Effects of the Experience and Avoidance of Physical Pain on Dishonest Behavior

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Abstract

A prior study found that participants who had experienced physical pain subsequently behaved more dishonestly than those who did not experience physical pain. While this finding could be interpreted as support for the notion that experiencing physical pain would increase dishonest behavior, an alternative interpretation remains possible: the effect was instead driven by the avoidance of physical pain. Study 1 was an attempt to concurrently replicate the prior finding and to rule out this alternative interpretation. However, the results did not replicate the prior finding and we were unable to rule out the alternative interpretation. In Study 2, we shifted our focus to directly test this alternative interpretation by manipulating participants' belief that they had avoided physical pain due to luck. Contrary to the alternative interpretation, results indicated that the manipulation had no significant effect on dishonest behavior. Taken together, our findings suggest that the effects of physical pain on dishonest behavior is either less robust or less straightforward than previously expected. We discuss several possible explanations for these findings and propose directions for future research.

Effects of the Experience and Avoidance of Physical Pain on Dishonest Behavior

Unethical behavior is a pervasive problem that poses serious societal concerns. For example, corruption, one form of unethical behavior, has been estimated to cost the European Union €990 billion annually (Hafner et al., 2016). In recent years, research on unethical behavior has made much headway in our understanding of the factors influencing individual's propensity to engage in unethical behavior. These factors range from individual-level factors such as creativity (Vincent & Kouchaki, 2016) and social class (Piff, Stancato, Côté, Mendoza-Denton, & Keltner, 2012) to situational factors such as the presence of wealth (Gino & Pierce, 2009) and a competitive environment (Pierce, Kilduff, Galinsky, & Sivanathan, 2013).

However, the effects of physical pain, a ubiquitous aspect of the human condition experienced by 25.3 million adults in America on a daily basis (Nahin, 2015), has been largely overlooked. This dearth of research is surprising since several lines of research (outlined in the following section) suggest that physical pain may increase the propensity to engage in unethical behavior. In an attempt to bridge this research gap, we recently conducted a study which provided initial evidence that physical pain can increase unethical behavior (Ong, Nelissen, & van Beest, 2017). The current research aims to build upon this prior study by investigating the robustness and possible interpretations of this prior finding.

Why Physical Pain May Increase Unethical Behavior?

As illustrated in Figure 1, at least four lines of existing research support the idea that experiencing physical pain can increase the tendency to engage in unethical behavior.

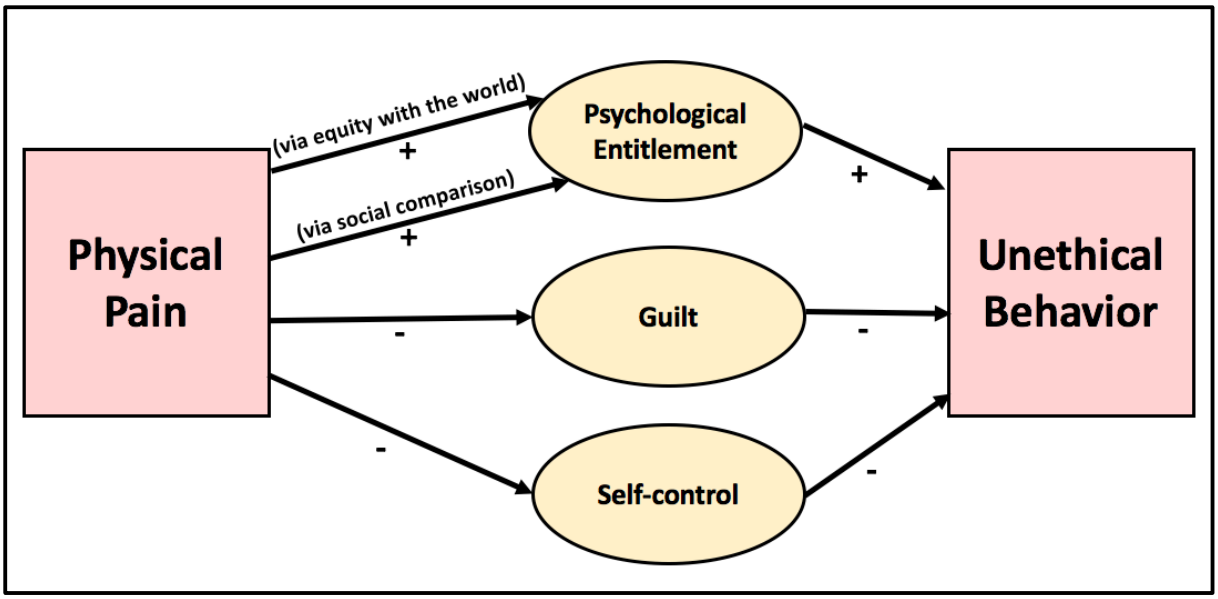

Figure 1. Summary of theoretical explanations suggesting that physical pain can increase unethical behavior.

Psychological entitlement and equity with the world. The first line of research revolves around psychological entitlement, which refers to the sense that "one deserves more and is entitled to more than others" (Campbell, Bonacci, Shelton, Exline, & Bushman, 2004, p. 31). While Campbell and colleagues (2004) had conceptualized psychological entitlement as an individual difference (i.e., a trait), it can also be viewed as a psychological *state* that varies across time and situations (e.g., Zitek, Jordan, Monin, & Leach, 2010).

Alterations in state level of psychological entitlement has been identified as a potential proximate cause of unethical behavior that mediates the effects of creativity (Vincent & Kouchaki, 2016) and winning a competition (Schurr & Ritov, 2016) on unethical behavior. More relevant to the present research, increased psychological entitlement has also been found to mediate the effect of social pain (arising from social exclusion or ostracism) on unethical behavior (Poon, Chen, & DeWall, 2013). This finding may be explained by the 'equity with the world' hypothesis (Austin & Walster, 1974), which extends traditional equity theory (Adams, 1965) by arguing that the tendency to maintain equity (i.e., the fair

distribution of rewards in relation to one's contribution) is not restricted and compartmentalized into individual relationships. Instead, individuals would seek to maintain equity with the world at large. According to this view, the suffering of social pain would lead to perceived inequity with the world, which could manifest as an increase in psychological entitlement (i.e., the belief that one deserves more). These individuals would then be motivated to obtain what they believe they deserve by seeking greater rewards. This reward-seeking tendency may therefore motivate unethical behavior for personal gains.

Like social pain, physical pain is also highly aversive. Furthermore, social and physical pain have been suggested to share common neural substrates (e.g., Williams, 2010). Thus, it stands to reason that physical pain may also increase unethical behavior through the same psychological processes.

Social comparison and psychological entitlement. The second explanation is closely related to the first and pertains to how social comparison processes can influence psychological entitlement. Alongside inequity with the world, social comparison processes could also increase psychological entitlement in certain circumstances. According to relative deprivation theory, comparisons with better-off individuals can lead one to believe that he deserves better (for review, see Smith, Pettigrew, Pippin, & Bialosiewicz, 2012). Therefore, when an individual experiencing physical pain engages in upwards social comparison by contrasting his situation with other pain-free individuals, he may have an increased sense of psychological entitlement and believes that he deserves better. As previously outlined, this increase in psychological entitlement could then motivate unethical behavior. It is important to note, however, that this explanation would only be applicable in situations where target(s) of social comparison is available.

Guilt-reduction. Third, physical pain may indirectly increase unethical behavior by reducing guilt. Research on self-punishment has found that the experience of physical pain

can atone for past unethical behavior by reducing the guilt evoked by the deed (Inbar, Pizarro, Gilovich, & Ariely, 2013; Nelissen & Zeelenberg, 2009). While the guilt-reducing effect of physical pain has been interpreted by some as a *benefit* of pain (Bastian, Jetten, Hornsey, & Leknes, 2014; Leknes & Bastian, 2014), it may also bring about undesirable consequences such as unethical behavior. As guilt has been found to reduce unethical behavior (Motro, Ordóñez, Pittarello, & Welsh, 2016), the reduction of guilt by physical pain may thereby increase unethical behavior. To illustrate, consider a hypothetical scenario where John was initially inhibited from behaving unethically by guilt from his past behavior. John then experienced a painful episode which reduced his level of guilt. Following this episode, John might be more likely to behave unethically as the pain would have negated the inhibitory effect of guilt on unethical behavior.

