



## Social Psychology

# Revisiting the Role of Public Exposure and Moral Beliefs on Feelings of Shame and Guilt: Replication Registered Report of Smith et al. (2002)'s Study 1

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Shame and guilt are unpleasant self-conscious emotions associated with negative evaluations of oneself or one's behavior. Smith et al. (2002) demonstrated that shame and guilt are distinct and are impacted differently by public exposure, that is, the (potential) exposure to disapproving appraisals of one's misdeeds by others. The impact of public exposure (compared to no exposure) was greater for feelings of shame than for feelings of guilt. We conducted a direct replication ( $N = 1272$ ) of Smith et al. (2002)'s Study 1 and found that exposure increased both feelings of shame ( $\eta_p^2 = .14$ , 95% CI [.11, .17]) and guilt ( $\eta_p^2 = .13$ , 95% CI [.10, .16]) compared with the private condition. Moreover, people who were in the high moral conditions reported both higher shame ( $\eta_p^2 = .33$ , 95% CI [.29, .37]) and guilt ( $\eta_p^2 = .36$ , 95% CI [.32, .39]). Shame and guilt both had moderate-to-high correlations with the shame-related and guilt-related reactions and both exposure and moral belief manipulations had effects on shame-related and guilt-related reactions. Our results suggest a failed replication: public exposure and moral belief influence both shame and guilt, so we cannot conclude that shame and guilt can be distinguished from each other solely based on public exposure, which diverges from the target article's main theory and findings. All materials, data, and code are available at <https://osf.io/j3ue4/>

Emotions are said to be the interface between an organism and its environment, mediating the ever-changing contexts and the behavioral responses of the organism (Scherer, 1984). In humans, emotions play a vital role in coordinating social interactions (Gilbert, 2004; Parrott, 2019), both signaling to ourselves how we feel about the experiences (Lazarus & Lazarus, 1994) and signaling our inner world to others (Van Kleef, 2009). The social emotions of shame and guilt have been linked to morality (Dempsey, 2017; Gilbert, 2003; Parrott, 2019; Teroni & Bruun, 2011) yet the theoretical explanations for distinguishing between the two emotional states are still in debate (Dempsey, 2017; Miceli & Castelfranchi, 2018).

## The Public-private Distinction

One of the many propositions is the distinction made between private and public emotions. In the eyes of Plato and Aristotle, individuals tend to feel shame when faced with the possibility of a worse reputation, discredit, or disgrace, whereas individuals tend to feel guilt when they have committed a wrongful act (Aristotle, 1941; Plato, 1997). Thus, public exposure is more strongly associated with shame than with guilt. This distinction was also noticed by Darwin, who referred to the association between the shame felt over norm violations and judgments by fellow man (Darwin, 2008).

In this line of reasoning, shame is regarded as a moral emotion experienced when one's faults are made public un-

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## Study Design Table

Question	Hypothesis	Sampling plan	Analysis Plan	Rationale for deciding the sensitivity of the test for confirming or disconfirming the hypothesis	Interpretation given different outcomes	Theory that could be shown wrong by the outcomes	Observed outcome (Added in Stage 2)
Does public exposure affect the magnitude of shame and guilt over one's misconduct?	Public exposure (implicit and explicit) increases experienced shame more than guilt over one's misconduct compared with in private settings. Explicit public exposure has a stronger effect on shame than implicit exposure.	We followed the "small-telescope" approach (Simonsohn, 2015) to decide the sample size. Given $N = 168$ in Study 1 of Smith et al. (2002), the target sample was 420 ( $168 \times 2.5$ ). However, considering there are 3 between-subject scenarios, we decided to recruit 420 participants for each scenario, which makes the total sample size being 1260. Accounting for possible exclusions, and allowing for the potential of additional analyses, we aimed for a larger total sample of 1350 participants. (75 per condition).	First, 3 (Publicity: private vs. implicit public vs. explicit public) $\times$ 2 (Moral belief: high vs. low) $\times$ 3 (Scenario: cheating vs. steal vs. disobey) between-subject ANOVAs to examine whether Scenario interacts with other experimental manipulations. If Scenarios interacted with other experimental manipulations, we would report the three-way ANOVAs and examine the effect of public exposure and moral belief for each scenario. If not, we will run 3 (Publicity: private vs. implicit public vs. explicit public) $\times$ 2 (Moral belief: high vs. low) two-way ANOVAs and report the possible main effects of public exposure and moral belief manipulation and possible interactions. To examine whether the effects of manipulations differ between the two emotions, we will also run mixed 3 (Public Exposure: private vs. implicit public vs. explicit public) $\times$ 2 (Moral belief: Low vs. High) $\times$ 2 (Emotion: shame vs. guilt) ANOVA with Emotion being the within-subject variable. Planned contrasts will be conducted using the emmeans with "fdr" corrections.	We calculated the effect sizes for the primary results in the original article: the effect of public exposure on shame is $f = .39$ and the effect of moral belief on guilt is $f = .27$ . Given the very large effects, it is likely that these are overestimations of the true effect size (Button et al., 2013; Halsey et al., 2015; Lakens, 2022), and – if true – we expected to find weaker effects for the primary analyses (around Cohen's $f = .20$ ). The planned sample size can reliably detect at least an effect of $f = .12 > .20$ . See <i>Sample Size Planning</i> for details.	Based on the criteria used by Lebel et al. (2019), we examine the replicability of findings from Smith et al. (2002).	Both hypotheses are not linked to a specific theory. However, the hypotheses are from the target article are argued as consistent with the functional approach of studying emotion from an evolutionary perspective. If the hypotheses were not supported, then this should prompt adjusting our priors regarding the original's findings and the hypotheses they argue to support.	Exposure increased both feelings of shame ( $\eta_p^2 = .14$ , 95% CI [.11, .17]) and guilt ( $\eta_p^2 = .13$ , 95% CI [.10, .16]). We conclude <u>no support</u> for differences between guilt and shame.
Does stronger moral belief increase guilt and shame over one's misconduct?	Moral belief impacts guilt over one's misconduct more than shame. Higher moral beliefs result in higher ratings for shame.						People who were in the high moral conditions reported both higher shame ( $\eta_p^2 = .33$ , 95% CI [.29, .37]) and guilt ( $\eta_p^2 = .36$ , 95% CI [.32, .39]). We conclude <u>no support</u> for differences between guilt and shame.

der others' scrutiny and judgement. On the other hand, guilt is considered an emotion rooted primarily in self-directed negative evaluation and criticism (Combs et al., 2010). Unlike shame, which involves the discrepancy between the self and the social ideal self, guilt is primarily focused on the self's moral conduct (Higgins, 1987). That is, in the case of shame, individuals perceive the self from others' perspectives and expectations, whereas the guilty individual refers to their own standpoint or agency. It should be noted that this presence of the "other" could be actual, presumed, or imagined (Ausubel, 1955). Thus, shame is not solely dependent on an actual "other" explicitly exposing a transgression. Rather, it depends on whether or not an individual senses that there is a discrepancy between the present, and the social ideal self—the latter of which is formed based on others' expectations of us (Cooley, 1902/1964). Put simply, it is the recognition of another's dissatisfaction—presumed or otherwise—that causes the experience of shame (Ausubel, 1955; Higgins, 1987).

Humans evolved in social groups with status structures, where the fitness of the individual depends on their position in the group and the relations with their conspecifics. Shame and guilt can thus be distinguished by their function in solving the re-occurring adaptive problems in social lives.

Shame and guilt address two different kinds of challenges and originate from two distinct social motives. Shame is associated with being held in low esteem by other group members and motivates one to win their place within the group or to disengage to minimize the cost of conflicts. Whereas guilt originates from a care-providing system, which motivates one to avoid harming others and make reparations when there is perceived harm (Beall & Tracy, 2020; Gilbert, 2004). de Hooze (2014) proposed shame as a general sociometer monitoring the threat of being excluded from the group, which motivates affiliative behaviors in many circumstances. Therefore, public exposure of wrongdoing or unethical behavior can induce a greater sense of shame as it increases one's risk of exclusion by the group but not guilt because the perceived harm of one's act is not conditioned on public exposure.

### The Self-behavior Distinction

The public vs. private distinction is not the only mainstream thought regarding the differentiation between shame and guilt. Another influential explanation posits that the object of negative evaluation (self vs. behavior) can differentiate shame and guilt (Tangney et al., 2007). While shame focuses on the negative evaluation of the global self (e.g., being a bad person), guilt is associated with the negative appraisal of the specific behavior (e.g., having done a bad thing). Previous research has found that when describing shame-inducing situations, participants expressed more concerns about negative evaluations of the self, compared with guilt-inducing situations. While the opposite holds for concerns about the effect on others (Tangney, 1994).

However, as expressed by Tangney et al. (2007), the two schools of thought need not be mutually exclusive. The

salience of public exposure could shift the individual's attention to the self and thus induce a greater feeling of shame. While in private, the individual may pay more attention to the effects of their behaviors on others. Other research has also pointed out that both accounts receive empirical support, and a new scale measuring shame and guilt-proneness (Guilt and Shame Proneness scale, GASP) has been developed taking into consideration arguments from both sides (Cohen et al., 2011). GASP measures guilt-proneness using negative behavior evaluations towards private transgressions and shame proneness using negative self-evaluations towards public transgressions.

In view of the debate over the two schools of thought, it is thus more important to ensure the empirical foundations of the theorizing are reliable and replicable, which we hope to contribute by replicating one of the classic findings: Smith et al. (2002).

### Choice of Replication: Smith et al. (2002)

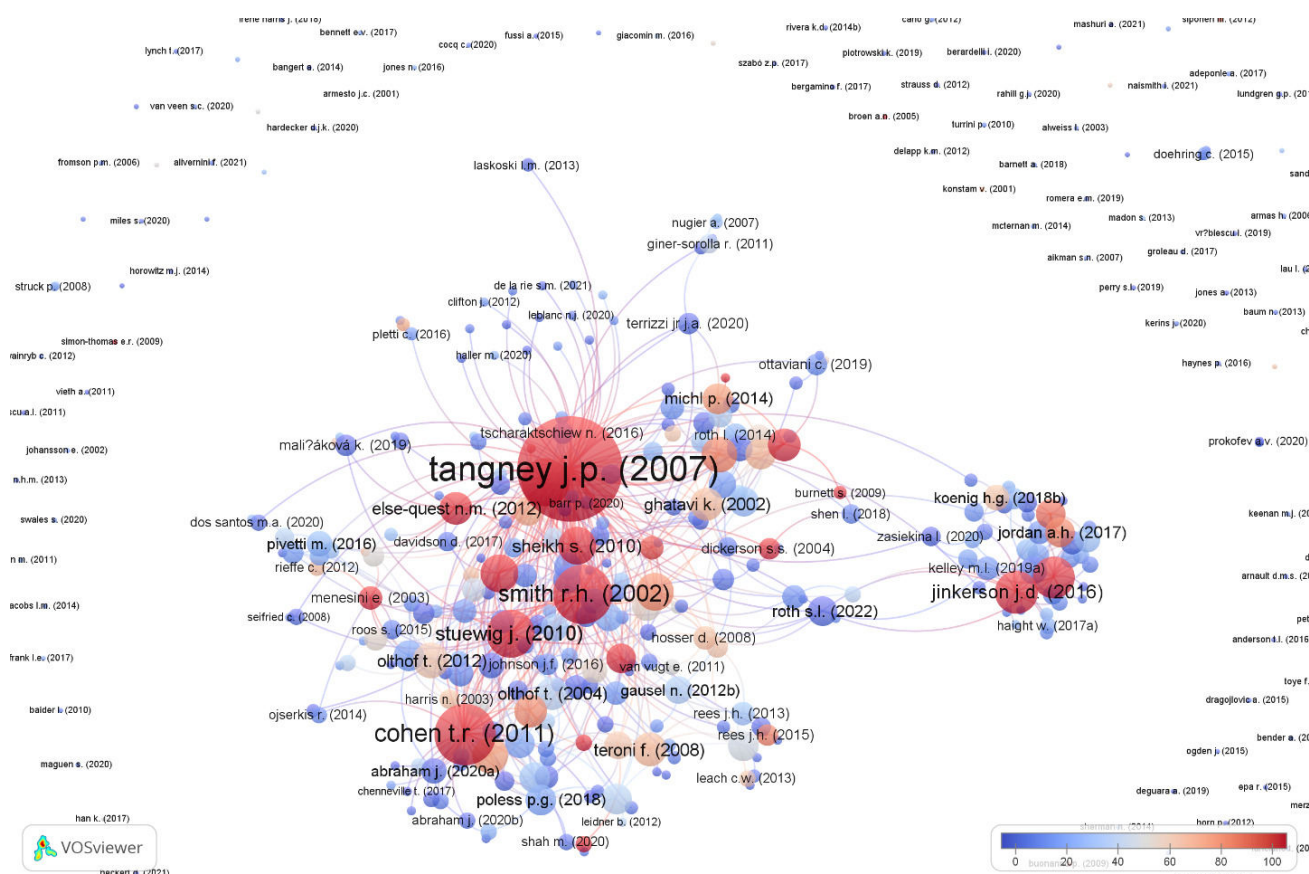
Smith et al. (2002) explored whether the level of public exposure could differently affect the levels of shame and guilt experienced over one's transgression and found support for the public/private shame-guilt distinction. They found that public exposure (either implicit or explicit) was more strongly associated with shame than with guilt, compared to private situations.

