf = 3.95, SD = 1.31; t(78) = 1.01, p = .31), and neither did anxiety (Mlow-conf = 3.17, SD = 1.81 versus Mhigh-conf = 3.13, SD = 1.55; t(78) = −1.11, p = .91). Similarly, when mood and anxiety were measured after the main task, we observed a null effect on mood (Mlow-conf = 3.92, SD = 1.59 versus Mhigh-conf = 3.76, SD = 1.41) and anxiety (Mlow-conf = 2.80, SD = 1.88 versus Mhigh-conf = 2.82, SD = 1.53; both p > .63). Furthermore, anticipated happiness from the chosen product did not vary by levels of confidence (Ms = 5.80 versus 5.90; p > .89). Together, these results showed that the effect of confidence could not be attributed to mood, anxiety, or the motive to repair or regulate negative affect. Similar pattern of the results was observed when we excluded the participant who failed to list any event related to confidence as mentioned in the protocol analysis (all p > .30).

Prosocial consumption
Participants under low confidence were more likely to choose the non-green file cabinet than participants under higher confidence (Mlow-conf = 4.38, SD = 1.31 versus Mhigh-conf = 3.70, SD = 1.63; t(78) = −2.03, p = .04), supporting hypothesis 1. (Higher number indicated stronger preference for the non-green product over the green product.) Cohen’s effect size value (d = .46) suggested a moderate practical significance. Similar pattern of the results was observed when we excluded the participant who failed to list any event related to confidence as mentioned in the protocol analysis (Mlow-conf = 4.41, SD = 1.31 versus Mhigh-conf = 3.70, SD = 1.63; t(77) = −2.12, p = .03, d = .48).

Further, we conducted two separate ANCOVAs by controlling mood and anxiety, respectively, that were measured immediately after the confidence manipulation task. The ANCOVAs showed that neither mood nor anxiety had a significant effect on prosocial consumption (mood-index1: F(1, 77) < 1.00, p = .93; anxiety-index1: F < 1.00, p = .33), but the effect of confidence remained significant (both p = .04). Similar pattern of the results was observed in two additional ANCOVAs with the second mood index and second anxiety index as the respective covariate (both p< mood-index2 and p< anxiety-index2 > .71), but the effect of confidence remained significant (both p = .04). These results ruled out mood and anxiety as valid alternative explanations.

Discussion of Studies 1A and 1B
Studies 1A and 1B provided converging evidence to support hypothesis 1 concerning the transfer effect of confidence. That is, lower incidental confidence increased subsequent self-interested behaviors in unrelated domains: people kept
more money for themselves in a dictator game (Study 1A) and preferred non-green products over green products (Study 1B).

Our manipulation of incidental confidence did not have an effect on mood when they were measured immediately after the confidence priming task in Study 1B or after the main task in the subsequent experiments. We therefore will not discuss the details of these alternative explanations further. Further, we did not find any evidence that participants primed with lower confidence favored the non-green product over the green product based on an expectation that the product would make them happier (Study 1B). This finding suggests that the observed effect cannot be attributed to potential motives for repairing or regulating negative affect; rather, the effect arises from more specific desires to restore their confidence level.

Together, the results of the Studies 1A and 1B lend support to hypothesis 1 that lower confidence can increase self-interested behaviors that generate monetary payoffs. These findings show that confidence can have a transfer effect on subsequent self-interested behaviors that are unrelated to the true source of confidence. In the next two experiments, we tested both hypotheses 1 and 2 to further examine the proposed compensatory mechanism.

As presented earlier, the pretest in Study 1A provided preliminary evidence suggesting that power and self-esteem were unlikely to play a crucial role in the effect of incidental confidence. We further addressed the issues of power and self-esteem by using an abstract cognitive task to manipulate incidental confidence in the next two experiments. The abstract task is unrelated to key elements of power and self-esteem.

**STUDY 2**

In Study 2, we tested both hypotheses 1 and 2 by manipulating source of status directly: We expected lower confidence to decrease prosocial consumption when money served as the primary means for compensating for lower confidence. We also expected the results to reverse when the ownership of a green product could better compensate for lower confidence than money.