Compromising self-control. Fourth, the stress and physiological arousal evoked by physical pain (Carr & Goudas, 1999) may compromise one's ability to exercise self-control in the face of temptations (Baumeister & Heatherton, 1996; Solberg Nes, Roach, & Segerstrom, 2009). Because unethical behavior often brings about tempting rewards, the failure to exercise effective self-control could thereby lead to unethical behavior (e.g., Gino, Schweitzer, Mead, & Ariely, 2011). In line with this reasoning, Kouchaki and Wareham (2015) found that the effect of social exclusion (also a stressful and arousing experience) on unethical behavior was mediated by physiological arousal.

Prior Study by Ong and Colleagues (2017)

Motivated by the lines of reasoning outlined above, we recently conducted a study to investigate the causal effects of physical pain on one form of unethical behavior: dishonest behavior (Ong et al., 2017). This study used an adapted cold pressor procedure (e.g., Mitchell, MacDonald, & Brodie, 2004) to induce physical pain among some participants. The study was conducted in a room set up with two water containers, one with cold water at 4-

6°C and one with warm water at 30-35°C. Participants were told that they were required to assess the temperature of the water in one of the two water containers. They were then led to believe that they had been randomly assigned to one of the containers through a die roll[1]. Next, depending on their assignment, participants proceeded to submerge their non-dominant hand in either the cold water container (a painful experience) or the warm water container (not a painful experience) for up to 40 seconds.

Next, participants were given the opportunity to behave dishonestly for financial gains in a variant of the die-under-cup task (Fischbacher & Heusi, 2013). In this task, participants rolled a die under a paper cup thrice and checked the outcome of each die roll by looking through a hole at the bottom of the cup. With the knowledge that they would receive a bonus payment proportionate to the outcome of the first die roll (€1 for each point of the die roll), they could over-report the die roll outcome for financial gains without anyone knowing.

Results of the study revealed that the average reported outcome of the incentivized die roll was higher among participants assigned to cold water as compared to those assigned to warm water. Further, the incentivized die roll outcome among those assigned to cold water was significantly higher than the expected 3.5 of a fair die, while that of those assigned to warm water did not significantly differ from 3.5. Taken together, these results suggest that participants assigned to cold water had behaved more dishonestly than those assigned to the warm water. There are at least two possible interpretations of this key finding. One interpretation is that the *experience* of physical pain had *increased* dishonest behavior. This interpretation is consistent with the various lines of theoretical explanations described earlier and illustrated in Figure 1. The explanation involving social comparison is also potentially applicable to this finding because participants in the study were aware of the presence of the

[1] In actuality, participants were randomly assigned to the water container by a randomizer of the web survey, independent of the die roll outcome.

condition they were not assigned to, which allowed those who experienced physical pain to compare themselves with those who were better-off (i.e., those assigned to warm water who would not experience pain).

Nonetheless, an alternative interpretation remains plausible: the key finding was not driven by the experience of pain, but by the *avoidance* of pain. The next section further elaborates on this alternative interpretation.

A Gratitude-Based Alternative Interpretation

In the above-described prior study, participants assigned to warm water were led to believe that they had avoided pain due to luck through a random die roll. The avoidance of negative and aversive outcomes due to luck, as is the case here, has been suggested to elicit gratitude. For example, McCullough, Kilpatrick, Emmons, and Larson (2001) suggested that "perceiving one's positive outcome as related to factors such as luck… can be associated with feelings of gratitude" (p. 255; see also Teigen, 1997). Gratitude, in turn, has been found to increase prosocial behavior (Bartlett & DeSteno, 2006) and cooperative behavior at the expense of individual gains (DeSteno, Bartlett, Baumann, Williams, & Dickens, 2010). Taken together, the awareness of a potential negative outcome, coupled with the avoidance of such an outcome due to luck, might have inhibited dishonest behavior. While the evidence for such an account is indirect and relatively weak, it is nonetheless a plausible alternative explanation.

Current Research

The current research sought to examine the robustness of the key finding in the prior study by Ong and colleagues (2017) and investigate the two possible interpretations. In Study 1, we attempted to conceptually replicate the key finding and focused on the interpretation that it was the *experience* of physical pain that had *increased* dishonest behavior. In Study 2,

we investigated the alternative interpretation that it was the *avoidance* of physical pain that had *decreased* dishonest behavior.

Study 1

Because we found it more theoretically plausible that it was the experience of physical pain that had increased dishonest behavior, we opted to focus on this interpretation in our first study. We therefore conducted Study 1 with two main objectives: (i) to conduct a conceptual replication of the prior study, and (ii) to provide support for the interpretation that it was the *experience* of physical pain that had *increased* dishonest behavior.

This study adopted the procedures of the prior study with two key modifications. First, we included an additional control condition where participants assessed the temperature of the room they were in (instead of water temperature). Second, participants were not made aware of the experimental conditions they were not assigned to[2]. The main rationale behind these modifications was to rule out the gratitude-based interpretation. As participants were not aware of the potential to experience physical pain, participants in the two control conditions would not be expected to experience gratitude. The room condition served to further boost our confidence that the effect is driven by physical pain rather than any unforeseen effects of submerging one's hand in warm water. For example, just as holding a cup with hot drinks can influence interpersonal warmth (Williams & Bargh, 2008), the warmth from submerging one's hand in warm water may also influence dishonest behavior, albeit in ways we had not anticipated. Thus, this additional control condition could address any potential effects of submerging one's hand in warm water, without changing the nature of the task (i.e., temperature assessment).

[2] A by-product of this modification was that it would also eliminate the effect of physical pain on unethical behavior if this effect was entirely driven by the 'social comparison and psychological entitlement' explanation. This issue is further elaborated on in the discussion section.

Following these modifications, if we were to find that participants assigned to assess the temperature of cold water had behaved more dishonestly than those in the two control conditions, we would be able to concurrently replicate the prior study and garner support for the interpretation that physical pain can increase dishonest behavior. This study received ethics approval[3] and was pre-registered at www.aspredicted.org (see Appendix A for the pre-registration).

Method

The study consisted of three between-subject conditions (see Figure 2). Participants were randomly assigned to assess the temperature of either cold water, warm water, or the room they were in. Participants assigned to assess cold water were expected to experience physical pain while those in the other two conditions were not. Next, all participants responded to manipulation check items and provided temperature estimate. Finally, all participants were presented with the opportunity to behave dishonestly in the die-under-cup task.

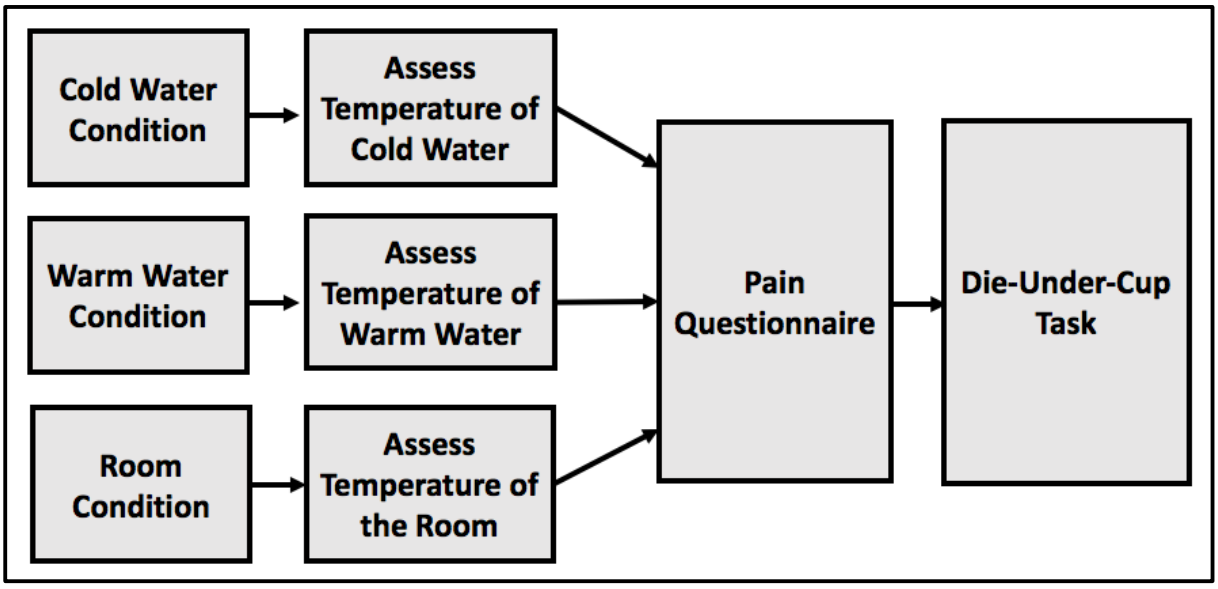

Figure 2. Depiction of the design of Study 1.