Their findings had vast implications from theoretical developments of moral psychology to practical applications in pedagogy or the justice system. At the time of writing (March 2022), the target article has been cited 621 times (according to Google Scholar), with many impactful follow-ups, such as the development of GASP (Cohen et al., 2011) which measures shame and guilt by referring to reactions towards public and private transgressions or failures. The public-private distinction has also contributed to the theorizing of the relationship between morality and reputation (Sperber & Baumard, 2012) and considerations of the justice system reformations (Tangney et al., 2011).

We conducted a simple scientometric analysis of research articles on shame, guilt, and moral behavior for the last two decades (2001 -2022) in Scopus with the String: *shame AND guilt AND (\*moral\* OR norm\* OR \*ethical)* and the results of a total of 580 publications were visualized using VOSviewer (Waltman et al., 2010). As shown in [Figure 1](#), Smith et al. (2002) is connected to many other highly influential papers in this research area, supporting the centrality of this work. However, to the best of our knowledge, despite its impact, there seem to be no published direct replications of Smith et al. (2002).

### Hypotheses and findings in the target article

The main hypothesis in the target article was that shame is stronger for public exposure of moral experiences (e.g., a defect, failure, or transgression) than guilt. We listed the hypotheses in [Table 1](#) and summarized the supported findings in [Table 2](#).



**Figure 1. Network of Research on Shame, guilt, and behavior**

*Note.* The scale of the circles reflects the weights of each paper, which are determined by their connections with other publications in the network. The color gradient represents the number of citations (from 0 to 100).

**Table 1. Summary of hypotheses of the target article**

	Hypotheses
H1	Exposure (private, implicit, and explicit) of moral (transgressions) and nonmoral (incompetence) experiences is more strongly associated with shame than with guilt. Higher public exposure of moral (transgressions) and nonmoral (incompetence) experiences results in stronger feelings of shame. (Page 141 Line 1 in the target article)
H2	Moral belief (low and high) is more strongly associated with guilt than with shame. Stronger moral belief is associated with stronger feelings of guilt. (Page 141 Line 3-4 in the target article)
H3	Exposure and moral beliefs [do not] interact on guilt. (Page 141 Line 15-18 in the target article). [Reframed from a null hypothesis of no interaction in the target]

*Note.* These hypotheses are interpreted and summarized in our own wordings as the hypotheses are not explicitly stated in the original article. The target article did not specify a hypothesis regarding an interaction between exposure and moral beliefs for shame. Summary in the target article: "We expected moral beliefs to enhance guilt regardless of the public exposure of the transgression. In contrast, we expected public exposure to have relatively little effect on guilt, regardless of moral belief."

## Replication overview

In view of its impact and the absence of direct replications, we embarked on well-powered close replication of Study 1 in Smith et al. (2002). We chose Study 1 as the most comprehensive well-controlled baseline experimental demonstration of the effect, using simplified clear vignettes that are well-suited for online administration and our target sample. The experimental design of the target's Study 1 was a 3 (Exposure: private vs. implicit public vs. explicit public)  $\times$  2 (Moral belief: high vs. low)  $\times$  3 (Scenario: cheating vs. steal vs. disobey)  $\times$  2 (Gender: male vs. female)

between-subject design. The factor Scenario was dropped from the analyses in Smith et al. (2002) as it produced no systematic effects on any dependent variables while Gender was included in the ANOVAs. The original article reported no interaction effect between Gender and Exposure or Moral belief, and gender did not seem to have any theoretical importance. Therefore, in the current replication, we collapsed the two genders (male and female) and did not include the factor Gender in the analyses.

**Table 2. Smith et al. (2002) Study 1: Effect sizes and confidence intervals**

Dependent Variables		Independent Variables	F statistics	Effect( $\eta^2$ )	CIL	CIH
Manipulation Check	“Judged by others”	Exposure	$F(2, 156) = 9.64$	0.11	0.03	0.21
		Moral Beliefs	$F(1, 156) = 16.79$	0.10	0.03	0.20
		Exposure $\times$ Moral Beliefs	$F(2, 156) = 2.97$	0.04	0	0.11
Explicit Emotion	Shame	Exposure	$F(2, 154) = 12.47$	0.14	0.05	0.24
		Moral Beliefs	$F(1, 154) = 11.03$	0.07	0.01	0.16
		Exposure $\times$ Moral Beliefs	$F(2, 154) = 3.15$	0.04	0	0.11
Shame-related measures	Guilt	Moral Beliefs	$F(1, 154) = 14.14$	0.08	0.02	0.18
		Exposure	$F(2, 156) = 14.47$	0.16	0.06	0.26
		Moral Beliefs	$F(1, 156) = 4.26$	0.03	0	0.10
	Bodily Change	Exposure $\times$ Moral Beliefs	$F(2, 156) = 5.49$	0.07	0.01	0.15
		Exposure	$F(2, 155) = 14.35$	0.16	0.06	0.26
		Exposure $\times$ Moral Beliefs	$F(2, 155) = 3.63$	0.04	0	0.12
	Embarrassment	Exposure	$F(2, 155) = 4.71$	0.06	0.003	0.14
	Humiliated	Exposure	$F(2, 155) = 4.71$	0.06	0.003	0.14
	Self-directed anger	Exposure	$F(2, 155) = 6.89$	0.08	0.01	0.17
		Moral Beliefs	$F(1, 155) = 11.31$	0.07	0.01	0.16
		Exposure $\times$ Moral Beliefs	$F(2, 155) = 4.42$	0.05	0.002	0.13
Guilt-related measures	Inwardly guilty feelings	Moral Beliefs	$F(1, 156) = 8.20$	0.05	0.005	0.13
	Hurt others	Exposure	$F(2, 155) = 21.46$	0.22	0.11	0.33
		Moral Beliefs	$F(1, 155) = 4.20$	0.03	0	0.10
Emotion Intensity		Emotion (Shame vs. Guilt)	$F(1, 154) = 26.51$	0.15	0.06	0.26
		Emotion $\times$ Exposure	$F(1, 154) = 10.17$	0.06	0.01	0.15
		Emotion $\times$ Exposure $\times$ Moral Beliefs	$F(1, 154) = 3.31$	0.02	0	0.09

Note. Only supported findings are included. The effect sizes were calculated using the MOTE package (Buchanan et al., 2017) in R. Scripts are provided on the OSF.



## Open Science Declaration

We provided all materials, data, and code on: <https://osf.io/j3ue4/>. This project received Peer Community in Registered Report Stage 1 in-principle acceptance (<https://osf.io/j7kt2/>; <https://rr.peercommunityin.org/articles/rec?id=180>) after which we created a frozen pre-registration version of the entire Stage 1 packet (<https://osf.io/js5db/>) and proceeded to data collection. All measures, manipulations, and exclusions conducted for this investigation are reported, and data collection was completed before analyses.

## Method

### Sample size plan

We calculated the target article's  $\eta^2$  effect sizes (Table 2). Our calculations indicated that the effect of exposure on explicit shame was  $\eta^2 = 0.14$  and the effect of moral belief on explicit shame was  $\eta^2 = 0.08$ . To make the effect sizes comparable with sensitivity analyses results (see below), we also computed the effect sizes in terms of Cohen's  $f$  using Webpower (<https://webpower.psychstat.org/models/means03/effectsize.php>). The effect of exposure on shame is  $f = .39$  and the effect of moral belief on guilt is  $f = .27$  (for protocols see the "Additional analyses and results" section in supplementary materials). Given the very large effects, it is likely that these are overestimations of the true effect size (Button et al., 2013; Halsey et al., 2015), and – if true – we expected to find weaker effects for the primary analyses (around Cohen's  $f = .20$ ).

The "small-telescope" approach for replications (Simonsohn, 2015) proposed aiming for enough power to detect effects much weaker than those reported by the original study ( $d_{33\%}$ ) with a general rule of thumb that a simplified design replication should employ a sample size 2.5 times of the original. We followed this generalized approach, even if meant for other designs, and given  $N = 168$  in Study 1 of Smith et al. (2002) the target sample was 420 ( $168 \times 2.5$ ), per each of the 3 between-subject scenarios, overall, 1260. Accounting for possible exclusions, and allowing for the potential of additional analyses, we aimed for a larger total sample of 1350 participants (75 per condition).

A sensitivity analysis with GPower (Faul et al., 2007) indicated that a sample of 1260 would allow the detection of  $f = 0.12$  (groups = 18,  $df = 4$ ; 3 exposure  $\times$  2 moral belief  $\times$  3 scenarios, between-subject ANOVA) and  $d = 0.23/0.19$  for any contrasts between two conditions in collapsed main effects (independent samples,  $n = 420/630$ ) (both: 95% power,  $\alpha = 5\%$ , one-tail), effects much weaker than any of the supported effects reported in the target article and considered weak in social psychology literature. We also ran sensitivity analysis for the two-way interactions (Exposure  $\times$  Emotion and Moral belief  $\times$  Emotion) in the mixed 3 (Exposure: private vs. implicit public vs. explicit public)  $\times$  2 (Moral belief: Low vs. High)  $\times$  2 (Emotion: shame vs. guilt) ANOVA using Morepower (Campbell & Thompson, 2012). Results showed that a sample of 1260 would allow the detection of  $f = 0.10$  with a power of 95% and  $\alpha$  of 5%. The protocols are available in the "Additional analyses and re-

sults" section in supplementary materials. Overall, our target sample size was 8 times that of the original.

### Participants

We recruited 1309 American participants from Amazon Mechanical Turk via CloudResearch (Litman et al., 2017). The final sample of those who completed the survey ( $N = 1272$ ) consisted of 599 male participants (47.1%) and 673 female participants (52.9%) after exclusion. The average age of the sample was 44.9 ( $SD = 13.1$ ), ranging from 20 to 84.

We limited participation using the following criteria: (1) over 18 years old, (2) born, raised, and residing in the US, and (3) a native English speaker. Based on previous experience of running similar replications on MTurk, to ensure high-quality data collection, we employed the following CloudResearch options: Duplicate IP Block, Duplicate Geocode Block, Suspicious Geocode Block, Verify Worker Country Location, Enhanced Privacy, CloudResearch Approved Participants, Block Low-Quality Participants, etc. We also employed the Qualtrics fraud and spam prevention measures: reCAPTCHA, prevent multiple submissions, prevent ballot stuffing, bot detection, security scan monitor, and relevantID.

Assignment pay was based on the federal wage of 7.25 USD/hour. We first pretested survey duration with 30 participants to make sure our time run estimate was accurate and then adjust pay as needed, the data of the 30 participants were not analyzed separately from the rest of the sample other than to assess survey completion duration and needed pay adjustments. For those pretest participants, if survey durations were longer than expected, they would be paid a bonus as pay adjustment. The average compensation for participation in this study was \$0.7.

### Procedure and materials

The overall procedure of Study 1 was as follows: Participants first read the consent form, which includes the following information: the purpose of the study, procedures, risks and benefits, compensation, confidentiality, and voluntary participation. Then they had to confirm that they were over 18 years old and gave informed consent. Then, they read a short introduction of the study and instructions for imagining the scenarios, followed by several questions to ensure that they were eligible and willing to participate in the research. Next, participants indicated their gender (Options: male, female, other, and rather not disclose), and based on their gender participants who chose either male or female were randomly assigned to one of the eighteen conditions matching their gender. The three hypothetical transgression scenarios were: (1) cheating on a lab report (plagiarize), 2) stealing (steal), and 3) disobeying parents (disobey). We informed participants that participation is limited to those who self-identify as male or female, given the gendered replication study materials, and those who did not indicate male or female were asked to return the HIT.

We used the original materials described in the target article for the stealing and cheating scenarios (summarized in the supplementary materials Table 2) yet had to reconstruct the materials for the disobeying account ourselves, as these were not provided in the original study (summarized in the supplementary materials Table 5).

Following Smith et al. (2002), moral belief manipulation was achieved by including information about the hypothetical individuals' self-view of their characters before the wrongful act. For example, in the cheating scenario, high moral belief was manipulated by presenting that Julia [Jason] knows it would be very wrong to take the lab report, but, because of her [his] desperation, she [he] takes it. In the low moral belief condition, it was presented that she [he] resents that many of the students have an unfair advantage over her [him] and thinks that, given the high stakes, it would not harm anyone for her [him] to copy the report. For exposure manipulation, after reading about the transgression, participants read either that the individual in the account either came across or was reminded of someone who would not approve of his or her action (the implicit condition) or that the individual's transgression is actually discovered by someone who would not approve of his or her action (the explicit condition). In the private condition, no such information was provided (for details, see Table 2 and Table 5 in supplementary materials).