As noted, we expanded the research by using another procedure to manipulate incidental confidence that required participants to complete an abstract elemental task (Raven’s puzzles; Appendix A). Although the protocol analysis in Study 1A showed that the confidence priming task did not cause participants to recall events related to power or self-esteem, one might still argue that the analysis did not capture potential fluctuations in the state of power or self-esteem. We therefore tested our hypotheses using the puzzle task that is unrelated to any social power or control over valued resources (Magee & Galinsky, 2008) and unlikely to retrieve internal information about self-acceptance or worthiness (Wylie, 1979).

In addition, the abstract elemental task can rule out perceived self-efficacy (Bandura, 1997) as another potential alternative explanation. Although general self-efficacy might have a positive relationship with confidence in some contexts, these two constructs are distinguishable conceptually. Whereas general self-efficacy pertains to the strength of one’s general belief in one’s own ability to complete tasks and reach goals (Bandura, 1997; Peng, Schaubroeck, & Xie, 2015), confidence refers to an assessment or metacognitive judgment of one or multiple specific primary judgments (Petty, Briñol, Tormala, & Wegener, 2007; Tsai & McGill, 2011; Tsai et al., 2008). Theoretically, it is unlikely that performing poorly in an abstract cognitive task (such as Raven’s puzzles) would put people in a state of low general self-efficacy.

**Method**

**Participants, design, and stimuli**

We had a target of 30 participants per cell and managed to recruit 115 students (56.10% female; age = 19.52) from the same university in Study 1B. Participants received $5 each for completing the study.

This computerized study employed a 2 (incidental confidence: lower versus higher) × 2 (source of status: money versus prosocial product) between-subjects design. We first manipulated incidental confidence using a puzzle task. Depending on the condition, participants either completed an easy set of puzzles or a difficult set. As in Study 1B, the second (main) task was the shopping task that was used to measure self-interested behaviors. We manipulated source of status directly in the second task.

**Procedure**

At the beginning of the study, we manipulated incidental confidence by asking participants to complete a set of 12 Ravens puzzles that were either difficult or easy (Appendix A), a procedure adapted from existing research (Burson, 2007; Burson, Larrick, & Klayman, 2006). People may neglect the fact that a challenging task is not only difficult for themselves but also for other people (Kruger, 1999). Thus, confidence often decreases more than it should when people encounter challenging tasks. Similarly, confidence increases more than warranted for easy tasks as well (Griffin & Tversky, 1992; Justlin, Winman, & Olsson, 2000). We therefore expected confidence to be lower for participants who worked on the difficult puzzle set than participants who worked on the easy set.

Next, participants encountered the manipulation of source of status. Specifically, we told half the participants to consider shopping online by themselves (a private context) or in the actual store (a public context), a procedure adapted from extant research (Griskevicius et al., 2010). Next, participants completed the shopping task from Study 1B and indicated their preference for a green file cabinet versus a non-green option (1 = definitely X [non-green product], 7 = definitely Y [green product]).

We expected prosocial consumption to be a stronger signal of status than money when people shopped in a public context (e.g., in a brick-and-mortar store). The notion of competitive altruism (Roberts, 1998) suggests that people
are particularly sensitive to the social and reputational aspects of altruism (Bateson, Nettle, & Roberts, 2006). For example, people are more likely to donate money to preserve the environment when the giving is public and can influence one’s reputation (Milinski, Semmann, Krambeck, & Marotzke, 2006). Also, people are more likely to acquire green products when shopping in public (Griskevicius et al., 2010). Observable altruistic behaviors can establish a prosocial reputation (Semmann, Krambeck, & Milinski, 2005; Wedekind & Braithwaite, 2002) and increase status because altruism indicates the willingness and ability to incur costs for others’ (even strangers’) benefit (Gurven et al., 2000; Hardy & Van Vugt, 2006; Milinski et al., 2002).

Likewise, when shopping in a public context (e.g., store), choosing a green product over a non-green one can conspicuously signal characteristics about the buyer to an immediate audience. This is because purchasing the green item reveals the buyers’ willingness and ability to sacrifice self-interests for the greater good. In contrast, if a person were to shop in private (e.g., alone on the computer at home), prosocial consumption would have little signaling value. We therefore predicted that when people considered shopping in a private context, lower incidental confidence would increase their preference for the non-green product over the more-expensive green product.