[3] Approval was obtained from Tilburg University's Ethics Review Board (reference number: EC-2016.22a).

Participants. Participants consisted of 243 students at Tilburg University (193 females; M_{age} = 20.44, SD_{age} = 2.36). One additional participant was excluded from all analyses for misunderstanding and not following the instructions[4]. The sample size was determined by two *a priori* decision rules. First, we sought to recruit a minimum of 50 participants per cell (i.e., a total of 150). Second, upon meeting the minimum sample size, data collection would be terminated either when (i) we managed to recruit 80 participants per cell (i.e., a total of 240)[5], or (ii) data collection had lasted for two weeks. We checked the participant registration system on a daily-basis and stopped further sign ups once the number of registered participants exceeded 240. Participants could choose to receive either course credit (n = 211) or financial payment of €5 (n = 32) for participating in the study. In addition, all participants received an additional bonus payment (ranging from €1 to €6) dependent on their response on the die-under-cup task. Participants also chose to receive study instructions through a web survey in either Dutch (n = 153) or English (n = 90).

Set-up and equipment. The study was conducted at a laboratory with individual cubicles, each furnished with a computer on a table. Also on the table were a six-sided die and a paper cup with a hole at the bottom. For participants in the cold and warm water conditions, a water container with either cold (4-6 °C) or warm water (30-35 °C) was located at the side of participants' non-dominant hand. Temperature of the water was recorded before the start of each session using a Mastech digital multi-meter (model MS8233CL) with thermocouple function. An Aqualantis Easyflux-200 aquarium pump circulated water in each of the containers to prevent inconsistencies in water temperature around the hand. Figure 3 shows the set-up for participants in these two conditions. All else remained the same for

[4] The participant revealed to the experimenter that when prompted to report the first die roll outcome, he/she had reported the third die roll outcome instead.
[5] We believed that this sample size would provide sufficient power as a cell size of 80 participants is more than twice that of the prior study (Ong et al., 2017).

participants in the room condition except that the water container and aquarium pump were absent.

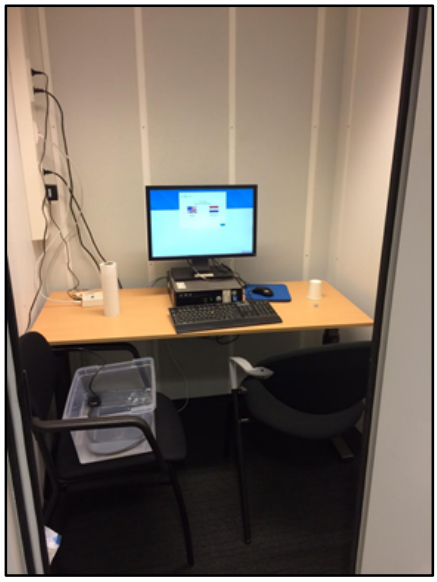

Figure 3. Set-up for the cold and warm water conditions.

Procedures. Upon arrival at the laboratory, participants were led to individual cubicles and seated in front of the computer. Participants were then informed that they would receive all information and instructions regarding the experiment through the web survey loaded on the computer. The experimenter then left the cubicle and closed the cubicle door. After selecting a language (English or Dutch) for the web survey, participants were provided with information on what the study was about. Specifically, they were told that the study consisted of two tasks: (i) a temperature assessment task, and (ii) a die roll task. Next, participants provided informed consent and commenced the temperature assessment task.

Temperature assessment task. Participants were told that they were required to assess temperature in the first task. Specifically, participants in the cold and warm water conditions

were instructed to submerge their non-dominant hand in the water container for 40 seconds[6] to assess the water temperature. Participants in the room condition were instructed to take 40 seconds to assess the temperature of the room. In all three conditions, a timer counting down from 40 to zero seconds was displayed on the screen.

Next, all participants rated the level of pain they had experienced during the task (0 = *No pain at all*, 10 = *A lot of pain*), how annoying the pain was (0 = *Not annoying at all*, 10 = *Very annoying*) and depending on their assigned condition, provided temperature estimate of either the water or room. After which, they proceeded to the next task.

Die-under-cup task. Participants were first given instructions (including a video demonstration[7]) on how to roll a die using the cup. After which, they were asked to practice rolling the die using the cup at least thrice. Next, they were told that for the actual task, they were required to roll the die using the cup thrice and that they would receive a bonus payment dependent on the first of the three die rolls they reported (at a rate of 1 point = €1). Participants then performed the actual task by rolling the die thrice and reporting the outcome of all three die rolls.

Concluding the session. After completing the die-under-cup task, participants provided demographics information (e.g., age, gender). Finally, they were debriefed and thanked for their participation.

Results

Temperature assessment task. All participants in the warm water condition kept their hands in the water container for the full 40 seconds, while 81.7% of participants in the

[6] To prevent permanent harm, participants were allowed to remove their hands earlier if they found the sensation to be unbearable.
[7] Video available at: https://www.youtube.com/watch?v=iSgzJ4jIDY8

cold water condition did so (mean duration = 37.40 seconds, *SD* = 7.53). This difference was statistically significant, $t(81) = 3.89$, $p < .001$[8].

Participants in the cold and warm water conditions estimated the water to be 1.15 °C (*SD* = 6.47) and 31.68 °C (*SD* = 7.37) respectively. Participants in the room condition estimated the room temperature to be 19.63 °C (*SD* = 2.05).

Participants in the cold water condition reported experiencing more pain (*M* = 6.68, *SD* = 1.90) than those in the warm water condition (*M* = 0.19, *SD* = 0.89; $t[115] = 27.94$, $p < .001$[9]) and room condition (*M* = 0.16, *SD* = 0.49; $t[92] = 30.04$, $p < .001$[10]). The level of reported pain did not differ between those in the warm water and room conditions, $t(159) = 0.29$, $p = .775$.

Similarly, participants in the cold water condition also found the pain to be more annoying (*M* = 7.06, *SD* = 1.93) than those in the warm water condition (*M* = 0.27, *SD* = 1.01; $t[123] = 28.17$, $p < .001$[11]) and room condition (*M* = 0.36, *SD* = 1.23; $t[138] = 26.43$, $p < .001$[12]). There was no significant difference in the reported level of annoyance between the warm water and room conditions, $t(159) = 0.53$, $p = .594$.

The results of the pain and annoyance items suggest that our manipulation was successful in inducing pain among participants in the cold water condition while inducing almost no pain in the other two conditions.

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[8] Levene's test indicated unequal variance ($F = 78.65$, $p < .001$), so degrees of freedom was adjusted from 160 to 81.
[9] Levene's test indicated unequal variance ($F = 43.74$, $p < .001$), so degrees of freedom was adjusted from 160 to 115.
[10] Levene's test indicated unequal variance ($F = 64.20$, $p < .001$), so degrees of freedom was adjusted from 161 to 92.
[11] Levene's test indicated unequal variance ($F = 31.22$, $p < .001$), so degrees of freedom was adjusted from 160 to 123.
[12] Levene's test indicated unequal variance ($F = 20.53$, $p < .001$), so degrees of freedom was adjusted from 161 to 138.

Incentivized die roll. The key results of the die-under-cup task are presented in Table 1. The main dependent variable of interest was the reported outcome of the first die roll. As participants would receive bonus payment proportionate to the die roll outcome, they had financial incentives to dishonestly over-report the outcome. Contrary to our expectations, pairwise comparisons conducted using Mann-Whitney *U* tests indicate that the reported outcome of the incentivized die roll did not differ across the three conditions (see Table 2).

Wilcoxon signed-rank tests indicate that the reported outcome of the incentivized die roll was significantly above the expected 3.5 in the warm water ($Z = 2.67$, $p = .008$) and room conditions ($Z = 2.97$, $p = .003$), but not in the cold water condition ($Z = 1.55$, $p = .122$).