Different from Smith et al. (2002), after reading the scenario, participants in all conditions first answered two comprehension questions (e.g., "Did Julia consider it wrong to take the report?" and "Did Juila see anyone nearby right after taking the report?"). Only after having chosen the correct answer for both comprehension questions, participants were reminded of the scenario and presented with a set of items depicting feelings or thoughts and indicated the degree to which they thought the item was characteristic of the individual's experience over the transgression act (0 = *Not at all characteristic*; 9 = *Extremely characteristic*).

The main dependent measures were two manipulation checks for moral belief ("violated a personal value") and exposure ("judged by others") respectively as well as two explicit measures of emotions of focus ("shame" and "guilt"). Following Smith et al. (2002), we also included the measures for shame-related reactions and guilt-related measures (see Table 3 for the categorization and specific items).

Upon completion, participants answered a number of funneling questions about the purpose of the study as well as whether they had participated in similar studies before. Then, they answered demographic questions about age, country of origin, country of residence, social class, and English proficiency regarding the experiment materials (see Table 8 in supplementary materials). Finally, participants were debriefed about the detailed purpose of the study and compensated for their participation.

## Deviations

We provided a list of deviations between the original study and the present replication in Table 9 in the supplementary materials.

## Replication closeness evaluation

We provided details on the classification of the replications using the criteria by LeBel et al. (2018) criteria in Table 4 and concluded the replication as a close replication.

## Data Analysis Plan

### Overview

We conducted all data analyses in R (version 4.1.2, R core team, 2021). We employed Null Hypothesis Significance Testing (NHST) to examine the hypotheses and exploratory relationships using the *afex* package (Singmann et al., 2015). We calculated the 95% CIs of  $\eta_p^2$  with the *effectsize* package (Ben-Shachar et al., 2020) and 95% CIs of Cohen's *d* in planned contrasts and post-hocs with *emmeans* package (Lenth, 2022).

### Outliers and exclusions

Our generalized exclusion criteria are detailed in the "exclusion criteria" subsection of supplementary materials. Note that the original article did not report any criteria or operations for exclusions. Therefore, there is a possibility that the exclusion process will constitute a deviation from the original study. However, most of the exclusion criteria we employed were to make the sample more comparable to the original sample and ensure data quality, which makes it unlikely to be a consequential deviation.

### Confirmatory analyses

In the original study, the authors did not report the correlations between explicit emotion measures and the corresponding emotion-related reactions in Study 1. Although similar analyses were done in Study 4 of the original article, the measures were different. Therefore, after performing internal consistency analyses (i.e., Cronbach's Alpha) following the original study, we ran and reported the Pearson correlations between explicit shame and shame-related reactions as well as the correlations between explicit guilt and guilt-related reactions to establish the validities of the measures.

In addition, considering that in this replication we created a scenario on our own, to ensure it is justified to collapse the three scenarios in the following reporting, we first ran 3 (Exposure: private vs. implicit public vs. explicit public)  $\times$  2 (Moral belief: high vs. low)  $\times$  3 (Scenario: cheating vs. steal vs. disobey) between-subject ANOVAs for all the dependent variables to rule out that there were interaction effects between Scenario and Exposure/ Moral belief. We found that Scenario did interact with experimental manipulations, indicating that the effects of experimental manipulations differed across scenarios. However, across scenarios, the effects of exposure and moral beliefs on explicit emotions and/or emotion-related reactions were similar and differed only in magnitude, indicating that collapsing three scenarios would not result in misinterpretation of the data. To compare the replication with the target article efficiently, we decided to first report the results of two-

**Table 3. Replication experimental design**

IV1: Exposure (3 between)	IV1: <b>Private condition</b>	IV1: <b>Implicit public exposure condition</b>	IV1: <b>Explicit public exposure condition</b>
IV2: Moral belief (2 between)	E.g., Jody took some candy without anyone noticing	E.g., Jody has hidden the M&Ms and is sure that nobody has seen her take the candy, she sees her boss from a distance	Jody realizes that her boss had been watching her as she took the candy
IV3: Scenarios (1) cheating on a lab report, (2) stealing, and (3) disobeying parents			
IV2: <b>Low moral belief (incompetence)</b>	<b>Manipulation checks:</b> <ul style="list-style-type: none"> <li>Exposure: Judged by others</li> <li>Moral Belief: Violate a personal value</li> </ul> <b>Dependent variables:</b> 0 ( <i>Not at all characteristic</i> ) to 9 ( <i>Extremely characteristic</i> )		
E.g., Jody sees herself as a fairly honest person, but she does not see anything wrong with taking a little candy now and then	<b>Shame</b> <i>Explicit measure of shame</i> <i>Shame-related implicit measures:</i> <ul style="list-style-type: none"> <li>Body change: Racing heart; sweaty and perspiring; shaken; loss of composure; a trembling and shaking feeling; flustered</li> <li>Desire to escape: Desire to disappear; Desire to hide; Desire to be alone; Desire to escape public exposure</li> <li>Embarrassed</li> <li>Humiliated</li> <li>Inferior self: learned something unflattering about him/herself; defective; others seemed superior; self-respect decreased; feeling worthless; inferior to others</li> <li>Anger to others: a desire to lash out in anger; resentful, angry at others; vengeful; blaming others; helpless anger</li> <li>Anger to self: anger at him/herself; blame for what happened; disgusted with him/herself</li> </ul> <b>Guilt</b> <i>Explicit measure of guilt:</i> <i>Guilt-related implicit measures:</i> <ul style="list-style-type: none"> <li>Guilty conscience: Inwardly troubled; guilty conscience; a troubled conscience</li> <li>Not real self: The action did not reflect the 'real self'</li> <li>Hurt other: Concerned over how others were affected; thought others were hurt</li> <li>Undo wrong: Desire to undo what was done; wanting to set things right; Desire to make amends; would try to make things better; Desire to apologize</li> </ul>		
IV2: <b>High moral belief (transgression)</b>			
E.g., Jody sees herself as a very honest person and believes that stealing is wrong but succumbs to the temptation to take some candy without paying for it			

Note. The table only details the two IVs that are central to the conclusions drawn from the original study.

way ANOVAs without including Scenario as a factor. Then we briefly summarized the effects in different scenarios (in subsections titled "Exploratory: Scenario interactions") and provided the details in supplementary materials.

### **Main analysis: Explicit guilt and shame**

To test the focal hypotheses that public exposure is associated with elevated levels of shame more than guilt experienced over one's transgression and that high moral belief is associated more with an elevated level of guilt than shame, we ran two types of analyses. First, we ran 3 (Exposure: private vs. implicit public vs. explicit public)  $\times$  2 (Moral belief: Low vs. High) between-subject two-way ANOVAs to examine the effects of *exposure* and *moral beliefs* on the level of reported explicit shame and guilt, respectively in these three situations. Second, we also transformed the data into long format and did a mixed 3 (Exposure: private vs. implicit public vs. explicit public)  $\times$  2 (Moral belief: Low vs. High)  $\times$  2 (Emotion: shame vs. guilt) ANOVA following Smith et al. (2002). This was done to examine whether the effects of manipulations differ between the two emotions (i.e., the two-way interaction between exposure and emo-

tion and the two-way interaction between moral belief and emotion).

### **Secondary analysis: Guilt and shame reactions**

Next, following the original study, we examined the effect of exposure and moral belief on the level of reported shame-related reactions as well as guilt-related reactions with a series of 3 (Exposure: private vs. implicit public vs. explicit public)  $\times$  2 (Moral belief: Low vs. High) between-subject two-way ANOVAs.

### **Evaluation criteria for replication findings**

We aimed to compare the replication effects with the original effects using the criteria set by LeBel et al. (2019), where we provided a simplified replication taxonomy based on comparing the CI of our replication effects with that of the original article's effects.



**Table 4. Classification of the replication, based on LeBel et al. (2018)**

Design facet	Replication	Details of deviation
Effect/hypothesis	Same	
IV construct	Same	
DV construct	Same	
IV operationalization	Same	
DV operationalization	Same	
IV stimuli	Similar	Only 2 out of 3 scenarios were presented in the original, we reconstructed scenario 3 “Disobeying Parents”, with close consideration of the tone and wording of the original article.
DV stimuli	Same	
Procedural details	Similar	We specified several exclusion criteria to ensure data quality and make the sample more comparable to the original study. We added comprehension check questions before the scales measuring emotions. Originally, participants were compensated with course credit, replication participants received monetary rewards.
Physical settings	Different	Replication was conducted online individually; the original experiment was carried out in person in groups of 30.
Contextual variables	Different	The original study was conducted in 2002; replication was done in 2022 during the COVID-19 pandemic. The considerable time gap and pandemic may cause contextual variations.
Population (e.g., age)	Different	The original experiment focused on university students (Age 18-22), Age range for replication was 18 and above.
Replication classification	Close	

## Results

### Manipulation checks

Manipulations were successful. We conducted a two-way ANOVA and found that for the exposure check, there was a main effect of exposure,  $F(2, 1266) = 295.94, p < .001, \eta_p^2 = .32, 95\% \text{ CI } [.28, .36]$  and a main effect of moral belief,  $F(1, 1266) = 49.94, p < .001, \eta_p^2 = .04, 95\% \text{ CI } [.02, .06]$ . We did not find support for the interaction effect between moral belief and exposure manipulation,  $F(2, 1266) = 2.78, p = .062, \eta_p^2 = .004, 95\% \text{ CI } [.00, .01]$ . As expected, our Tukey post-hoc pairwise comparisons showed that the average score of exposure check was the highest in the explicit public condition ( $M = 6.84, SD = 2.08$ ), followed by the implicit public condition ( $M = 3.75, SD = 2.78$ ),  $p < .001$ , which in turn was higher than the private condition ( $M = 2.86, SD = 2.71$ ),  $p < .001$ . As for the manipulation of moral belief, participants in the high moral belief condition ( $M = 4.95, SD = 2.91$ ) reported higher scores than those in the low moral belief condition ( $M = 3.99, SD = 3.13$ ),  $p < .001$ . This suggested an association between exposure and moral beliefs.

For the moral belief manipulation check, we found support for a main effect of moral belief,  $F(1, 1266) = 580.59, p < .001, \eta_p^2 = .31, 95\% \text{ CI } [.28, .35]$ , a main effect of exposure,  $F(2, 1266) = 26.12, p < .001, \eta_p^2 = .04, 95\% \text{ CI } [.02, .06]$ , and an interaction effect between moral belief and exposure manipulation,  $F(2, 1266) = 9.24, p < .001, \eta_p^2 = .01, 95\% \text{ CI } [.00, .03]$ . As expected, participants in the high moral belief condition ( $M = 6.81, SD = 2.28$ ) reported higher scores than those in the low moral belief condition ( $M = 3.34, SD = 2.93$ ),  $p < .001$ . Our Tukey's HSD tests showed that participants in the explicit public condition reported higher scores

( $M = 5.75, SD = 2.86$ ) than participants in the implicit public condition ( $M = 4.94, SD = 3.19$ ),  $p < .001$ , which in turn was nominally higher than the private condition ( $M = 4.51, SD = 3.26$ ),  $p = .108$ . The effect of the moral belief manipulation was stronger in the private condition ( $\eta_p^2 = .41, 95\% \text{ CI } [.34, .47]$ ), followed by the implicit public condition ( $\eta_p^2 = .32, 95\% \text{ CI } [.25, .38]$ ), which in turn was stronger than the public exposure condition ( $\eta_p^2 = .22, 95\% \text{ CI } [.15, .28]$ ).

### Exploratory: Scenario interactions

We supplemented these analyses with three-way ANOVAs that included Scenario as a factor and found support for a two-way interaction between Scenario and exposure manipulation on the exposure manipulation check, a two-way interaction between Scenario and exposure manipulation on moral belief check, and a two-way interaction between Scenario and moral belief manipulation on moral belief check. We provided estimated marginal means for each condition as well as the estimated marginal means collapsing the three scenarios in [Table 5](#).

This is suggestive of differences between the various scenarios, though we caution against over-interpreting these exploratory findings. The over-arching pattern was that 1) compared with private and implicit public conditions, participants in the explicit public conditions agreed more with “being judged by others”; 2) compared with low moral belief conditions, participants in the high moral belief conditions agreed more with the statement “violating a personal value”; and 3) in the high moral belief conditions, participants in the private, implicit public, and explicit public conditions, unanimously showed high agreement with the statement “violating a personal value”.