As in Study 1B, participants indicated which cabinet they would choose from 1 (definitely X; the green product) to 7 (definitely Y; the non-green product). Next, as a manipulation check for confidence, participants were asked to estimate their performance in the puzzle task. Specifically, they were asked “Recall the earlier puzzle task. How many puzzles would you estimate that you have solved correctly (out of 12)?” One of the standard measures for confidence from the calibration literature is judges’ estimates of their frequencies or proportions of success across several individual judgments, e.g., “How many out of your last 10 answers will be correct?” (Gigerenzer, Hoffrage, & Kleinbolting, 1991; Griffin & Tversky, 1992; Sniezek, Paese, & Switzer, 1990). The retrospective assessment of confidence at an aggregate level is a conservative measure because it often reduces overconfidence bias (Liberman, 2004).

Results
Manipulation checks
The estimated number of correct answers reflected participants’ confidence about their performance in the puzzle task, whereas the actual score served as an objective measure of task performance. We submitted the estimated scores and actual scores of the puzzle task to two separate 2 (confidence) × 2 (source of status) ANOVAs. The analysis confirmed that participants who worked on the difficult puzzles were less confident in their performance and also solved fewer puzzles in reality than participants who worked on the easy puzzles (estimated score: $M_{\text{low-conf}} = 4.49$, $SD = 3.09$ versus $M_{\text{hi-conf}} = 10.07$, $SD = 2.00$; $F(1, 111) = 132.58$, $p < .001$; actual score: $M_{\text{low-conf}} = 2.62$, $SD = 1.60$ versus $M_{\text{hi-conf}} = 10.04$, $SD = 2.41$; $F(1, 111) = 378.94$, $p < .001$). Source of status did not have a significant effect on the manipulation checks (both $F < 1.00$, $p > .64$). The two-way interaction had a significant effect on confidence (public context: $M_{\text{low-conf}} = 3.86$ versus $M_{\text{hi-conf}} = 10.46$; private context: $M_{\text{low-conf}} = 5.06$ versus $M_{\text{hi-conf}} = 9.71$; $F(1, 111) = 3.97$, $p = .05$) but not on the actual scores ($p = .47$). However, the two-way interaction on confidence (estimated score) was not replicated in Study 3.

Product preference
We submitted the product preference ratings to a two-way ANOVA, which revealed a significant interaction of confidence and source of status only ($F(1, 111) = 9.40$, $p = .002$; $\eta^2 = .075$).

To ensure that incidental confidence induced by the priming task influenced product preferences as intended, we replaced the discrete variable of confidence with the $z$ scores of the confidence manipulation check (standardized estimated number of correct responses) and submitted product preference ratings to a linear regression with $z$ scores of confidence, source of status, and their two-way interaction as independent variables. Consistent with the previous analysis, we observed a significant two-way interaction of confidence and source of status only ($t(1, 111) = -2.27$, $p = .025$, $R^2 = .09$). Planned contrasts showed that when shopping in private, people primed with lower confidence were more likely to purchase the non-green file cabinet than people primed with higher confidence ($M_{\text{low-conf}} = 4.81$, $SD = 1.82$ versus $M_{\text{hi-conf}} = 3.82$, $SD = 2.14$; $F(1, 111) = 4.11$, $p = .04$, $d = .50$), replicating the results of Study 1B (Figure 1). (Higher number indicated stronger preference for the non-green product over the green product.) By contrast, when shopping in public, people under lower confidence were less likely to purchase the non-green product than people under higher confidence ($M_{\text{low-conf}} = 4.52$, $SD = 2.02$, versus...
Results of Study 2 showed that individuals primed with lower confidence appeared to be more or less prosocial in product choices, depending on whether the ownership of a green product or the savings incurred from purchasing a non-green product was considered more effective in compensating for lower confidence. These results were consistent with the proposed compensatory mechanism. One might attribute the findings in the money condition to effort or fairness. Given that every participant received the same flat fee for completing the study, those who had to work on the harder puzzles might have perceived the study as unfair and that they deserved greater amount of compensation for their effort. Therefore, those participants preferred the non-green product that could help them gain some savings. However, if any of these accounts played a crucial role in explaining our findings, we should have observed a main effect of confidence regardless of the source of status. Instead, we found that the effect of confidence on product preference was not significant ($F < 1, p = .59$), but the two-way interaction of confidence and source of status was. Thus, the results further ruled out negative affect, perceived fairness, and effort as alternative explanations because all of these accounts implied a main effect of confidence rather than the two-way interaction that was observed in this experiment.