Table 1

Reported Die Roll Outcomes Across Conditions

(Means are presented with standard deviations in parenthesis)

Condition	Die Roll		
	First (incentivized)	Second (un-incentivized)	Third (un-incentivized)
Cold Water ($n = 82$)	3.78 (1.64)	3.69 (1.66)	3.72 (1.63)
Warm Water ($n = 80$)	4.00* (1.60)	3.68 (1.68)	3.69 (1.70)
Room ($n = 81$)	4.09* (1.70)	3.62 (1.69)	3.43 (1.72)

Note. * denotes Wilcoxon signed-rank test indicates that the reported outcome significantly differed (i.e., $p < .05$, two-tailed) from the expected 3.5.

Table 2

Results of Pairwise Mann-Whitney *U* Tests Comparing Reported Die Roll Outcomes Across Conditions

Die Roll	Comparison		
	Cold water vs. Warm water	Cold water vs. Room	Warm water vs. Room
First Die Roll	$Z = 0.84$, $p = .403$	$Z = 1.27$, $p = .205$	$Z = 0.43$, $p = .665$
Second Die Roll	$Z = 0.00$, $p = .999$	$Z = 0.24$, $p = .814$	$Z = 0.21$, $p = .833$
Third Die Roll	$Z = 0.15$, $p = .885$	$Z = 1.08$, $p = .282$	$Z = 0.95$, $p = .348$

Un-incentivized die rolls. For the two un-incentivized die rolls, pairwise Mann-Whitney *U* tests indicate that there was no difference in the reported outcomes across conditions (see Table 2). Wilcoxon signed-rank tests also indicate that the reported outcome of the un-incentivized die rolls did not significantly differ from the expected 3.5 in all three conditions (see Table 1 for *M*s and *SD*s). These results suggest that participants in all three conditions did not over-report die roll outcomes when there was no financial incentive to do so.

Exploratory analyses. For exploratory purposes, we also examined whether participants' gender and language choice had an effect on the reporting of the incentivized die roll. Non-parametric ANOVA[13] indicates that the interaction effect between gender and condition was not significant, $F(2, 242) = 1.13$, $p = .324$. There was, however, a main effect of gender, $F(1, 242) = 4.61$, $p = .033$, where males ($M = 4.26$, $SD = 1.66$) reported higher die

[13] This and all subsequent implementations of non-parametric ANOVA were conducted using the *aligned.rank.transform* function from the R package '*ART'* version 1.0 (Villacorta, 2015). Type II sum of squares was used whenever the interaction effect was not significant.

roll outcome than females (M = 3.88, SD = 1.64). Language choice neither interacted with condition, $F(2, 242) = 0.11$, $p = .893$ nor had a main effect, $F(1, 242) = 0.97$, $p = .327$.

Because participants had disproportionately participated for course credit rather than financial payment (approximately 87% did so for course credit), we do not report the effects of compensation mode on the incentivized die roll. Nonetheless, we found that approximately 9% of participants who participated for course credit had declined the bonus payment. The exclusion of these participants did not change our key finding that the reported outcome of the incentivized die roll did not differ across conditions.

Discussion

Study 1 was conceptualized as a continuation of our prior study (Ong et al., 2017) which found that participants who experienced physical pain engaged in more dishonest behavior than those who did not experience physical pain. In this present study, we had aimed to conceptually replicate the aforementioned finding and provide support for the interpretation that physical pain could increase dishonest behavior. However, these expectations were not met as our results indicated that the experience of physical pain did not influence the tendency to engage in dishonest behavior.

A possible reason for this null finding could be because the effect of physical pain on dishonest behavior is *entirely* due to social comparison processes (i.e., the 'social comparison and psychological entitlement explanation'). A key difference between Study 1 and our prior study (Ong et al., 2017) was that participants in the prior study, but not those in Study 1, were aware of the presence of condition(s) they were not assigned to and could therefore engage in social comparison. That is, participants in the prior study who experienced pain might have felt greater psychological entitlement after comparing their situation with those who were better-off (i.e., did not experience pain). This elevated sense of psychological entitlement could have then led to greater dishonest behavior. In contrast, participants in Study 1 were

precluded from engaging in such social comparison. Thus, if the effect of physical pain on dishonest behavior is entirely due social comparison processes, we would not expect to observe any effect of physical pain in Study 1.

Another possible reason for the null finding could be gleaned from the gratitude-based alternative explanation where the *avoidance* of physical pain might *decrease* dishonest behavior. While we sought to rule out this alternative explanation in Study 1, we were unable to do so because physical pain did not increase dishonest behavior when participants were not aware of the presence of other conditions. Furthermore, while participants who did not experience physical pain had *not* behaved dishonestly in our prior study, the reported outcome of the incentivized die roll were significantly above the expected 3.5 among Study 1 participants in both control conditions (i.e., warm water and room conditions). Hence, the preclusion of gratitude in Study 1 might have increased dishonest behavior.

In sum, we postulate two possible theoretical explanations for the null finding in Study 1. First, the social comparison processes could solely explain the effect of physical pain on unethical behavior. Second, the avoidance of physical pain might decrease dishonest behavior, possibly by eliciting gratitude. While both explanations are plausible, we opted to focus on the latter explanation in our next study.

Study 2

In Study 2, we turned to directly investigate the alternative interpretation that the avoidance of physical pain might indirectly decrease dishonest behavior by eliciting gratitude. To do so, we conducted an experiment where we manipulated participants' belief that they had avoided physical pain due to luck. As in Study 1, we then measured dishonest behavior using the die-under-cup task. If the alternative interpretation is correct, we would expect participants who were led to believe that they had avoided physical pain due to luck to behave less dishonestly.

Method

The study consisted of two between-subject conditions: lucky condition and control condition. Participants first performed a variant of the temperature assessment task where those in the lucky condition were led to believe that they might potentially be assigned to assess the temperature of cold water (a painful experience) and that they had avoided doing so due to luck. Participants in the control condition received no indications of the potential to experience physical pain. Next, all participants responded to manipulation check items and indicated their estimation of water temperature. Finally, all participants proceeded to perform the die-under-cup task, which provided the opportunity to behave dishonestly for financial gains. This study received ethics approval[14] and was pre-registered at www.aspredicted.org (see Appendix B for the pre-registration).

Participants. Participants consisted of 112 students at Tilburg University (76 females; M_{age} = 21.18, SD_{age} = 3.06). One additional participant was excluded from all analyses for not following instructions[15]. We *a priori* decided to collect data from as many participants as possible over the course of two weeks. Because a small proportion of participants in Study 1 who participated for course credit had declined bonus payment, we opted to compensate all participants financially (€5) for participating in the study. All participants received an additional bonus amount (ranging from €1 to €6) dependent on their response on the die-under-cup task. Participants could choose to receive instructions through a web survey in either Dutch (n = 91) or English (n = 21).

Set-up and Equipment. The study was conducted at a laboratory with several individual cubicles. The set-up of the cubicles is depicted in Figure 4 and a photo of the set-

[14] Approval was obtained from Tilburg University's Ethics Review Board (reference number: EC-2016.22a2).
[15] The participant, assigned to the lucky condition, had assessed the temperature of the cold water rather than warm water.

up in the control condition is presented in Figure 5. Each cubicle contained a table, a computer, a six-sided die and a paper cup with a hole at the bottom. For participants in the control condition, there was also an unlabeled water container with warm water (30-35 °C) on the table. At the bottom of the water container were two stickers with the letters 'A' and 'B' (hereafter referred to as 'sticker A' and 'sticker B' respectively).

For participants in the lucky condition, there were two water containers: (i) one with cold water (4-6 °C) labelled 'pain', and (ii) one with warm water (30-35 °C) labelled 'control'. The inclusion of container labels in the lucky condition was intended to highlight the painful effects of submerging one's hand in the cold water. Sticker A was at the bottom of the cold water container while sticker B was at the bottom of the warm water container. As in Study 1, for both conditions, the temperature of the water was recorded before the start of each session with a multi-meter. An aquarium pump also circulated the water in each water container.