**Table 5. Manipulation Checks: Estimated Marginal Means for Exposure**

	Conditions		Plagiarize scenario		Steal scenario		Disobey scenario		Overall	
Check	Exposure	Moral Belief	Emmeans	95%CI	Emmeans	95%CI	Emmeans	95%CI	Emmeans	95%CI
Exposure	Private	High	3.93	[3.36, 4.50]	2.80	[2.22, 3.38]	3.93	[3.35, 4.51]	3.55	[3.22, 3.89]
	Implicit	High	3.93	[3.37, 4.50]	4.49	[3.91, 5.07]	4.37	[3.82, 4.93]	4.26	[3.93, 4.59]
	Explicit	High	7.05	[6.44, 7.65]	7.76	[7.20, 8.32]	6.48	[5.88, 7.08]	7.13	[6.78, 7.47]
	Private	Low	2.89	[2.31, 3.46]	1.34	[0.78, 1.91]	2.38	[1.82, 2.94]	2.19	[1.86, 2.53]
	Implicit	Low	3.19	[2.61, 3.76]	3.42	[2.85, 4.00]	3.03	[2.44, 3.62]	3.22	[2.88, 3.55]
	Explicit	Low	6.48	[5.91, 7.05]	7.17	[6.60, 7.74]	6.06	[5.48, 6.63]	6.57	[6.24, 6.90]
Moral belief	Private	High	7.07	[6.49, 7.65]	7.21	[6.63, 7.80]	5.54	[4.95, 6.13]	6.62	[6.27, 6.96]
	Implicit	High	7.03	[6.45, 7.60]	7.42	[6.83, 8.01]	5.73	[5.17, 6.30]	6.71	[6.36, 7.05]
	Explicit	High	7.39	[6.78, 8.00]	7.99	[7.42, 8.55]	5.82	[5.21, 6.42]	7.11	[6.76, 7.46]
	Private	Low	3.19	[2.60, 3.77]	2.07	[1.50, 2.64]	2.18	[1.61, 2.74]	2.47	[2.12, 2.81]
	Implicit	Low	3.73	[3.14, 4.31]	2.82	[2.24, 3.40]	2.78	[2.19, 3.37]	3.11	[2.76, 3.46]
	Explicit	Low	4.24	[3.66, 4.82]	4.82	[4.24, 5.40]	4.31	[3.73, 4.89]	4.46	[4.11, 4.80]

## Explicit shame and guilt: Impact of exposure and moral beliefs

To examine whether exposure and moral belief manipulations had an impact on explicit shame and guilt, we performed a 3 (Exposure: private vs. implicit public vs. explicit public)  $\times$  2 (Moral belief: High vs. low) two-way ANOVAs for the two explicit measures of emotion (see Figure 2).

For *explicit shame*, we found support for a main effect of exposure,  $F(2, 1266) = 90.69, p < .001, \eta_p^2 = .13$ , 95% CI [.09, .16], a main effect of moral belief,  $F(1, 1266) = 549.17, p < .001, \eta_p^2 = .30$ , 95% CI [.26, .34], and an interaction effect between exposure and moral belief,  $F(2, 1266) = 15.90, p < .001, \eta_p^2 = .02$ , 95% CI [.01, .04]. We conducted Tukey's HSD tests and found that explicit shame in the explicit public condition ( $M = 6.11, SD = 2.73$ ) was higher than that in the implicit public condition ( $M = 4.51, SD = 3.10$ ),  $p < .001$ , which was higher than the explicit shame in the private condition ( $M = 3.89, SD = 3.15$ ),  $p = .007$ .

As for the effect of moral belief manipulation on *explicit shame*, participants in the high moral belief conditions ( $M = 6.47, SD = 2.34$ ) reported higher explicit shame than participants in the low moral belief conditions ( $M = 3.20, SD = 2.99$ ),  $p < .001$ . The main effect of exposure on explicit shame was present in both high moral belief conditions,  $F(2, 629) = 17.91, p < .001, \eta_p^2 = .05$ , 95% CI [.02, .09], and low moral belief conditions,  $F(2, 637) = 80.31, p < .001, \eta_p^2 = .20$ , 95% CI [.15, .25], with the effect of exposure being larger in the low moral belief conditions.

We found highly similar results for our analyses for *explicit guilt*. We found support for a main effect of exposure,  $F(2, 1266) = 88.59, p < .001, \eta_p^2 = .12$ , 95% CI [.09, .16], a main effect of moral belief,  $F(1, 1266) = 639.33, p < .001, \eta_p^2 = .34$ , 95% CI [.30, .37], and an interaction between exposure and moral belief,  $F(2, 1266) = 19.73, p < .001, \eta_p^2 = .03$ , 95% CI [.01, .05]. Explicit guilt in the explicit public condition ( $M = 6.26, SD = 2.75$ ) was higher than that in the implicit public condition ( $M = 4.77, SD = 3.12$ ),  $p < .001$ , which was higher than the explicit guilt in the private condition ( $M = 4.08, SD = 3.18$ ),  $p = .003$ . Explicit guilt in the high moral belief conditions ( $M = 6.76, SD = 2.18$ ) was higher than the explicit guilt in the low moral belief conditions ( $M = 3.31, SD = 3.03$ ),  $p < .001$ . The main effect of exposure on explicit guilt was present in both high moral belief conditions,  $F(2, 629) = 15.94, p < .001, \eta_p^2 = .05$ , 95% CI [.02, .08], and low moral belief conditions,  $F(2, 637) = 79.14, p < .001, \eta_p^2 = .20$ , 95% CI [.15, .25], with the effect of exposure being larger in the low moral belief conditions.

Deviating from our expectations and the target's findings, the analyses on explicit shame and guilt had very similar results not just in the presence of but also the magnitudes of the effects. We summarized the estimated marginal means for each condition in Table 6.

### Exploratory: Scenario interactions

To examine whether scenario affected exposure, moral belief, or the interaction, we followed the pre-registered plan and supplemented the replication analyses with three-way ANOVAs that included scenario as a factor.

We found support for the exposure  $\times$  scenario interaction effect and the moral belief  $\times$  scenario interaction effect on both explicit shame and guilt. We then examined the effects of exposure and moral beliefs in each scenario using two-way ANOVAs. We found that in each scenario, there was support for a main effect of exposure on explicit shame, a main effect of moral belief on explicit shame, a main effect of exposure on explicit guilt, and a main effect of moral belief on explicit guilt (for details, see supplementary subsection "Details of the three-way ANOVAs on manipulation checks, explicit emotions, and emotion-related reactions"). Therefore, the interactions seem to suggest the effects of experimental manipulations differ in magnitude across scenarios, yet the patterns remain consistent (see Table 6), and we, therefore, caution against overinterpreting these exploratory findings.

### Directly comparing shame and guilt

We ran a 3 (Exposure: private vs. implicit public vs. explicit public)  $\times$  2 (Moral belief: Low vs. High)  $\times$  2 (Emotion: shame vs. guilt) mixed ANOVA and found that in addition to the main effect of exposure,  $F(2, 1266) = 93.97, p < .001, \eta_p^2 = .13$ , 95% CI [.10, .16], and the main effect of moral belief,  $F(1, 1266) = 621.82, p < .001, \eta_p^2 = .33$ , 95% CI [.29, .37], there was also a main effect of emotion,  $F(1, 1266) = 45.02, p < .001, \eta_p^2 = .03$ , 95% CI [.02, .06]. Paired t-test showed that on average participants reported higher scores for guilt ( $M = 5.02, SD = 3.16$ ) than for shame ( $M = 4.82, SD = 3.14$ ),  $t(1271) = 6.68, p < .001$ .

We also found support for a two-way interaction between exposure and moral belief,  $F(2, 1266) = 18.61, p < .001, \eta_p^2 = .03$ , 95% CI [.01, .05], and a two-way interaction between moral belief and emotion,  $F(2, 1266) = 10.73, p = .001, \eta_p^2 = .008$ , 95% CI [.00, .02]. The two-way interaction between moral belief and emotion indicated that although in both low and high moral belief conditions, the score of explicit guilt was higher than the score of explicit shame, the differences were larger in the high moral belief condition ( $M_{\text{diff}} = 0.30, t(631) = 6.96, p < .001$ ) compared with the low moral belief condition ( $M_{\text{diff}} = 0.10, t(639) = 2.46, p = .014$ ). Crucially, we found no support for the two-way interaction between exposure and emotion,  $F(2, 1266) = 1.08, p = .34, \eta_p^2 = .002$ , 95% CI [.00, .02], failing to indicate exposure having differential effects on shame and guilt. This result is again inconsistent with the original article's finding that exposure had a greater effect on shame than guilt. Therefore, we conclude that both key tests failed to find support for the target article's hypothesis.

### Correlations between manipulation checks, explicit emotions, and emotion reactions

All multi-item measures of emotional reactions had acceptable reliability. We summarized correlations and reliabilities in Table 7.

A higher score on the exposure manipulation check ("judged by others") was associated with higher scores of explicit shame,  $r(1272) = .54$ , 95% CI [.50, .58],  $p < .001$ . A higher score on the manipulation check for moral belief

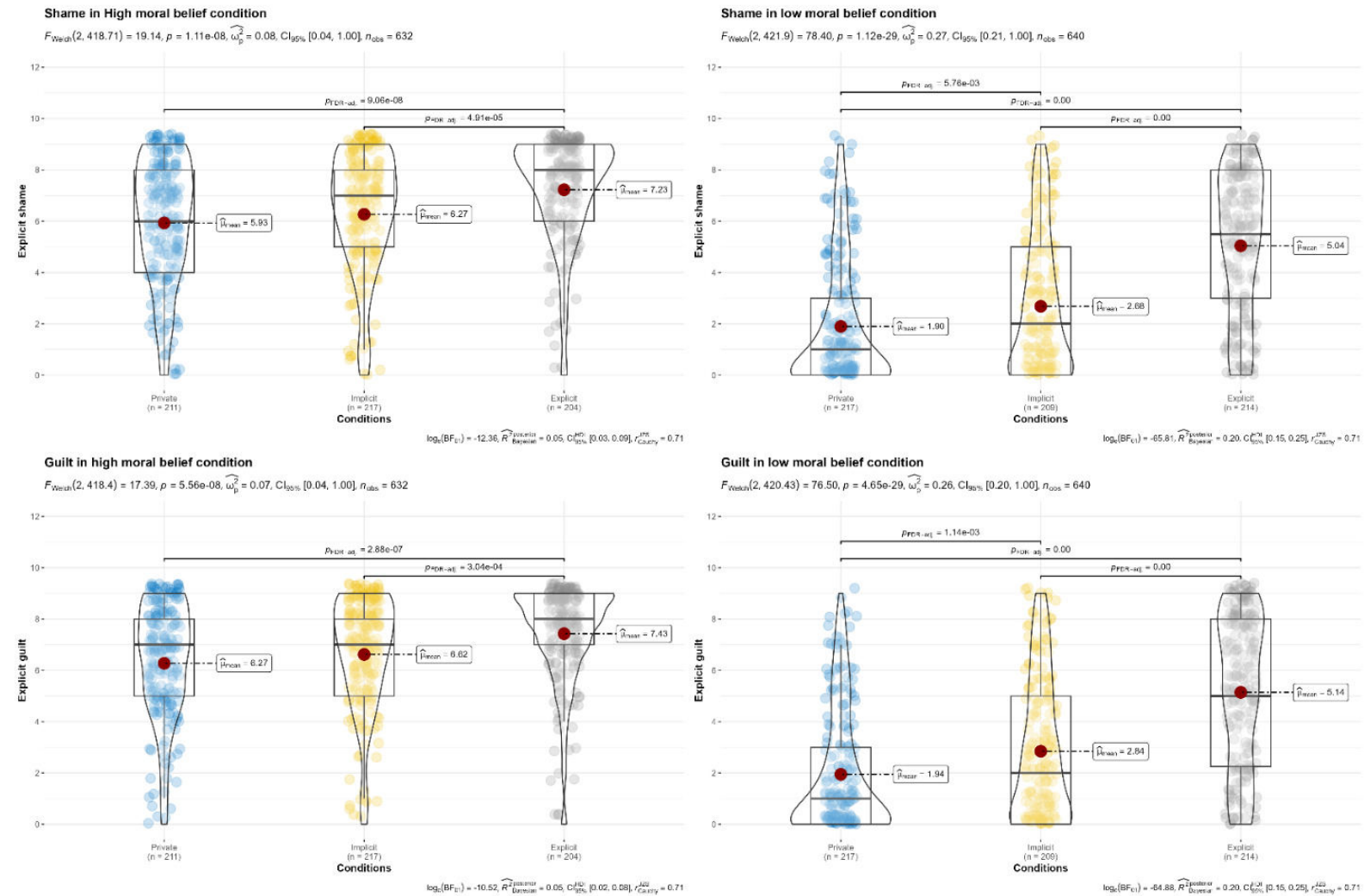


Figure 2. The effects of Exposure and Moral Belief Manipulation on Explicit Shame and Guilt