**STUDY 3**

In Study 3, we tested hypotheses 1 and 2 using the same one-shot dictator game from Study 1A. As in Study 2, the primary source of status in the present study was either altruism or financial gains that people could obtain by behaving more selfishly. To provide further evidence for the compensatory mechanism, we used a different procedure to manipulate source of status. Specifically, we manipulated source of status by varying the strength of group affiliation (Briley & Wyer, 2002). We told participants that their recipient either took the same puzzle study as they did or was involved in a different study. Drawing from studies showing that sharing similar experiences can cause people to identify with the reference group (Aronson, Wilson, & Akert, 2010), we expected group affiliation to be strengthened when participants thought their recipients took the same study.

As mentioned earlier, the display of altruism could compensate for lower confidence because selfless behaviors could help one gain status by signaling one’s willingness and ability to sacrifice self-interest for others. Moreover, prior studies on competitive altruism and costly signaling (Barchay & Willer, 2007; Roberts, 1998; Van Vugt et al., 2007) suggested that altruism was more likely to help one gain status in a community with strong group affiliation than one with weak group affiliation. We therefore expected altruism to be perceived as the better means for restoring confidence when group affiliation was strengthened. Under the condition of strong affiliation, people would feel that they could gain status by being generous in the money allocation decision, as this would signal that they were willing and could afford to sacrifice for others. In this case, lower confidence should decrease the amount of money that people kept for themselves, causing them to appear more altruistic. However, under the condition of weak group affiliation, money would be the better means for restoring confidence. Thus, lower confidence would increase the amount that people kept for themselves, causing them to appear more selfish.

**Method**

**Participants, design, and stimuli**

We had a target sample size of 30 participants per cell and managed to recruit 103 students from the same university. Study 3 employed a 2 (confidence: lower versus higher) × 2 (source of status: money versus altruism) between-subjects design. The first task was used to manipulate incidental confidence, and the second task was the one-shot dictator game from Study 1A.

**Procedure**

At the beginning of the study, each student received a five-dollar fee for participation and an endowment of S3 (in quarters) for the dictator game. To manipulate incidental confidence, we gave participants either 3 minutes or as much time as they needed to complete a puzzle task (Appendix B). We expected that participants who had less time to complete the task would find the puzzle task harder and feel less confident (lower-confidence condition) than those who completed the same puzzles at their own pace (easy task, high-confidence condition). This procedure also allowed us to control for the content of the confidence manipulation task. That is, all participants completed the same puzzle task and only the time limit varied.

Next, participants encountered the manipulation of source of status. Specifically, we told participants that their counterpart (recipient in the dictator game) either completed the same puzzle study as they did (strong affiliation) or was involved in a different study (weak affiliation). They then proceeded to the one-shot dictator game, wherein they (initiators) had to divide their three-dollar endowment with an unknown person (recipient) as in Study 1A. After the dictator game, participants estimated the number of puzzles that they had solved correctly as a manipulation check.

**Pretests**

We conducted a pretest by using a similar sample population ($N = 32$) to verify the difficulty of puzzles. Specifically, we measured the amount of time that participants took to
complete the puzzle task that would be used to manipulate confidence in the main study. On average, participants took 8.60 minutes to complete the puzzle task, confirming that it was challenging to finish all the puzzles within 3 minutes and this condition should lower confidence.

In another pretest (N = 42, similar sample population), we verified the relationship between confidence and motives for obtaining status-enhancing monetary resources. Participants first completed the puzzle task under the three-minute limit or at their own pace. Next they reported their motives for obtaining additional monetary payment. Specifically, participants were informed that they would enter a raffle to win a cash bonus and indicated why they wanted the bonus (1 = disagree, 7 = agree): “receiving this cash prize would make you feel your status is higher than that of participants who did not receive this prize” and “receiving this cash prize would make you feel respected.” Higher numbers indicated greater motives for status enhancement (α = .70).

The results showed that participants in the low-confidence condition were more inclined to attribute their desire for the monetary prize to status-enhancement reasons (M = 3.43, SD = 1.57) than did participants in the higher-confidence condition (M = 2.39, SD = 1.39; t(42) = 2.32, p = .02).

Results
Manipulation checks
Two-way ANOVAs confirmed that participants who had only 3 minutes to complete the puzzles were less confident in their performance in the puzzle task (estimated score: M<sub>low-conf</sub> = 4.58, SD = 2.94 versus M<sub>hi-conf</sub> = 6.78, SD = 2.93; F(1, 99) = 13.78, p < .001) and also solved fewer puzzles than the self-paced group (actual score: M<sub>low-conf</sub> = 3.09, SD = 1.84 versus M<sub>hi-conf</sub> = 6.04, SD = 3.69, F(1, 99) = 25.62, p < .001). Neither source of status nor the two-way interaction had a significant effect on confidence (both p > .26) or the actual score (both p > .18).