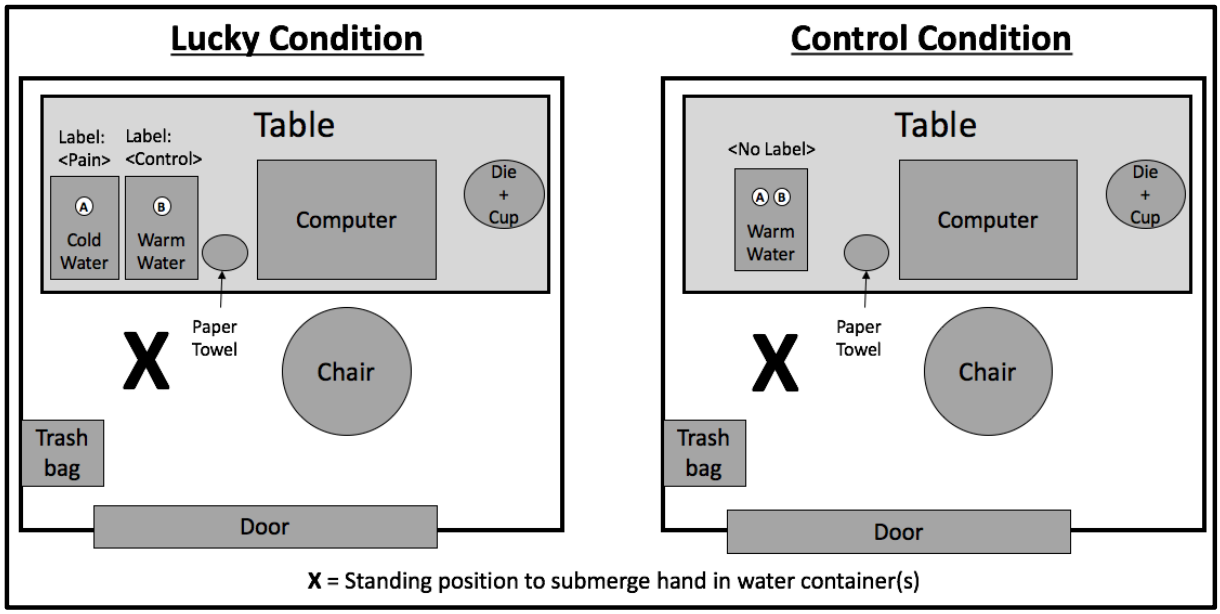

Figure 4. Diagram depicting the set-up of the cubicle in which the study was conducted

Figure 5. Photo of the set-up in the control condition.

Procedures. As in Study 1, the study was conducted in individual cubicles. Participants received all information and instructions regarding the experiment through the web survey loaded on the computer in front of them. After selecting a language (Dutch or English), participants were told that the study consisted of two tasks: (i) a temperature assessment task, and (ii) a die roll task. Participants then provided informed consent and proceeded to the temperature assessment task.

Temperature assessment task. All participants first submerged their non-dominant hand in the container with warm water for 40 seconds to minimize potential differences in initial hand temperature. Next, they were told that the task required them to assess water temperature by placing their non-dominant hand in the water with the tip of their middle finger on either sticker A or sticker B for 40 seconds. Participants in the lucky condition were also told that one of the containers contained cold water and because submerging one's hand

in it could be painful, they could remove their hand before 40 seconds if they found the pain to be unbearable. This piece of instruction was another attempt to highlight the potential to experience physical pain among participants in the lucky condition.

Next, participants were assigned to place their middle finger on one of the two stickers in an ostensibly random manner by rolling a die. Importantly, participants were not provided with any details on how this assignment would be implemented (i.e., they did not know how die roll outcomes would correspond to sticker assignment). After reporting the die roll outcome, all participants were told that they had been assigned to sticker B. In this manner, all participants were assigned to assess the temperature of the warm water. This sticker assignment procedure was intended to minimize differences in procedures and instructions across the two conditions.

Participants were then shown a photo depicting how they should place their hand in the water container (i.e., with the middle finger on the sticker B) and to commence the task when ready. Upon commencing the task, a timer counting down from 40 to zero seconds was displayed on the screen. Participants were instructed to click a button immediately if they had removed their hand before the timer reached 0, thereby allowing the web survey to record the duration which their hand was submerged for.

Next, all participants rated the level of pain they experienced during the task (0 = *No pain at all*, 10 = *A lot of pain*), how annoying the pain was (0 = *Not annoying at all*, 10 = *Very annoying*) and provided estimate of the water temperature. After which, they proceeded to the die-under-cup task.

Die-under-cup task. Participants were provided with instructions (including a video demonstration) on how to roll a die using the cup and asked to practice at least thrice. Next, they were told that for the actual task, they were required to roll the die using the cup thrice and subsequently report the outcome of the first die roll. Before performing the task, they

were also told that they would receive a bonus payment dependent on the die roll outcome they reported (at a rate of 1 point = €1).

Concluding the session. After completing the die-under-cup task, participants provided demographics information (e.g., age, gender) and were then debriefed and thanked for their participation.

Results

Temperature assessment task. All participants (except for one participant in the lucky condition whose duration was 3.70 seconds) submerged their hand in the water for the full 40 seconds. The estimated water temperature did not differ across participants in the lucky (M = 28.69°C, SD = 8.47) and control (M = 29.86°C, SD = 6.31) conditions, $t(100) = 0.83$, $p = .409$[16].

The pain and annoyance ratings were low and did not differ across conditions (see Table 3), indicating that participants generally experienced little or no pain and annoyance in the temperature assessment task.

Table 3

[16] Levene's test indicated unequal variance (F = 10.32, p = .002), so degrees of freedom was adjusted from 110 to 100.

Pain and annoyance ratings across conditions

(Means are presented with standard deviations in parenthesis)

Rating	Condition		Results of t-test comparing the two conditions
	Lucky (n = 55)	Control (n = 57)	
Pain	0.17 (0.59)	0.22 (0.82)	$t(110) = 0.36$, $p = .721$
Annoyance	0.15 (0.43)	0.27 (0.95)	$t(110) = 0.86$, $p = .390$

Note. Ratings were on a 0 to 10-point scale, where higher numbers indicate greater levels of pain or annoyance.

Un-incentivized die roll. For the temperature assessment task, participants were ostensibly assigned to place their finger on one of the two stickers by rolling a die and reporting the outcome. Because participants were not aware of how the die roll outcomes corresponding to sticker assignment, there was no clear incentives for participants to dishonestly report the outcome. The means and standard deviations of this die roll outcome are presented in Table 4. Wilcoxon signed-rank test indicates that the outcome differed significantly from the expected 3.5 in the lucky condition ($Z = 2.70$, $p = .007$) but not in the control condition ($Z = 1.12$, $p = .264$). However, Mann-Whitney U test indicates that the outcome did not significantly differ across the two conditions, $Z = 1.24$, $p = .215$.

To further investigate the likelihood that the mean outcome of a fair die roll would be as extreme as it was in the lucky condition ($M = 4.15$) merely due to chance, we conducted a simulation using R (R Core Team, 2017). In this simulation, we generated 100,000 samples, each with 55 (i.e., the number of participants in the lucky condition) simulated die rolls (i.e.., randomly generated integer ranging from one to six). Results indicated that only 211 out of 100,000 samples (0.21%) had means of 4.15 or greater. Thus, this finding further

corroborates the finding of the Wilcoxon signed-rank test and indicates that it is highly improbable that the reported die roll outcome in the lucky condition was simply a result of chance.

Table 4

Reported Outcomes of the Incentivized and Un-incentivized Die Rolls

(Means are presented with standard deviations in parenthesis)

Die Roll Outcome	Condition	
	Lucky (n = 55)	Control (n = 57)
Un-incentivized	4.15* (1.68)	3.75 (1.71)
Incentivized	4.49* (1.45)	4.53* (1.34)

Note. * denotes Wilcoxon signed-rank test indicates that the reported outcome significantly differed (i.e., $p < .05$, two-tailed) from the expected 3.5.

Incentivized die roll. In the die-under-cup task, participants were financially incentivized to over-report the outcome of the first die roll. Wilcoxon signed-rank tests indicate that this reported outcome was significantly higher than 3.5 (see Table 4 for *M*s and *SD*s) in both lucky ($Z = 4.20$, $p < .001$) and control ($Z = 4.66$, $p < .001$) conditions. Mann-Whitney *U* test indicates that this reported outcome did not differ across the two conditions, $Z = 0.02$, $p = .981$ (see Table 4 for *M*s and *SD*s). These results suggest that while participants in both conditions had over-reported the outcome of the incentivized die roll, the extent of over-reporting did not differ across conditions.