**Table 6. Estimated Marginal Means for Explicit Emotions**

DV	Exposure	Moral Belief	Plagiarize scenario		Steal scenario		Disobey scenario		Overall	
			Emmeans	95%CI	Emmeans	95%CI	Emmeans	95%CI	Emmeans	95%CI
Shame	Private	High	7.11	[6.57, 7.65]	6.29	[5.74, 6.84]	4.35	[3.79, 4.90]	5.93	[5.60, 6.27]
	Implicit	High	6.79	[6.26, 7.33]	7.16	[6.61, 7.71]	4.93	[4.40, 5.46]	6.27	[5.94, 6.60]
	Explicit	High	7.28	[6.71, 7.86]	8.24	[7.71, 8.77]	6.00	[5.43, 6.57]	7.23	[6.88, 7.57]
	Private	Low	2.74	[2.20, 3.29]	1.58	[1.04, 2.11]	1.42	[0.89, 1.95]	1.90	[1.57, 2.23]
	Implicit	Low	2.89	[2.34, 3.44]	2.83	[2.29, 3.38]	2.31	[1.75, 2.87]	2.68	[2.34, 3.02]
	Explicit	Low	3.96	[3.41, 4.50]	6.25	[5.71, 6.79]	4.90	[4.36, 5.45]	5.04	[4.71, 5.38]
Guilt	Private	High	7.25	[6.71, 7.79]	6.47	[5.92, 7.02]	5.06	[4.51, 5.61]	6.27	[5.95, 6.60]
	Implicit	High	7.01	[6.48, 7.55]	7.33	[6.78, 7.89]	5.57	[5.04, 6.10]	6.62	[6.29, 6.94]
	Explicit	High	7.28	[6.71, 7.85]	8.32	[7.79, 8.85]	6.54	[5.97, 7.11]	7.43	[7.09, 7.76]
	Private	Low	2.41	[1.87, 2.96]	1.55	[1.01, 2.09]	1.89	[1.36, 2.43]	1.94	[1.62, 2.27]
	Implicit	Low	2.94	[2.39, 3.49]	2.96	[2.41, 3.50]	2.62	[2.06, 3.17]	2.84	[2.51, 3.17]
	Explicit	Low	3.79	[3.24, 4.33]	6.39	[5.85, 6.93]	5.23	[4.68, 5.77]	5.14	[4.81, 5.47]



**Table 7. Correlations between explicit emotions and emotional reactions (N = 1272)**

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Explicit shame	4.82	3.14	(-)												
2. Explicit guilt	5.02	3.16	.94 [.94, .95]	(-)											
3. Body change	3.65	2.79	.73 [.71, .76]	.71 [.68, .73]	(.96)										
4. Desire hide	3.90	2.94	.69 [.66, .72]	.67 [.63, .69]	.88 [.87, .90]	(.93)									
5. Embarrassed	4.42	3.30	.76 [.74, .79]	.75 [.73, .77]	.84 [.82, .85]	.80 [.78, .82]	(-)								
6. Humiliated	3.51	3.23	.69 [.66, .72]	.66 [.63, .69]	.85 [.84, .87]	.80 [.78, .82]	.85 [.83, .86]	(-)							
7. Inferior self	3.66	2.57	.68 [.65, .71]	.64 [.60, .67]	.84 [.82, .86]	.81 [.79, .83]	.75 [.72, .77]	.79 [.77, .81]	(.92)						
8. Anger other	2.12	2.31	.03 [-.03, .08]	-.02 [-.07, .04]	.25 [.20, .30]	.23 [.18, .28]	.15 [.10, .21]	.22 [.16, .27]	.36 [.31, .41]	(.92)					
9. Anger self	3.14	2.33	.67 [.64, .70]	.65 [.62, .68]	.75 [.73, .77]	.71 [.68, .73]	.71 [.68, .74]	.71 [.69, .74]	.77 [.75, .79]	.43 [.38, .47]	(.74)				
10. Guilty conscience	4.73	2.92	.83 [.81, .85]	.85 [.84, .87]	.74 [.72, .77]	.69 [.67, .72]	.76 [.73, .78]	.69 [.66, .71]	.70 [.67, .73]	.04 [-.02, .09]	.69 [.67, .72]	(.93)			
11. Real self	3.97	2.86	.57 [.53, .60]	.57 [.53, .61]	.53 [.49, .57]	.51 [.46, .55]	.54 [.50, .58]	.49 [.45, .53]	.48 [.43, .52]	.02 [-.03, .08]	.50 [.45, .54]	.63 [.59, .66]	(-)		
12. Hurt other	2.83	2.49	.58 [.54, .62]	.60 [.56, .63]	.57 [.53, .60]	.51 [.47, .55]	.56 [.52, .59]	.54 [.50, .58]	.50 [.46, .54]	.09 [.03, .14]	.53 [.49, .57]	.67 [.64, .70]	.51 [.46, .55]	(.71)	
13. Undo wrong	3.94	2.89	.72 [.70, .75]	.73 [.71, .76]	.70 [.67, .73]	.65 [.62, .69]	.74 [.71, .76]	.68 [.65, .71]	.57 [.53, .61]	.02 [-.04, .07]	.63 [.59, .66]	.80 [.78, .82]	.63 [.60, .66]	.74 [.72, .77]	(.97)

*Note.* Reliability is provided on the diagonal, we calculated Cronbach's  $\alpha$  for scales with more than two items, and Pearson's correlation for the two-item scale. *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. For effect sizes  $> |r| = .04$ ,  $p < .01$ ; for effect sizes  $> |r| = .09$ ,  $p < .001$ .

(“violates a personal value”) was associated with higher scores of explicit guilt,  $r(1272) = .76$ , 95% CI [.74, .78],  $p < .001$ . However, the manipulation check on exposure had a similar association with explicit guilt,  $r(1272) = .52$ , 95% CI [.48, .56],  $p < .001$ , to that of explicit shame, and the manipulation check on moral belief had a similar association with explicit shame,  $r(1272) = .77$ , 95% CI [.74, .79],  $p < .001$ , to that of explicit guilt. Both explicit shame and explicit guilt were related to shame-related and guilt-related measures in an extremely similar way.

These results suggest that the supposedly distinctive measures of shame and guilt are not as meaningfully different as expected.

### **Exploratory analyses: Explicit measures and emotional reactions**

To further examine whether shame-related reactions were more closely related to explicit shame and guilt-related reactions were more closely related to explicit guilt, we performed regression analyses with explicit shame and guilt entered into the models. We summarized the results in Tables 8 and 9. These analyses were not part of our original analysis plan and were not pre-registered.

The Variance Inflation Factors (VIF) were 8.98, consistent with the moderate-to-high correlation between explicit shame and guilt. However, taking into consideration that the sample size of the current study is large and both explicit shame and guilt had ample variance (Gordon, 2015), we consider the results of regression analyses reliable. As shown in Tables 8 and 9, explicit shame was a more robust predictor of shame-related reactions than guilt. Interestingly, when entered simultaneously, explicit shame had a positive, and explicit guilt had a negative relationship with anger toward others. For guilt-related reactions, both explicit shame and guilt predicted all four dependent variables with larger coefficients for guilt than shame. The exploratory analyses provided limited evidence that the supposedly distinctive reactions of shame and guilt had stronger associations with explicit shame or guilt respectively but also reconfirmed that they cannot differentiate the two emotions very well.

### **Shame-related and Guilt-related Reactions**

We conducted a series of two-way ANOVAs to examine the effect of exposure and moral belief manipulation on shame-related and guilt-related reactions.

For *shame*-related reactions, we found support for the main effect of exposure and the main effect of moral belief on all measures, yet mixed results regarding the interaction between exposure and moral belief (see Table 10). For *guilt*-related reactions, the pattern was again very similar, with support for the main effect of exposure and the main effect of moral belief on all measures, yet mixed findings regarding the two-way interactions. We summarized the estimated marginal means and standard errors of each condition in Table 11. These results again were not in support of the target’s hypothesis of a distinction between shame and guilt dependent on exposure.

Notably, the effect of moral belief on anger toward others was in the opposite direction to the effect of moral belief on other emotional actions. Participants in the high moral belief conditions reported higher anger toward others compared with those who were in the low moral belief conditions.

### **Exploratory: Scenario interactions**

We conducted a series of three-way ANOVAs with scenario as the third factor, to examine the effect of exposure and moral belief manipulation on shame-related and guilt-related reactions.

For all the *shame*-related reactions except anger at others, we found support for the two-way interaction between exposure and scenario as well as the two-way interaction between moral belief and scenario. We did not find support for three-way interactions.

For *guilt*-related reactions, we found support for the two-way interaction between exposure and moral belief (for guilty conscience, not real self, undo wrong but not for hurt others), the two-way interaction between exposure and scenario (for guilty conscience, hurt others, and undo wrong), and the two-way interaction between moral belief and scenario (for guilty conscience, not real self, undo wrong but not for hurt others). Finally, we found support for a three-way interaction between scenario, exposure, and moral beliefs for undo wrong.

We then ran 3 (Exposure: private vs. implicit public vs. explicit public)  $\times$  2 (Moral belief: high vs. low) two-way ANOVAs for each shame and guilt reactions in each scenario ( $n = 11$  reactions  $\times$  3 scenarios). The overall pattern is similar to that of explicit shame and guilt: both moral belief and exposure manipulation had effects on the emotional reactions. Compared with low moral belief conditions, participants in high moral belief conditions tended to report higher emotion reactions except for anger at others. Compared with private and implicit exposure conditions, participants in the explicit conditions tended to report higher emotion reactions. For some of the shame-related reactions in the plagiarize and steal scenarios and some guilt reactions in the steal and disobey scenarios, there was support for a 3 (Exposure: private vs. implicit public vs. explicit public)  $\times$  2 (Moral belief: high vs. low) interaction, indicating that the effect of exposure being greater in the low moral belief conditions compared with the high moral belief conditions.

### **Comparing Replication to Original Findings**

We evaluated whether the replication successfully replicated the original findings based on the criteria by LeBel et al. (2019) by examining signal detection, effects overlap (whether original effect size overlaps with the replication’s confidence intervals), and effect directionality. We summarized those in Tables 12A and 12B. Note that because the target article did not report the statistical tests of some findings, we could not compute the effect sizes and confidence intervals for these. Therefore, for these effects, we assume that they were not supported and only made judg-

**Table 8. Regression Models for Shame-related Reactions**

	Body change		Desire hide		Embarrassed		Humiliated		Inferior Self		Anger Other		Anger Self	
	<i>Est</i>	<i>SE</i>	<i>Est</i>	<i>SE</i>	<i>Est</i>	<i>SE</i>	<i>Est</i>	<i>SE</i>	<i>Est</i>	<i>SE</i>	<i>Est</i>	<i>SE</i>	<i>Est</i>	<i>SE</i>
Intercept	3.65*** [3.55,3.75]	0.05	3.90*** [3.79,4.02]	0.06	4.42*** [4.30,4.53]	0.06	3.51*** [3.38,3.64]	0.07	3.66*** [3.55,3.76]	0.05	2.12*** [2.00,2.25]	0.06	3.14*** [3.04,3.23]	0.05
Explicit Shame	1.69*** [1.38,2.00]	0.16	1.77*** [1.42,2.12]	0.18	1.69*** [1.34,2.04]	0.18	2.13*** [1.75,2.51]	0.20	1.86*** [1.55,2.18]	1.59	0.91*** [0.53,1.29]	0.19	1.20*** [0.91,1.48]	0.15
Explicit Guilt	0.38* [0.07,0.69]	0.16	0.28 [-0.07,0.63]	0.18	0.88*** [0.54,1.23]	0.18	0.12 [-0.26,0.51]	0.20	-0.12 [-0.43,0.19]	1.59	-0.89*** [-1.27,-0.52]	0.19	0.39** [0.10,0.67]	0.15

Note. Shame and Guilt were standardized when being entered into the models. Values in square brackets indicate the 95% confidence interval for each regression coefficient. \*\*\* $p < .001$ . \*\* $p < .01$ . \* $p < .05$ .

ments regarding the presence/absence of signal and the direction of the effect without comparing the overlapping of confidence intervals.

For 10 out of the 20 effects that were supported in the original study, our replication detected a larger signal. Five effects were consistent with the original article and four effects were smaller compared with the original article. Only the interaction effect between moral belief and exposure on desire to escape/hide was not supported in the current replication but supported in the original. Moreover, 19 out of the 25 assumed not-supported effects in the original study received support from our replication effect. Crucially, the original study did not detect a main effect of exposure manipulation on explicit guilt. However, in the replication, we found a main effect of exposure and the interaction effect between exposure and moral belief on explicit guilt.

For the 3 (Exposure: private vs. implicit public vs. explicit public)  $\times$  2 (Moral belief: Low vs. High)  $\times$  2 (Emotion: shame vs. guilt) mixed ANOVA, we found that two supported findings in the original article did not receive support from our replication and one supported finding was present but smaller (see [Table 12B](#)). We did not detect the crucial exposure  $\times$  Emotion two-way interaction, as reported in the original article. Taken together, we conclude that the current study failed to replicate the core findings of Smith et al. (2002).