Amount of money kept
We submitted the amount of money that participants kept for themselves to a two-way ANOVA and observed a significant interaction of confidence and source of status (F(1, 99) = 8.15, p = .005; η² = .076; Figure 2). Neither confidence nor source of status had a significant main effect (both F < 1, p > .53). As in Study 2, we submitted amount kept to a linear regression with the z score of the confidence manipulation check, source of status, and their two-way interaction as independent variables. Consistent with the previous analysis, we observed a significant two-way interaction of confidence and source of status (t(1, 99) = −2.02, p = .03, R-square = .058).

 Planned contrasts showed that when participants thought that their recipients took a different study (weak affiliation, money as the source of status), those with the time constraint (lower confidence) kept more money for themselves than the self-paced group (M<sub>low-conf</sub> = $2.42, SD = .64 versus M<sub>hi-conf</sub> = $2.01, SD = .72; F(1, 99) = 2.02, p = .03). As in Study 2, we submitted amount kept for self under weak group affiliation or for others under strong group affiliation, respectively (0 = disagree, 7 = agree) and provided consistent support for hypotheses 1 and 2.

Discussion
Results of Study 3 further supported hypotheses 1 and 2 by demonstrating our proposed compensatory mechanism underlying the effects of incidental confidence on self-interested behaviors. When group affiliation was strong, altruism was the better means for restoring confidence. Thus, people primed with lower confidence appeared to be more altruistic by keeping less money for themselves than people primed with higher confidence. By contrast, when group affiliation was weak, money became the better means for restoring confidence. Thus, lower incidental confidence caused people to be more selfish in their money allocation decisions.

Although the two-way interaction observed in Studies 2 and 3 offered evidence to rule out effort as a viable alternative explanation, one might still argue that when money was the better means for restoring confidence, people in the low-confidence condition felt that they had put forth more effort into solving the (harder) puzzle task and thus were entitled to keep more money in the purchase decisions (Study 2) and money allocation decisions (Study 3) than people in the high-confidence condition. The priming task of confidence in Study 3 provided additional evidence that effort did not play a crucial role in explaining the observed effect. Specifically, one measure for effort was the
amount of time spent on the task. This measurement was appropriate in our studies because participants were paid an hourly wage. In Study 3, participants in the 3-minute condition spent less time working on the puzzle task than the self-paced group (the average task completion time was 8.60 minutes in the pretest). If effort caused people to be more selfish, then the results should have reversed such that people in the 3-minute condition should have kept less, not more, money regardless of the source of status and we should have observed a main effect of confidence. We observed the opposite pattern in the money condition and thus a two-way interaction of incidental confidence and source of status.

GENERAL DISCUSSION

The present research provides two key findings. First, we find clear evidence for the transfer effect of confidence. That is, people may compensate for lower confidence in one domain by obtaining higher status in other unrelated domains. Second, the need to compensate for lower confidence can cause individuals to appear more selfish or selfless depending on the means of restoring confidence. The present studies contrast two such means—money versus altruism. The results of our studies show that lower incidental confidence promotes or inhibits self-interested behaviors, when money or altruism, respectively, is the better means for compensating for lower confidence. In four experiments, we examine two self-interested behaviors including sharing a windfall with someone else (dictator game) and the likelihood of engaging in prosocial consumption. The effect of incidental confidence occurs across two types of procedures—inputs from the external world (abstract puzzle task) and from internal long-term memory (remembered facts, impressions, and feelings). Further, in half of our studies, we examine decisions that have real financial consequences. The design features of our studies, the consistent findings, and the effect sizes provide strong evidence that the effects of incidental confidence on self-interested behaviors are substantial and reliable.

In addition, we tested our proposed compensatory mechanism in Studies 2 and 3 by manipulating source of status in two different ways—shopping context (Study 2) and group affiliation (Study 3). Finally, our data ruled out alternative explanations including affect, fairness, effort, self-efficacy, power, and self-esteem.