Comparing incentivized and un-incentivized die rolls. For exploratory purposes, we delved deeper into the difference between the incentivized and un-incentivized die rolls. Matched Wilcoxon signed-rank tests (non-parametric equivalent of the paired t-test) indicate that the two die rolls differed significantly in the control condition ($Z = 2.70$, $p = .007$) but not in the lucky condition ($Z = 1.25$, $p = .210$). To examine if the extent to which the difference between the two die roll varied across conditions, we first computed a difference score as follows:

Difference score = Incentivized die roll outcome – Un-incentivized die roll outcome

We then subjected this difference score to a Mann-Whitney *U* test with condition as the independent variable. The analysis indicates that the difference score did not differ across conditions, $Z = 1.20$, $p = .231$.

Gender differences in incentivized die roll. We also explored if there are any gender differences in the reporting of the incentivized die roll. Non-parametric ANOVA indicates that neither the interaction effect between gender and condition ($F[1, 111] = 3.26$, $p = .074$) nor the main effect of gender ($F[1, 111] = 1.19$, $p = .279$) were significant.

We do not report the effects of language choice (English vs. Dutch) because participants had disproportionately (i.e., 81% of participants) chose Dutch.

Discussion

In Study 2, we found no difference in the reported outcome of the incentivized die roll across the two conditions. Thus, our results did not support the notion that the avoidance of physical pain due to luck can decrease dishonest behavior.

Unexpectedly, participants in the lucky condition appeared to have over-reported the outcome of the un-incentivized die roll. A highly speculative reason for this might be that participants in the lucky condition (but not those in the control condition) were aware of the

potential of a negative outcome (i.e., experiencing pain) and were thus motivated to avoid such an outcome. While participants were not told how die roll outcomes corresponded to the negative outcome, they might have fallen back on the commonly-held belief that a higher die roll outcome is associated with more positive consequences and over-reported the outcome in a bid to avoid the negative outcome. However, this account is at odds with our prior study (Ong et al., 2017) where participants in a similar situation did not over-report the die roll outcome to avoid physical pain.

Exploratory analyses comparing the incentivized and un-incentivized die roll outcomes yielded mixed findings. While the incentivized die roll outcome was higher than the un-incentivized die roll outcome in the control condition, the difference between the two die roll outcomes (i.e., difference score) did not differ across conditions. The interpretation of this set of mixed findings is further complicated by the lack of clarity surrounding the conceptual meaning of the difference score. Therefore, we believe that it would be premature to draw any firm conclusions based on this set of findings.

General Discussion

Across two studies, we examined the robustness and two possible interpretations of a previous finding that individuals who experienced physical pain had behaved more dishonestly than those who did not experience physical pain (Ong et al., 2017). In Study 1, we attempted to conceptually replicate the finding and evaluated the interpretation that the effect was driven by the experience of physical pain. However, our results indicated that the experience of physical pain had no effect on dishonest behavior and therefore did not replicate the key finding in the prior study.

A noteworthy difference in the procedures between Study 1 and the prior study was that while participants in the prior study were aware of the presence of the experimental conditions they were not assigned to, this was not so in Study 1. This difference was a

deliberate modification intended to rule out the gratitude-based alternative interpretation that the avoidance of physical pain can decrease dishonest behavior. Bearing in mind this difference, the null finding in Study 1 could be explained by two possible theoretical explanations. First, the null finding may indicate that physical pain can increase dishonest behavior, but that this effect is entirely due to social comparison processes. Second, the null finding highlights the plausibility of the gratitude-based alternative explanation where the *avoidance* of physical pain can *decrease* dishonest behavior.

We then turned to directly investigate the latter gratitude-based explanation in Study 2 by manipulating participants' belief that they had avoided physical pain due to luck. Participants in the lucky condition (but not those in the control condition) were led to believe that they managed to avoid physical pain due to luck. However, contrary to what the gratitude-based alternative explanation would predict, we found that the luck manipulation had no effect on the tendency to engage in dishonest behavior.

Taken together, the results of Studies 1 and 2 did not replicate the key finding in the prior study and were unable to clarify its interpretations. A possible explanation for this is that the finding from the prior study may not be sufficiently robust. This lack of robustness may indicate that the effect is sensitive to minor variation(s) in study procedures, or that the prior finding was a false positive (i.e., Type I error). While the lack of robustness remains a clear possibility, we turn to discuss other theoretical and methodological reasons that may potentially account for the null results in each of the two studies.

Why did the Experience of Pain Not Influence Dishonest Behavior in Study 1?

Given that several theoretical accounts (as outlined in the introduction and illustrated in Figure 1) are consistent with the notion that physical pain can increase dishonest behavior, it is somewhat surprising that we did not observe this effect in Study 1. An unexamined possibility is that the effect of physical pain on dishonest behavior could be entirely due to

social comparison processes. Hence, the next logical step may be to focus on this explanation in future research.

Another possible explanation could be gleaned from existing research that had examined the effects of physical pain on self-indulgent behavior. Just as physical pain was found to lead to self-indulgent behavior only when the pain is perceived to be "unjust" (Bastian, Jetten, & Stewart, 2012), perceived unfairness may also be a boundary condition of the effects of physical pain on unethical behavior. Because the procedures in Study 1 did not involve any deliberate attempts to induce a sense of unfairness, participants would likely not perceive the pain experience to be unfair and might therefore not be affected by the pain. Nonetheless, because we did not measure perceived (un)fairness in our study, this explanation remains speculative. The investigation of the potential moderating role of perceived fairness may thus be a fruitful avenue for future research.

Why did the Avoidance of Pain Not Influence Dishonest Behavior in Study 2?

While the gratitude-based explanation indicates that the avoidance of pain due to luck may decrease dishonest behavior, this was not supported by the results of Study 2. We speculate that a possible reason is that the manipulation of participants' awareness of the potential to experience physical pain might be too subtle. While the instructions in the lucky condition had explicitly stated that participants could potentially experience physical pain, such information might still not be sufficiently salient. Consequently, the manipulation might not have been successful in inducing gratitude. As manipulation check items measuring feeling of gratitude were not included in the study, we could not directly evaluate the veracity of this account. Future research examining this interpretation may consider either pre-testing the effectiveness of the manipulation or to include manipulation check items.

The Intriguing Absence of Dishonesty

Empirical evidence has clearly demonstrated that there is a general tendency for people to engage in (small degree of) unethical behavior. For instance, a large-scale cross-cultural study involving more than two thousand participants across 23 countries found evidence of dishonest behavior in the die-under-cup task in all the countries sampled[17] (Gächter & Schulz, 2016). Therefore, the absence of dishonest behavior on the task would be an intriguing departure from a well-established finding.

Inspection of the reported outcome of the incentivized die roll across our prior study (Ong et al., 2017), Study 1, and Study 2 revealed that there were two sub-samples which had not, on average, behaved dishonestly (i.e., means did not differ from the expected 3.5; see Table 5 for overview). The first sub-sample were participants of the prior study assigned to the warm water condition. This sub-sample is generally comparable with participants assigned to the warm water condition in Study 1 and lucky condition in Study 2, both of which had exhibited dishonest behavior. The only conceivable manner in which the procedures for this sub-sample of the prior study had differed from *both* comparable sub-samples was in the level of privacy provided to the participants. The prior study was conducted in a room with the experimenter seated several meters away from the participant, separated by a cupboard. On the other hand, participants in Studies 1 and 2 had more privacy as they were seated in individual cubicles behind closed doors. As subtle environmental cues such as pictures of eyes has been found to decrease dishonest behavior (e.g., Bateson, Nettle, & Roberts, 2006; Oda, Kato, & Hiraishi, 2015), an experimenter in close proximity might potentially contribute to the absence of dishonest behavior as well.

[17] Nonetheless, they did find cultural variations in the *degree* of dishonest behavior.

Table 5

Average reported outcome of incentivized die roll across studies and conditions

Study	Condition		
	Pain	No Pain	
Prior Study (Ong et al., 2017)	Cold Water	Warm Water	
	4.34	**3.68**	
Study 1	Cold Water	Warm Water	Room
	3.78	4.00	4.09
Study 2		Lucky	Control
		4.49	4.53

Note. **Bold** denotes outcomes that did not significantly differ from the expected 3.5.