## Discussion

We attempted a close replication of Study 1 in Smith et al. (2002). Deviating from the findings in the target article, we found that both exposure and moral belief manipulation affected the perceived shame and guilt responses and the effects were similar for both guilt and shame. Moreover, explicit shame and explicit guilt had similar associations with shame-related and guilt-related emotional reactions.

Despite our best efforts to be consistent with the original article and to be rigorous in methodology, we found effects where none were expected (guilt) and very similar across the two emotions, which deviates from the core hypothesis of the target article claiming that the two emotions differ. It is therefore not the case that we did not find effects reported in the target, but rather a rather unique case in which we found unexpected associations which were not in line with the target's theory or findings. This held for both planned and exploratory analyses.

In the following, we discuss the results, our deviations, and implications.

### The distinction between shame and guilt

We found that the effects of exposure and moral beliefs manipulations had very similar impact on both guilt and shame. Across several other analyses we found no indication of differences between guilt and shame, suggesting that the distinction made between shame and guilt in the target article was not successfully replicated.

Moreover, our findings cast doubt on the distinction between shame-related and guilt-related emotional reactions,

as both shame-related and guilt-related reactions were as closely related to explicit shame as to explicit guilt. Our exploratory regression analyses showed that explicit shame predicted shame-related reactions more than guilt and vice versa, yet the two emotions were both uniquely related to the guilt-related reactions. In addition, the experimental manipulations had similar effects on shame-related and guilt-related reactions.

This did not seem to be an issue with the manipulations - Our analyses showed that the manipulations were successful. Both exposure and moral beliefs manipulations affected the exposure and moral beliefs manipulation checks. There was a stronger effect for exposure manipulation on the exposure check and a stronger effect for moral belief manipulation on the moral belief check.

Although deviating from the original article, our replication results are consistent with other research on the shame-guilt distinction. For example, Schmader and Lickel (2006) also showed that for self-caused wrongdoings, shame and guilt were highly correlated, thus difficult to distinguish from each other. However, in the case of other-caused wrongdoings, shame and guilt not only were moderately correlated with each other but also uniquely predicted avoidance and approach motivations respectively. We see the need to revisit findings in this literature and to try and aggregate findings to try and determine whether shame and guilt are indeed distinct, and if so in what way and under what circumstances.

### Comparison with the target article and theoretical implications

In the target article, Smith et al. (2002) reported that exposure had a stronger impact on shame than guilt and that guilt was only impacted by moral belief. We found that moral belief and exposure both impacted shame and guilt and the effects were highly similar between the two emotions. In addition, we found that exposure and moral belief interacted to predict the emotions.

The evaluation of replication suggests that the majority of the effects reported in the original study were also detected in the present study, with half of the effects being larger than the original. However, we found no indication for exposure having a different impact on eliciting shame than eliciting guilt.

Our replication findings seem to suggest that the public-private distinction (alone) is not enough to distinguish shame from guilt. As briefly summarized by Miceli and Castelfranchi (2018), shame and guilt share many similarities: 1) unpleasant; 2) implying a negative self-evaluation; 3) can be elicited by the same type of wrongdoings; 4) can be experienced either publicly or privately; 5) may trigger either self-defensive or reparative action tendencies; and 6) can be either adaptive or maladaptive. It is therefore not entirely surprising that we found public exposure had a similar impact on shame and guilt. However, this also means that there is much work to be done before being able to achieve a complete understanding of shame and guilt. To be able to reach such an understanding, we believe it is important to have a solid empirical foundation, which re-

**Table 12A. Comparing Replication to Original Findings: Two-way ANOVAs**

Dependent Variables	Independent Variables	Original				Replication			
		Effect( $\eta^2$ )	CIL	CIH		Effect( $\eta^2$ )	CIL	CIH	Categorization
Exposure Check	Exposure	0.11	0.03	0.21		0.32	0.28	0.36	Signal-inconsistent, larger
	Moral Beliefs	-	-	-		0.04	0.02	0.06	Signal-inconsistent, positive
	Exposure $\times$ Moral Beliefs	-	-	-		0.004	0.00	0.01	No Signal, consistent
Moral Belief Check	Exposure	-	-	-		0.04	0.02	0.06	Signal-inconsistent, positive
	Moral Beliefs	0.10	0.03	0.20		0.31	0.28	0.35	Signal-inconsistent, larger
	Exposure $\times$ Moral Beliefs	0.04	0	0.11		0.01	0.00	0.03	Signal-inconsistent, smaller
Explicit Shame	Exposure	0.14	0.05	0.24		0.13	0.09	0.16	Signal-consistent
	Moral Beliefs	0.07	0.01	0.16		0.30	0.26	0.34	Signal-inconsistent, larger
	Exposure $\times$ Moral Beliefs	0.04	0	0.11		0.02	0.01	0.04	Signal-consistent
Explicit Guilt	Exposure	-	-	-		0.12	0.09	0.16	Signal-inconsistent, positive
	Moral Beliefs	0.08	0.02	0.18		0.34	0.30	0.37	Signal-inconsistent, larger
	Exposure $\times$ Moral Beliefs	-	-	-		0.01	0.03	0.05	Signal-inconsistent
Bodily Change	Exposure	0.16	0.06	0.26		0.19	0.15	0.23	Signal-consistent
	Moral Beliefs	0.03	0	0.10		0.13	0.10	0.16	Signal-inconsistent, larger
	Exposure $\times$ Moral Beliefs	0.07	0.01	0.15		0.005	0.00	0.01	Signal-inconsistent, smaller
Desire to Escape	Exposure	0.16	0.06	0.26		0.17	0.13	0.20	Signal-consistent
	Moral Beliefs	-	-	-		0.10	0.07	0.13	Signal-inconsistent, positive
	Exposure $\times$ Moral Beliefs	0.04	0	0.12		0.005	0.00	0.01	No signal-inconsistent
Embarrassed	Exposure	0.06	0.003	0.14		0.25	0.21	0.29	Signal-inconsistent, larger
	Moral Beliefs	-	-	-		0.17	0.13	0.21	Signal-inconsistent, positive
	Exposure $\times$ Moral Beliefs	-	-	-		0.02	0.01	0.03	Signal-inconsistent
Humiliated	Exposure	0.06	0.003	0.14		0.24	0.20	0.27	Signal-inconsistent, larger
	Moral Beliefs	-	-	-		0.11	0.08	0.14	Signal-inconsistent, positive
	Exposure $\times$ Moral Beliefs	-	-	-		0.003	0.00	0.01	No signal- consistent
Inferior Self	Exposure	-	-	-		0.10	0.07	0.13	Signal-inconsistent, positive
	Moral Beliefs	-	-	-		0.12	0.09	0.15	Signal-inconsistent, positive
	Exposure $\times$ Moral Beliefs	-	-	-		0.003	0.00	0.01	No signal- consistent
Anger to Self	Exposure	0.08	0.01	0.17		0.10	0.07	0.13	Signal-consistent
	Moral Beliefs	0.07	0.01	0.16		0.13	0.10	0.16	Signal-inconsistent, larger



Anger to Other	Exposure × Moral Beliefs	0.05	0.002	0.13	0.01	0.00	0.03	Signal-inconsistent, smaller
	Exposure	-	-	-	0.01	0.00	0.03	Signal-inconsistent, positive
	Moral Beliefs	-	-	-	0.05	0.03	0.08	Signal-inconsistent, negative
Guilty Conscience	Exposure × Moral Beliefs	-	-	-	0.004	0.00	0.01	No signal-consistent
	Exposure	-	-	-	0.11	0.08	0.15	Signal-inconsistent, positive
	Moral Beliefs	0.05	0.005	0.13	0.32	0.28	0.36	Signal-inconsistent, larger
Real Self	Exposure × Moral Beliefs	-	-	-	0.02	0.01	0.04	Signal-inconsistent
	Exposure	-	-	-	0.03	0.01	0.05	Signal-inconsistent, positive
	Moral Beliefs	-	-	-	0.17	0.13	0.20	Signal-inconsistent, positive
Hurt Others	Exposure × Moral Beliefs	-	-	-	0.006	0.00	0.02	Signal-inconsistent
	Exposure	0.22	0.11	0.33	0.12	0.08	0.15	Signal-inconsistent, smaller
	Moral Beliefs	0.03	0	0.10	0.18	0.15	0.22	Signal-inconsistent, larger
Undo Wrong	Exposure × Moral Beliefs	-	-	-	<.001	0.00	0.00	No signal-consistent
	Exposure	-	-	-	0.23	0.19	0.27	Signal-inconsistent, positive
	Moral Beliefs	-	-	-	0.20	0.17	0.24	Signal-inconsistent, positive
	Exposure × Moral Beliefs	-	-	-	0.004	0.00	0.01	No signal-consistent

Note. The target article only reported supported findings. Therefore, for effects that were not reported in the target article, we lacked the information to calculate the effect sizes and their confidence intervals and assumed that they were not supported. To make a direct comparison, scenarios were not included as a factor following the original article.

**Table 12B. Comparing Replication to Original Findings: Three-way ANOVAs**

Dependent Variable	Independent Variables	Original	CIL	CIH	Replication	CIL	CIH	Categorization
		Effect( $\eta^2$ )			Effect( $\eta^2$ )			
Emotion intensity	Exposure	-	-	-	0.13	0.10	0.16	Signal-inconsistent, positive
	Moral Beliefs	-	-	-	0.33	0.29	0.37	Signal-inconsistent, positive
	Exposure × Moral Beliefs	-	-	-	0.03	0.01	0.05	Signal-inconsistent
	Emotion	0.15	0.06	0.26	0.03	0.02	0.06	Signal-inconsistent, smaller
	Exposure × Emotion	0.06	0.01	0.15	0.002	0.00	0.01	No signal-inconsistent
	Moral Beliefs × Emotion	-	-	-	0.008	0.00	0.02	Signal-inconsistent
	Exposure × Moral Beliefs × Emotion	0.02	0	0.09	0.001	0.00	0.01	No signal-inconsistent

Note. The target article only reported supported findings. Therefore, for effects that were not reported in the target article, we lacked the information to calculate the effect sizes and their confidence intervals and assumed that they were not supported.

**Table 9. Regression Models for Guilt-related Reactions**

	Guilty Conscience		Real Self		Hurt Others		Undo Wrong	
	Est	SE	Est	SE	Est	SE	Est	SE
Intercept	4.73*** [4.65, 4.81]	0.04	3.97*** [3.84, 4.10]	0.07	2.83*** [2.72, 2.94]	0.06	3.94*** [3.83, 4.04]	0.05
Explicit Shame	0.67*** [0.42, 0.92]	0.13	0.69*** [0.31, 1.08]	0.20	0.44** [0.11, 0.77]	0.17	0.83*** [0.50, 1.15]	0.16
Explicit Guilt	1.86*** [1.62, 2.11]	0.13	0.98*** [0.60, 1.37]	0.20	1.07*** [0.74, 1.40]	0.17	1.34*** [1.02, 1.66]	0.16

Note. Shame and Guilt were standardized when being entered into the models. Values in square brackets indicate the 95% confidence interval for each regression coefficient. \*\*\* $p < .001$ . \*\* $p < .01$ .