Contributions

Theoretically, our findings contribute to the confidence literature by investigating how confidence can influence self-interested behaviors, an unexplored consequence in the confidence literature. More importantly, this research demonstrates the transfer effects of confidence. This transfer effect suggests that properties brought to the judgmental context by the decision maker can influence his or her preference, choice, and behaviors as much as cues emanating from the target itself do. Given that the bulk of past research focused on judgments and decision making in the same domain as the origin of confidence, our research invites researchers to further explore consequences of confidence judgments in domains outside the context in which confidence is formed.

Our work also contributes to research on self-interested behaviors. Immorality and, consequently, self-interested behaviors are seen as balancing acts between wanting to do good and wanting to profit from doing bad (Eisenberg & Shell, 1986). Prior research has focused on the determinants of wanting to do good (Dunning, 2007; Sachdeva, Iliev, & Medin, 2009). Our research augments this area of inquiry by investigating how incidental confidence may systematically trigger self-interested behaviors involving financial gains/savings. Our work provides a clearer picture for how confidence influences self-interested behaviors by offering evidence for the proposed compensatory mechanism. It casts light on how source of status (e.g., money versus altruism) moderates the relationship between confidence and self-interested behaviors.

Future research and limitations

The present findings lead to a number of questions about generality. For example, it is possible that the effect of incidental confidence might not be sufficiently strong to influence real transgressions. Although some of our experiments included monetary consequences (dictator game in Studies 1A and 3), acting more selfishly in the money decisions does not violate any law or cause anyone to suffer financial losses after all. Might incidental confidence increase real transgressions such as theft? We explored this possibility in a follow-up study.

In the post-study (N = 36 university students, 66.70% female; age = 21.16), participants first received $5 for taking the study and then they had either 3 minutes or as much time as needed to complete a puzzle task from Study 3. After the puzzle task, the experimenter gave participants the answer key, told them to take their bonus (one quarter for each correct answer), and let participants check their answers in private. We found that participants in the 3-minute condition took greater amount of unearned bonus than self-paced participants (Mlow-conf = 28.25 cents, SD = .43 versus Mhi-conf = 3.75 cents, SD = .12; t(34) = 2.39, p = .02, d = .76). Although the amount of money stolen in this post-study might seem trivial, small repeated effects add up (Abelson, 1988). Further, the amount of unearned money that participants took in the 3-minute condition was 35.56% greater than the amount to which they were entitled based on their actual performance in the puzzle task. While the sample size seems small, the results are not skewed by a small number participants in the low-confidence condition; the number of participants who took unearned money was significantly greater in the low-confidence condition (M = 37.50%) than the high-confidence condition (M = 10%; Mann–Whitney test: U = 116.00, p = .05). This post study expands our findings.
to theft, a clear transgression that causes financial losses to others.

The inclusion of monetary consequences in a series of studies provides a rigorous test of the effects of incidental confidence, and it is likely that the effects of incidental confidence may generalize to other self-interested behaviors that involve monetary payoffs (e.g., fraud) or status enhancement (e.g., backstabbing to gain higher position in an organization). Nevertheless, the present research cannot address the question whether incidental confidence would have similar effects on self-interested behaviors that do not result in financial gains or any status-enhancing resource (e.g., recycling garbage or conserving natural resources). Future research is needed to explore this type of self-interested behavior. Relatedly, we find that incidental lower confidence can reduce self-interested behaviors in two laboratory experiments with moderate sample sizes. It might be worthwhile to replicate the positive effect of lower confidence using different sample populations and greater sample sizes.

The conflicts between monetary reward and altruism might also vary at macro-level and micro-level. For example, purchasing green products is clearly prosocial at the micro-, individual level but might be less so at the macro-, household level (Schroeder & Graziano, 2015). Paying a premium for green products is prosocial if members of the household agree unanimously to sacrifice some of their savings or comfort for the sake of the environment, but it might not be the case when disagreement within the household arises. Also, decision makers are less likely to consider the sustainability issue at the micro-level than the macro-level. Although it is beyond the scope of our research to investigate how incidental confidence might affect other types of self-interested behavior or even interact with decision context to influence self-interested behavior, this topic is worth further investigation.