The second sub-sample that did not exhibit dishonest behavior was Study 1 participants assigned to the cold water condition. This sub-sample is comparable with participants of the prior study assigned to the cold water condition. These two samples had two noteworthy differences in experimental procedures. The first difference was the previously-described disparity in the degree of privacy. However, this difference is not a plausible explanation for the lack of dishonest behavior because the additional privacy ought to have increased rather than decreased dishonesty. Another key difference between the two sub-samples was that those in Study 1 were not aware of the presence of conditions they were not assigned to. While social comparison processes may seem relevant at first glance, it is not clear why the preclusion of social comparison would reduce dishonesty. This is especially so since people had been found to behave dishonestly in the absence of prior interventions and without any basis for social comparison (e.g., Gächter & Schulz, 2016). Thus, the absence of dishonest behavior in the cold water condition of Study 1 remains an open question.

Theoretical Implications

Overlap between social and physical pain. Whether social and physical pain lead to similar psychological consequences is a matter of much debate (e.g., Eisenberger, 2015). While social pain has been found to increase unethical behavior (Kouchaki & Wareham, 2015; Poon et al., 2013), Study 1 found no effects of physical pain on unethical behavior. If this finding stands up to future scrutiny, it would run contrary to the 'social-physical pain overlap' account and suggest that when it comes to unethical behavior, social and physical pain do not exert similar effects.

Fairness, a common thread? If future research reveals that the effects of physical pain on unethical behavior is conditional upon it being perceived as unfair, it would highlight the important role of (un)fairness in unethical behavior. In fact, it would dovetail with research demonstrating that unfair treatment leads to unethical behavior (e.g., Greenberg, 1990; Greenberg, 2002) and suggest that unfairness may be a common thread underlying the effects of various factors such as physical pain and social exclusion on unethical behavior. While speculative, this opens up new avenues for future research. First, it may be a productive venture to investigate if perceived unfairness would mediate the effect of social exclusion on unethical behavior. Second, if unfairness is indeed a 'common thread', we would expect other previously unexplored manifestations of unfairness (e.g., workplace bullying; Parzefall & Salin, 2010) to also increase unethical behavior.

Limitations

In Study 1, we found that a small portion of participants had declined the bonus payment, indicating that some participants (including some of those who had accepted the bonus payment) might not be motivated by financial incentives. However, it is unlikely that this finding (by itself) can adequately explain the null results in Study 1. First, the exclusion

of participants who declined the bonus payment did not alter the null finding. Second, the reported outcome of the incentivized die roll was significantly above 3.5 in the two control conditions, indicating that at the aggregate level, participants were still motivated by financial incentives to a certain extent. Nonetheless, because this can still decrease statistical power and increase statistical noise, it may be worthwhile for future research to consider the effectiveness of financial incentives in motivating behavior.

As with all empirical studies, a null finding may reflect a false negative (i.e., Type II error), which may be inflated by low statistical power. However, the average cell size in Study 1 (n = 81) and Study 2 (n = 56) were markedly higher than that of our prior study which found a significant effect of pain on dishonest behavior (n = 34.5), indicating that the present studies had greater statistical power than the prior study. The fact that we did not replicate the prior finding despite the increase in statistical power suggest that the likelihood of a false negative in our current studies is relatively low.

Concluding Note

The current studies suggest that the effects of physical pain on unethical behavior is either less robust or less straightforward than previously expected. While the current research is unable to definitively establish the veracity of the two possible ways to interpret the prior finding by Ong and colleagues (2017), it nonetheless opens up promising new avenues for future research.

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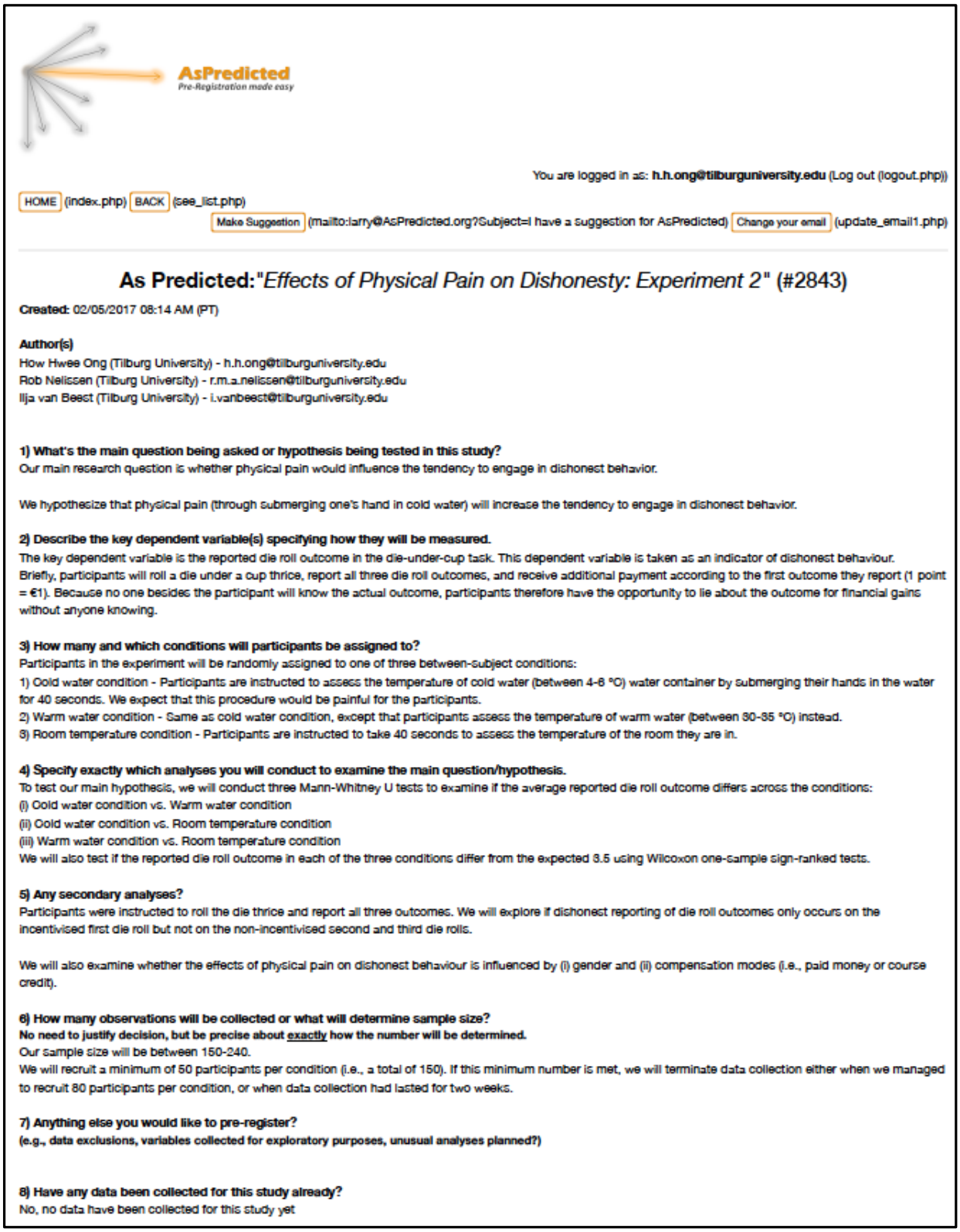
Appendix A

Pre-registration of Study 1



AsPredicted
Pre-Registration made easy

You are logged in as: **h.h.ong@tilburguniversity.edu** (Log out (logout.php))

HOME (index.php) BACK (see_list.php)
Make Suggestion (mailto:larry@AsPredicted.org?Subject=I have a suggestion for AsPredicted) Change your email (update_email1.php)

As Predicted: "*Effects of Physical Pain on Dishonesty: Experiment 2*" (#2843)

Created: 02/05/2017 08:14 AM (PT)

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1) What's the main question being asked or hypothesis being tested in this study?
Our main research question is whether physical pain would influence the tendency to engage in dishonest behavior.

We hypothesize that physical pain (through submerging one's hand in cold water) will increase the tendency to engage in dishonest behavior.

2) Describe the key dependent variable(s) specifying how they will be measured.
The key dependent variable is the reported die roll outcome in the die-under-cup task. This dependent variable is taken as an indicator of dishonest behaviour. Briefly, participants will roll a die under a cup thrice, report all three die roll outcomes, and receive additional payment according to the first outcome they report (1 point = €1). Because no one besides the participant will know the actual outcome, participants therefore have the opportunity to lie about the outcome for financial gains without anyone knowing.

3) How many and which conditions will participants be assigned to?
Participants in the experiment will be randomly assigned to one of three between-subject conditions:
1) Cold water condition - Participants are instructed to assess the temperature of cold water (between 4-6 °C) water container by submerging their hands in the water for 40 seconds. We expect that this procedure would be painful for the participants.
2) Warm water condition - Same as cold water condition, except that participants assess the temperature of warm water (between 30-35 °C) instead.
3) Room temperature condition - Participants are instructed to take 40 seconds to assess the temperature of the room they are in.