**Table 10. Effect sizes and confidence intervals for shame and guilt-related reactions**

	Exposure	Moral belief	Exposure * Moral belief
Body change	$F = 149.06, p < .001$ $\eta_p^2 = .19, 95\%CI [.15, .23]$	$F = 187.87, p < .001$ $\eta_p^2 = .13, 95\%CI [.10, .16]$	$F = 3.30, p = .037$ $\eta_p^2 = .005, 95\%CI [.00, .01]$
Desire to escape	$F = 126.03, p < .001$ $\eta_p^2 = .17, 95\%CI [.13, .20]$	$F = 144.29, p < .001$ $\eta_p^2 = .10, 95\%CI [.07, .13]$	$F = 2.97, p = .052$ $\eta_p^2 = .005, 95\%CI [.00, .01]$
Embarrassed	$F = 212.03, p < .001$ $\eta_p^2 = .25, 95\%CI [.21, .29]$	$F = 256.54, p < .001$ $\eta_p^2 = .17, 95\%CI [.13, .21]$	$F = 11.09, p < .001$ $\eta_p^2 = .02, 95\%CI [.01, .03]$
Humiliated	$F = 194.48, p < .001$ $\eta_p^2 = .24, 95\%CI [.20, .27]$	$F = 158.69, p < .001$ $\eta_p^2 = .11, 95\%CI [.08, .14]$	$F = 1.73, p = .178$ $\eta_p^2 = .003, 95\%CI [.00, .01]$
Inferior Self	$F = 68.78, p < .001$ $\eta_p^2 = .10, 95\%CI [.07, .13]$	$F = 166.37, p < .001$ $\eta_p^2 = .12, 95\%CI [.09, .15]$	$F = 2.09, p = .124$ $\eta_p^2 = .003, 95\%CI [.00, .01]$
Anger at other	$F = 7.53, p < .001$ $\eta_p^2 = .01, 95\%CI [.00, .03]$	$F = 68.95, p < .001$ $\eta_p^2 = .05, 95\%CI [.03, .08]$	$F = 2.47, p = .085$ $\eta_p^2 = .004, 95\%CI [.00, .01]$
Anger at self	$F = 68.58, p < .001$ $\eta_p^2 = .10, 95\%CI [.07, .13]$	$F = 188.19, p < .001$ $\eta_p^2 = .13, 95\%CI [.10, .16]$	$F = 9.39, p < .001$ $\eta_p^2 = .01, 95\%CI [.00, .03]$
Guilty Conscience	$F = 81.58, p < .001$ $\eta_p^2 = .11, 95\%CI [.08, .15]$	$F = 601.99, p < .001$ $\eta_p^2 = .32, 95\%CI [.28, .36]$	$F = 12.25, p < .001$ $\eta_p^2 = .02, 95\%CI [.01, .04]$
Not real self	$F = 19.91, p < .001$ $\eta_p^2 = .03, 95\%CI [.01, .05]$	$F = 250.37, p < .001$ $\eta_p^2 = .17, 95\%CI [.13, .20]$	$F = 3.89, p = .021$ $\eta_p^2 = .006, 95\%CI [.00, .02]$
Hurt others	$F = 82.78, p < .001$ $\eta_p^2 = .12, 95\%CI [.08, .15]$	$F = 284.75, p < .001$ $\eta_p^2 = .18, 95\%CI [.15, .22]$	$F = 0.01, p = .990$ $\eta_p^2 < .001, 95\%CI [.00, .00]$
Undo Wrong	$F = 190.64, p < .001$ $\eta_p^2 = .23, 95\%CI [.19, .27]$	$F = 323.11, p < .001$ $\eta_p^2 = .20, 95\%CI [.17, .24]$	$F = 2.74, p = .065$ $\eta_p^2 = .004, 95\%CI [.00, .01]$

quires more replication studies of findings in this literature and the field.

### Limitations and future directions

We note several limitations that may have influenced the results and might be improved in future investigations.

First, our comprehension checks were a deviation from the original study, which may have increased participants' attentiveness to the exposure and moral belief information. This was intentional, as we wanted to ensure manipulations worked as intended, yet we could not rule out the possibility that these may have led to their impact being stronger

than in the original in a way that elicited similar impact on shame and guilt.

Second, thanks to feedback from our participants, we realized several oversights in our materials. Our comprehension check to test exposure was not ideal for certain scenarios. In total, 40 participants (3.14%) indicated that they felt that the check was either wrong/inaccurate or vague. Among these 40 cases, 17 were from the plagiarize scenario explicit public condition. In hindsight, we realized that the question was not well suited for this condition as the question asked whether the main character saw anyone nearby after copying the classmate's report and the correct answer was set to be yes, however, the story only tells that she/he received a note from another person that the other person

**Table 11. Estimated Marginal Means for Shame-related Reactions**

	Private		Public Implicit		Public Explicit	
	High moral	Low moral	High moral	Low moral	High moral	Low moral
Body change	3.60 (0.16)	1.37 (0.16)	4.21 (0.16)	2.35 (0.16)	5.93 (0.17)	4.54 (0.16)
Desire to escape	3.75 (0.18)	1.63 (0.17)	4.52 (0.17)	2.73 (0.18)	6.08 (0.18)	4.81 (0.18)
Embarrassed	4.52 (0.18)	1.45 (0.18)	5.09 (0.18)	2.43 (0.18)	7.27 (0.19)	5.86 (0.18)
Humiliated	3.34 (0.19)	1.08 (0.18)	3.71 (0.18)	1.80 (0.19)	6.42 (0.19)	4.85 (0.19)
Inferior self	3.96 (0.16)	1.94 (0.16)	4.16 (0.16)	2.52 (0.16)	5.41 (0.16)	4.04 (0.16)
Anger at other	1.51 (0.15)	2.24 (0.15)	1.54 (0.15)	2.54 (0.15)	1.75 (0.16)	3.16 (0.15)
Anger at self	3.52 (0.14)	1.48 (0.14)	3.77 (0.14)	1.92 (0.14)	4.53 (0.14)	3.64 (0.14)
Guilty Conscience	5.79 (0.16)	1.97 (0.16)	6.18 (0.16)	2.81 (0.16)	7.00 (0.16)	4.71 (0.16)
Not real self	4.92 (0.18)	2.09 (0.18)	4.92 (0.18)	2.77 (0.18)	5.53 (0.18)	3.66 (0.18)
Hurt others	3.04 (0.15)	0.99 (0.15)	3.64 (0.15)	3.63 (0.15)	4.90 (0.16)	2.87 (0.15)
Undo wrong	4.06 (0.16)	1.41 (0.16)	4.64 (0.16)	2.19 (0.16)	6.68 (0.16)	4.75 (0.16)

Note. The numbers indicate estimated marginal means, with the numbers in the parentheses indicating standard errors.

saw her. However, we believe this flaw did not invalidate the study as the analyses done for different scenarios revealed similar patterns, and it was not the issue that we did not find effects but rather that we found effects even when effects were not expected to be found. Other minor errors in the survey also included one piped text error where the person's name was missing in one of the sentences and one error concerning pronouns. Our pretests did not reveal these issues, yet it highlights the importance of eliciting feedback from participants for the real sample in the funneling section, to help improve future studies.

Another obvious deviation was that in the current study we collected data online in a private setting whereas the original study collected data offline in groups. The difference in settings may have impacted the emotional intensity in some way. The mean shame ratings for the private, implicit public, and explicit public conditions were 3.89, 4.51, 6.11 in our study and 5.71, 6.96, 8.11 in Smith et al. (2002). For explicit guilt, the mean guilt ratings in the low and high moral belief conditions were 3.31 and 6.76 in our study yet 7.14 and 8.26 in the original study (Smith et al., 2002). This may explain smaller effects in the target article than in our sample, though we are not certain how that may explain bigger differences between shame in guilt in their study.

We note a shared limitation of both the original study and our replication was the manipulation of the exposure. The manipulation of exposure did not simply increase perceived exposure in the implicit and the explicit conditions compared to the private condition. More precisely, the manipulation increased the perceived exposure of misdeeds to colleagues or family, with whom the characters have a personal relationship. Baumeister et al. (1994) suggested that guilt serves various relationship-enhancing functions by increasing affiliative motivations and the exposure manipulation could also have an impact on guilt by making the objects of affiliation (i.e., colleagues or family members) more salient. That is, the exposure manipulation could increase levels of both shame and guilt in the implicit public and explicit public conditions compared with the private condition via different mechanisms, which is consistent

with what we observed in the current data. Future studies thus should design and validate manipulation procedures that separate exposure from exposure to affiliative targets.

Finally, as shown by the current study, the supposed shame or guilt-related actions were not uniquely related to these two emotions. The validation of these measures deserves a full-on investigation on its own and there have already been other follow-up studies that tackle this direction (e.g., the development of the GASP scale by Cohen et al., 2011). We consider the current dataset having the potential to offer more insights into this research direction and encourage anyone who would like to follow up to utilize the dataset.

## Conclusion

In this close replication of Smith et al. (2002) with a larger more diverse sample, we found that exposure and moral belief manipulations impacted both shame and guilt similarly. More specifically, we failed to find support that exposure had a greater effect on shame than guilt. We, therefore, conclude this as a failed replication, not in support of the distinction made between shame and guilt in the target article (i.e., exposure). In addition to the key confirmatory analyses above, we also found that the supposed shame or guilt-related measures were not uniquely associated with shame or guilt, respectively. We note several limitations that may have impacted our replication, yet not in a way that would explain these differences. Finally, we raised issues regarding the exposure manipulation employed in the target article. We suggest caution in future studies assuming that the distinction between guilt and shame lies in exposure and using the exposure manipulation.

## Competing Interests

The authors declared no potential conflicts of interest with respect to the authorship and/or publication of this article.

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## Authorship Declaration

Fung Chit Cheung, Hei Tung Wong, Lok Yee Yuen, and Hui Ching Sin designed the study, developed the experimental materials for each study respectively, and wrote an initial draft of the Registered Report Stage 1. Yikang Zhang revised the designs and experimental materials, wrote the analysis scripts, conducted the data analyses, and drafted the manuscript for submission. Hiu Tung Kristy Chow provided feedback and guidance in the initial stages. Gilad Feldman guided the replication efforts, supervised each step in the project, ran data collection and conducted the pre-registration, and edited the manuscript for submission.

## Important Links and Information

Citation of the target research article:

Smith, R. H., Webster, J. M., Parrott, W. G., & Eyre, H. L. (2002). The role of public exposure in moral and nonmoral shame and guilt. *Journal of Personality and Social Psychology*, 83(1), 138-159. doi:10.1037/0022-3514.83.1.138

## Data Accessibility Statement

We provided all materials, data, and code on: <https://osf.io/j3ue4/>.

## Contributor Roles Taxonomy

In the table below, we employed CRediT ([Contributor Roles Taxonomy](#)) to identify the contribution and roles played by the contributors in the current replication effort.

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	Yikang Zhang	Fung Chit Cheung, Hei Tung Wong, Lok Yee Yuen, Hui Ching Sin	Hiu Tung Kristy Chow	Gilad Feldman
Conceptualization		X		X
Data curation	X	X		
Formal analysis	X			
Funding acquisition				X
Investigation	X	X		X
Methodology	X	X		
Project administration				X
Resources	X	X		X
Software	X	X		
Supervision			X	X
Validation	X			
Visualization	X	X		
Writing-original draft	X	X		
Writing-review and editing	X			X



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## Supplementary Materials

### Peer Review History

Download: [https://collabra.scholasticahq.com/article/77610-revisiting-the-role-of-public-exposure-and-moral-beliefs-on-feelings-of-shame-and-guilt-replication-registered-report-of-smith-et-al-2002-s-study/attachment/162564.docx?auth\\_token=OmnuamPzEH0QVHHtUflw](https://collabra.scholasticahq.com/article/77610-revisiting-the-role-of-public-exposure-and-moral-beliefs-on-feelings-of-shame-and-guilt-replication-registered-report-of-smith-et-al-2002-s-study/attachment/162564.docx?auth_token=OmnuamPzEH0QVHHtUflw)

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### Supplemental Material

Download: [https://collabra.scholasticahq.com/article/77610-revisiting-the-role-of-public-exposure-and-moral-beliefs-on-feelings-of-shame-and-guilt-replication-registered-report-of-smith-et-al-2002-s-study/attachment/162565.docx?auth\\_token=OmnuamPzEH0QVHHtUflw](https://collabra.scholasticahq.com/article/77610-revisiting-the-role-of-public-exposure-and-moral-beliefs-on-feelings-of-shame-and-guilt-replication-registered-report-of-smith-et-al-2002-s-study/attachment/162565.docx?auth_token=OmnuamPzEH0QVHHtUflw)

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# Revisiting the Role of Public Exposure and Moral Beliefs on Feelings of Shame and Guilt: Replication Registered Report of Smith et al. (2002)'s Study 1

## **Supplementary**

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## Open Science disclosures

### Data and code

Data and code are accessible at Open Science Framework (OSF): <https://osf.io/j3ue4/>

### Pre-registrations and Qualtrics study designs

This study is a registered report and has no additional pre-registration.

Qualtrics files can be access on the OSF.

### Procedure and data disclosures

#### Data collection

Data collection was completed before analyzing the data.

#### Conditions reporting

All collected conditions are reported.

#### Data exclusions

Details are reported in this document

#### Variables reporting

All variables collected for this study are reported and included in the provided data.

#### Data handling

All data handling will not change.



## Analysis of the original article

### Original article methods

#### Type of study

Experiment.

#### Experimental design

A 3 (public exposure: private, implicit public, explicit public)  $\times$  2 (moral beliefs: high vs. low)  $\times$  3 (Scenario: cheating vs. stealing vs. disobeying parents)  $\times$  2 (Gender: male vs. female) between-subject design.

The original article did not specify whether participants were randomly assigned to various conditions. Instead, we were simply told that the experiment was conducted in sessions. This is done so by having the 168 participants (87 female; 81 male) separated into groups of 30 (Smith et al., 2002, pg.4, *Method: Participants and Design; Procedure*).

Participants were randomly assigned to read one of three hypothetical accounts (*i*) *cheating*; *ii*) *disobeying parents*; and *iii*) *stealing*) under one of six conditions. The six conditions are outlined below in Table 1:

Table 1

*Six conditions used within the Replication experiment of Smith et al., Study 1 (2002)*

	Private	Implicit public	Explicit public
Low moral beliefs	Low Moral Beliefs & Private	Low Moral Beliefs & Implicit public	Low Moral Beliefs & Explicit Public
High moral beliefs	High Moral Beliefs & Private	High Moral Beliefs & Implicit public	High moral beliefs & Explicit public

#### Independent variables (IV)

IVs include moral beliefs (*high vs. low*), and the level of publicity (*private, implicit public, and explicit public*) and Gender (*male vs. female*). The factor Scenario was dropped in all the analyses because it had no systematic effect on any of the dependent variables. In order to measure the relationship and possible effects the two conditions pose on shame and guilt, three hypothetical accounts (*stealing, disobeying parents, and cheating on a lab report*) were introduced by the original authors, and the details of each accounts were altered based on the IVs.