One limitation of the present research is that we did not directly measure the desire to compensate for confidence in our experiments (e.g., “Gosh I am terrible at solving puzzles. Maybe I can regain confidence by seeking status from elsewhere”). Although the confidence literature discusses the compensatory mechanism as a key driver for subsequent judgment and decision making when confidence fluctuates (Kahneman et al., 1982; Payne et al., 1992), there has not been careful research devoted to developing a scale that measures the compensatory mechanism explicitly. Simply measuring fluctuations in confidence and treating it as a mediator does not capture the complete picture of the underlying process either. In fact, we conducted mediation analyses for Studies 1A and 2 by using the manipulation check of confidence as a mediator based on the feedback received during the review process. As predicted, most, if not all, of the variance in manipulation checks has been explained by the independent variable and there is little unique variance in manipulation checks to explain the dependent variables (Baron & Kenny, 1986). Instead, we sought to understand the underlying mechanism by manipulating compensatory resources (money versus altruism) which serve as the critical link between confidence and compensatory process. As mentioned earlier, data support our compensatory hypothesis. Nonetheless, it would be fruitful to delve more deeply into the link between confidence and compensatory mechanism and more directly explore the judgment process in future research. A deeper investigation of the compensatory mechanism not only helps us better understand the transfer effect of confidence on subsequent behaviors as shown in the present research but will also shed lights on the general compensatory mechanism that has been utilized to explain various effects on immoral behaviors in the literature (Bommer, Gratto, Gravander, & Tuttle, 1987; Jones, 1991).

Confidence is complex and determined by multiple factors. This is no surprise given that assessments of confidence follow after a complex judgment process and involve acquisition and integration of external information into a unitary conclusion, and then making additional inferences to map the response onto a rating scale provided by an experimenter. One set of determinants of confidence comprise of properties of information or evidence on which the primary judgment is based. This includes the amount, validity, reliability, coherence, and redundancy of the information considered in making judgments. The other set of factors comprise of meta-cognitive cues (e.g., cognitive ease, speed, or fluency; Tsai & Thomas, 2011), social context and social cues, and characteristics of the person making the confidence judgment, especially self-assessed expertise and prior success in making similar judgments. All of these factors can affect confidence; they vary in impact depending on content, format, and context of the primary judgment; and they interact with one another in determining the ultimate overall degree of confidence (for a review see Tsai & Hastie, 2017). The present research tests two factors that have been shown to systematically influence the psychological state of confidence—inputs from an external task (puzzles) and internal memory (recalling past events). Although the underlying process for the formation of confidence might differ between the two factors, we find converging evidence for the transfer effect of incidental confidence on self-interested behavior, which attests to the generality of the present research. We believe that this research will evoke questions concerning how various types of confidence judgments might generate similar or diverging effects on self-interested behaviors.

**Practical implications**

Our findings have important practical implications. In an analysis of 100 records of bribery and abuse of power in China (http://www.ccdi.gov.cn) and the United States (https://en.wikipedia.org/wiki/Corruption_in_the_United_States) from 2003 to 2016, we found most of the crimes were committed near the age of retirement (Mage = 57.65). More pertinent to our research, government officials who held deputy positions were three times as more likely to commit
corruption crimes than those who held chief positions (72.00% vs. 28.00%). Although there are other ways to interpret this result, our research suggests that (lack of) confidence might play a role. Presumably, when approaching retirement age, the ultimate career goals (chief positions) seem unattainable for the deputies. This realization might put them in a lower confidence state and motivate them to engage in corruptive behaviors that generate substantial financial gains.

Given that confidence is ubiquitous, largely contextual, and can be altered at minimum cost, managers should strive to understand when people might be most likely to acquire goods associated positively with status, seek to spend less money, and engage in unethical or self-interested behaviors that generate financial gains. Managers may start by exploring organizational factors that reduce employees’ confidence and find ways to address them. For example, managers like to set challenging goals for their employees. However, when having trouble meeting the goals, employees may feel less confident and may be more likely to be tempted by financial gains, even if getting them involves self-interested behaviors or even transgressions. Managers may be able to address these issues by, for example, strengthening group affiliation within the department. Managers may also consider providing training for their employees to reduce the malleability of confidence judgments and understand consequences of lower confidence. Clearly, this research only begins to scratch the surface of the dynamic consequences of incidental confidence in the domain of self-interested behaviors. We believe that our research will stimulate further research on the transfer effect of confidence on judgment and decision making.

APPENDIX A
STUDY 2: PUZZLE TASK
Easy Puzzle Task (Higher-Confidence Condition)

APPENDIX B
STUDY 3: PUZZLE TASK FOR ALL CONDITIONS

REFERENCES


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