4) Specify exactly which analyses you will conduct to examine the main question/hypothesis.
To test our main hypothesis, we will conduct three Mann-Whitney U tests to examine if the average reported die roll outcome differs across the conditions:
(i) Cold water condition vs. Warm water condition
(ii) Cold water condition vs. Room temperature condition
(iii) Warm water condition vs. Room temperature condition
We will also test if the reported die roll outcome in each of the three conditions differ from the expected 3.5 using Wilcoxon one-sample sign-ranked tests.

5) Any secondary analyses?
Participants were instructed to roll the die thrice and report all three outcomes. We will explore if dishonest reporting of die roll outcomes only occurs on the incentivised first die roll but not on the non-incentivised second and third die rolls.

We will also examine whether the effects of physical pain on dishonest behaviour is influenced by (i) gender and (ii) compensation modes (i.e., paid money or course credit).

6) How many observations will be collected or what will determine sample size?
No need to justify decision, but be precise about exactly how the number will be determined.
Our sample size will be between 150-240.
We will recruit a minimum of 50 participants per condition (i.e., a total of 150). If this minimum number is met, we will terminate data collection either when we managed to recruit 80 participants per condition, or when data collection had lasted for two weeks.

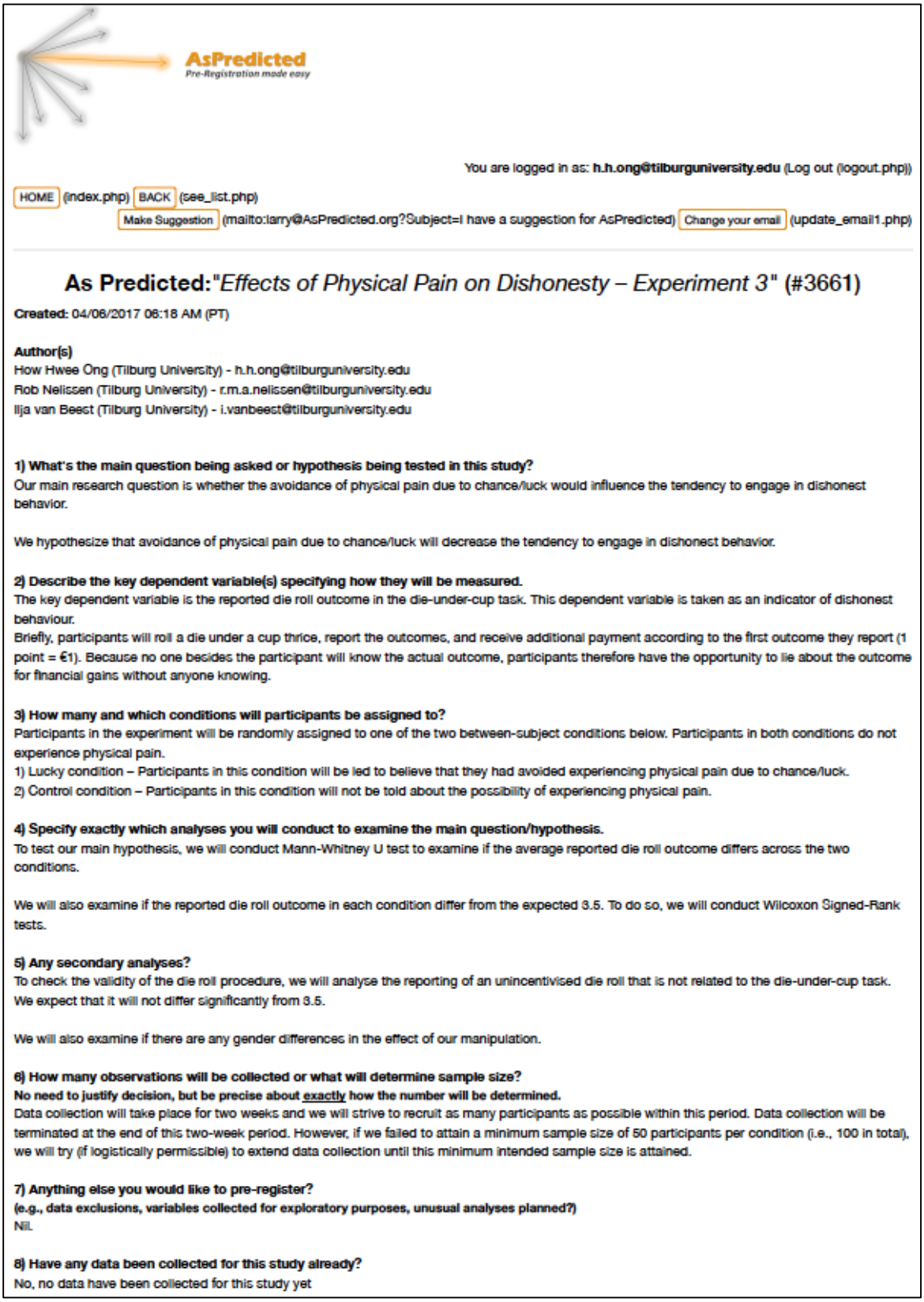
7) Anything else you would like to pre-register?
(e.g., data exclusions, variables collected for exploratory purposes, unusual analyses planned?)

8) Have any data been collected for this study already?
No, no data have been collected for this study yet

Note. The date of creation is in the MM/DD/YYYY format.

Appendix B

Pre-registration of Study 2



AsPredicted
Pre-Registration made easy

You are logged in as: **h.h.ong@tilburguniversity.edu** (Log out (logout.php))

HOME (index.php) BACK (see_list.php)
Make Suggestion (mailto:larry@AsPredicted.org?Subject=I have a suggestion for AsPredicted) Change your email (update_email1.php)

As Predicted: *"Effects of Physical Pain on Dishonesty – Experiment 3"* **(#3661)**

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1) What's the main question being asked or hypothesis being tested in this study?
Our main research question is whether the avoidance of physical pain due to chance/luck would influence the tendency to engage in dishonest behavior.

We hypothesize that avoidance of physical pain due to chance/luck will decrease the tendency to engage in dishonest behavior.

2) Describe the key dependent variable(s) specifying how they will be measured.
The key dependent variable is the reported die roll outcome in the die-under-cup task. This dependent variable is taken as an indicator of dishonest behaviour.
Briefly, participants will roll a die under a cup thrice, report the outcomes, and receive additional payment according to the first outcome they report (1 point = €1). Because no one besides the participant will know the actual outcome, participants therefore have the opportunity to lie about the outcome for financial gains without anyone knowing.

3) How many and which conditions will participants be assigned to?
Participants in the experiment will be randomly assigned to one of the two between-subject conditions below. Participants in both conditions do not experience physical pain.
1) Lucky condition – Participants in this condition will be led to believe that they had avoided experiencing physical pain due to chance/luck.
2) Control condition – Participants in this condition will not be told about the possibility of experiencing physical pain.

4) Specify exactly which analyses you will conduct to examine the main question/hypothesis.
To test our main hypothesis, we will conduct Mann-Whitney U test to examine if the average reported die roll outcome differs across the two conditions.

We will also examine if the reported die roll outcome in each condition differ from the expected 3.5. To do so, we will conduct Wilcoxon Signed-Rank tests.

5) Any secondary analyses?
To check the validity of the die roll procedure, we will analyse the reporting of an unincentivised die roll that is not related to the die-under-cup task. We expect that it will not differ significantly from 3.5.

We will also examine if there are any gender differences in the effect of our manipulation.

6) How many observations will be collected or what will determine sample size?
No need to justify decision, but be precise about exactly how the number will be determined.
Data collection will take place for two weeks and we will strive to recruit as many participants as possible within this period. Data collection will be terminated at the end of this two-week period. However, if we failed to attain a minimum sample size of 50 participants per condition (i.e., 100 in total), we will try (if logistically permissible) to extend data collection until this minimum intended sample size is attained.

7) Anything else you would like to pre-register?
(e.g., data exclusions, variables collected for exploratory purposes, unusual analyses planned?)
Nil.

8) Have any data been collected for this study already?
No, no data have been collected for this study yet

Note. The date of creation is in the MM/DD/YYYY format.