In the original articles, the names of the hypothetical individuals from the scenarios were highlighted in bold. The accounts are outlined in Table 2 below (as provided in Smith et al., 2002, pg. 4-5, *Accounts, Moral beliefs manipulation, Publicity manipulation*):

Table 2

Scenarios provided by Smith et al. (2002) for Study 1

	Private	Implicit public	Explicit public
<b>Low moral beliefs</b>	<p>1) Stealing (M/F_1st_L.M_PRI) Jim [Jody] has a summer job as an assistant manager at a movie theater. One of the main aspects of the job is to do the candy inventory every week to monitor possible theft by the high school kids who work concession. One day, he is doing the inventory by himself, feels particularly hungry, and slips some M&amp;Ms into his jacket pocket. <u>Jim [Jody] sees himself as a fairly honest person, but he does not see anything wrong with taking a little candy now and then.</u> He figures that everybody does it, and given his low pay and all the effort he contributes to his job, he feels that he has earned some candy if he wishes to take some.</p> <p>2) Disobeying parents* (M/F_2nd_L.M_PRI) Not reported in original article</p> <p>3) Cheating on a lab report (M/F_3rd_L.M_PRI) Julia [Jason] is a premed major and is taking a difficult organic chemistry course. She has an average grade point average and is worried about her chances of getting into medical school. Her organic chemistry course is not going well, especially the lab portion. She is worried about the most recent lab and is not close to figuring how to do the next lab report. <u>She resents that many of the students have an unfair advantage over her and thinks that, given the high stakes, it would not harm anyone for her to copy the report.</u> Ultimately, she takes her lab partner's report from her teaching assistant's mailbox and makes a copy of it.</p>	<p>1) Stealing (M/F_1st_L.M_IP) Jim [Jody] has a summer job as an assistant manager at a movie theater. One of the main aspects of the job is to do the candy inventory every week to monitor possible theft by the high school kids who work concession. One day, he is doing the inventory by himself, feels particularly hungry, and slips some M&amp;Ms into his jacket pocket. <u>Jim [Jody] sees himself as a fairly honest person, but he does not see anything wrong with taking a little candy now and then.</u> He figures that everybody does it, and given his low pay and all the effort he contributes to his job, he feels that he has earned some candy if he wishes to take some. <b>After Jim [Jody] has hidden the M&amp;Ms and is sure that nobody has seen him take the candy, he sees his boss from a distance.</b></p> <p>2) Disobeying parents* (M/F_2nd_L.M_IP) Not reported in original article</p> <p>3) Cheating on a lab report (M/F_3rd_L.M_IP) Julia [Jason] is a premed major and is taking a difficult organic chemistry course. She has an average grade point average and is worried about her chances of getting into medical school. Her organic chemistry course is not going well, especially the lab portion. She is worried about the most recent lab and is not close to figuring how to do the next lab report. <u>She resents that many of the students have an unfair advantage over her and thinks that, given the high stakes, it would not harm anyone for her to copy the report.</u> Ultimately, she takes her lab partner's report from her teaching assistant's mailbox and makes a copy of it. <b>A short time after taking the report, Julia [Jason] comes across her lab partner, who greets her cheerfully.</b></p>	<p>1) Stealing (M/F_1st_L.M_EP) Jim [Jody] has a summer job as an assistant manager at a movie theater. One of the main aspects of the job is to do the candy inventory every week to monitor possible theft by the high school kids who work concession. One day, he is doing the inventory by himself, feels particularly hungry, and slips some M&amp;Ms into his jacket pocket. <u>Jim [Jody] sees himself as a fairly honest person, but he does not see anything wrong with taking a little candy now and then.</u> He figures that everybody does it, and given his low pay and all the effort he contributes to his job, he feels that he has earned some candy if he wishes to take some. <b>Jim [Jody] realizes that his boss had been watching him as he took the candy.</b></p> <p>2) Disobeying parents* (M/F_2nd_L.M_EP) Not reported in original article</p> <p>3) Cheating on a lab report (M/F_3rd_L.M_EP) Julia [Jason] is a premed major and is taking a difficult organic chemistry course. She has an average grade point average and is worried about her chances of getting into medical school. Her organic chemistry course is not going well, especially the lab portion. She is worried about the most recent lab and is not close to figuring how to do the next lab report. <u>She resents that many of the students have an unfair advantage over her and thinks that, given the high stakes, it would not harm anyone for her to copy the report.</u> Ultimately, she takes her lab partner's report from her teaching assistant's mailbox and makes a copy of it. <b>Julia [Jason] gets a note from her lab partner indicating that she saw Julia take the report. She tells Julia [Jason] that she won't tell the teaching assistant what happened as long as Julia [Jason] puts the report back in the box.</b></p>
<b>High moral beliefs</b>	<p>1) Stealing (M/F_1st_H.M_PRI) Jim [Jody] has a summer job as an assistant manager at a movie theater. One of the main aspects of the job is to do the candy inventory every week to monitor possible theft by the high school kids who work concession. One day, he is doing the inventory by himself, feels particularly hungry, and slips some M&amp;Ms into his jacket pocket. <u>Jim [Jody] sees himself as a very honest person and believes that stealing is wrong but succumbs to the temptation to take some candy without paying for it.</u></p> <p>2) Disobeying parents* (M/F_2nd_H.M_PRI) Not reported in original article</p> <p>3) Cheating on a lab report (M/F_3rd_H.M_PRI) Julia [Jason] is a premed major and is taking a difficult organic chemistry course. She has an average grade point average and is worried about her chances of getting into medical school. Her organic chemistry course is not going well, especially the lab portion. She is worried about the most recent lab and is not close to figuring how to do the next lab report. <u>Julia [Jason] knows it would be very wrong to take the lab report, but, because of her desperation, she takes it.</u></p>	<p>1) Stealing (M/F_1st_H.M_IP) Jim [Jody] has a summer job as an assistant manager at a movie theater. One of the main aspects of the job is to do the candy inventory every week to monitor possible theft by the high school kids who work concession. One day, he is doing the inventory by himself, feels particularly hungry, and slips some M&amp;Ms into his jacket pocket. <u>Jim [Jody] sees himself as a very honest person and believes that stealing is wrong but succumbs to the temptation to take some candy without paying for it.</u> <b>After Jim [Jody] has hidden the M&amp;Ms and is sure that nobody has seen him take the candy, he sees his boss from a distance.</b></p> <p>2) Disobeying parents* (M/F_2nd_H.M_IP) Not reported in original article</p> <p>3) Cheating on a lab report (M/F_3rd_H.M_IP) Julia [Jason] is a premed major and is taking a difficult organic chemistry course. She has an average grade point average and is worried about her chances of getting into medical school. Her organic chemistry course is not going well, especially the lab portion. She is worried about the most recent lab and is not close to figuring how to do the next lab report. <u>Julia [Jason] knows it would be very wrong to take the lab report, but, because of her desperation, she takes it.</u> <b>A short time after taking the report, Julia [Jason] comes across her lab partner, who greets her cheerfully.</b></p>	<p>1) Stealing (M/F_1st_H.M_EP) Jim [Jody] has a summer job as an assistant manager at a movie theater. One of the main aspects of the job is to do the candy inventory every week to monitor possible theft by the high school kids who work concession. One day, he is doing the inventory by himself, feels particularly hungry, and slips some M&amp;Ms into his jacket pocket. <u>Jim [Jody] sees himself as a very honest person and believes that stealing is wrong but succumbs to the temptation to take some candy without paying for it.</u> <b>Jim [Jody] realizes that his boss had been watching him as he took the candy.</b></p> <p>2) Disobeying parents* (M/F_2nd_H.M_EP) Not reported in original article</p> <p>3) Cheating on a lab report (M/F_3rd_H.M_EP) Julia [Jason] is a premed major and is taking a difficult organic chemistry course. She has an average grade point average and is worried about her chances of getting into medical school. Her organic chemistry course is not going well, especially the lab portion. She is worried about the most recent lab and is not close to figuring how to do the next lab report. <u>Julia [Jason] knows it would be very wrong to take the lab report, but, because of her desperation, she takes it.</u> <b>Julia [Jason] gets a note from her lab partner indicating that she saw Julia take the report. She tells Julia [Jason] that she won't tell the teaching assistant what happened as long as Julia [Jason] puts the report back in the box.</b></p>

Note. Parts, which differ between the publicity conditions, have been **bolded**. Parts that differ between the moral beliefs conditions have been underlined and italicized. In light of the situation, we had created our own version of the account, which is outlined in supplementary - [Materials and scales used in the replication experiment - Procedures]

### Manipulation checks

Manipulation checks were conducted through separate three-way ANOVAs using a 3 (*public exposure: private, implicit public, explicit public*) X 2 (*moral beliefs: high vs. low*) X 2 (*gender: male, female*) on each of the two items serving as manipulation checks. These two items were: “*judged by others*”, and “*violated a personal value*”. The former served as a check on the publicity manipulation, while the latter served as a check on the moral beliefs manipulation.

The original authors outlined the two manipulation items, as well as the results of their manipulation checks on pg. 5 (*Dependent Measures, Manipulation checks; and Results, Manipulation Checks*).

It was reported that main effects were observed for all the aforementioned manipulations:

- Public exposure:  $F(2, 156) = 9.64, p < .0001$ 
  - Participants in the *explicit public* condition ( $M = 6.45, SD = 2.24$ ) saw more concern over evaluations from others than those in implicit ( $M = 4.58, SD = 2.43$ ), and private conditions ( $M = 4.58, SD = 2.43$ )
- Moral beliefs:  $F(1, 156) = 16.79, p < .0001$ 
  - Participants in the *high* moral beliefs conditions ( $M = 6.68, SD = 2.36$ ) felt with greater sense that their personal values had been violated, when compared with their counterparts in the low moral beliefs conditions ( $M = 5.10, SD = 2.62$ )
- Gender:  $F(2, 156) = 8.14, p < .005$ 
  - Female participants ( $M = 7.99, SD = 1.74$ ) reported having a higher sense that a wrong action had been done, compared with their male counterparts ( $M = 7.33, SD = 2.22$ )
- Public Exposure X Moral Beliefs interaction:  $F(2, 156) = 2.97, p < .053$ 
  - Regarded by Smith and colleagues (2002) as marginally significant.

### Dependent variables

Study 1 includes two *main* dependent measures: “shame”, and “guilt”, both acting as explicit measurements of shame and guilt respectively. The DVs also include Shame- and Guilt-related reactions (Smith et al., 2002, pg. 5, *Method, Dependent Measures, Shame-Related Reactions, Guilt-Related Reactions*).

In addition to the explicit measurement of “shame”, for Shame-related reactions, the following items were provided and categorized into three main categories:

Reactions associated with public exposure:

- I. Bodily changes (*average of the following 6 items*) - racing heart, sweaty and perspiring, shaken, loss of composure, a trembling and shaking feeling, flustered
- II. Desire to escape from others (*average of the following 4 items*) - a desire to disappear, a desire to escape, a desire to be alone, a desire to escape public exposure
- III. Embarrassed
- IV. Humiliated

Reactions associated with the self

- I. Self-related thoughts and feelings of defectiveness and inferiority (*average of the following 6 items*) - learned something unflattering about him/herself, defective, others seemed superior, self-respect decreased, feeling worthless, inferior to others

Anger

- I. Directed at others (*average of the following 6 items*) - a desire to lash out in anger, resentful, angry at others, vengeful, blaming others, helpless anger
- II. Directed at the self (*average of the following 3 items*) - anger at him/herself, feel to blame for what happened, disgusted with him/herself

In addition to the explicit measurement of “guilt”, for Guilt-related reactions, the following items were provided below:

- I. Private reactions (*average of the following 3 items*) - Inwardly troubled, guilty conscience, a troubled conscience
- II. The wrongdoing does not represent the real self (*represented by the following item*) - the action did not reflect the ‘real self’
- III. Concerns over others being affected by the wrongdoing (*average of the following 2 items*) - concerned over how others were affected, thought others were hurt
- IV. Concerns over undoing the wrongful action (*average of the following 5 items*) - a desire to undo what was done, wanting to set things right, a desire to make amends, would try to make things better, a desire to apologize

While the original authors did not mention the specific wordings of the question, it is understood that participants were asked to indicate “the degree to which they thought the item was characteristic of the individual’s experience (using a 10-point scale: 0 = *not at all characteristic*; 9 = *extremely characteristic*) (see pg.5, *Dependent Measures*).

It is noted that the original authors did not indicate whether they used any pre-established scales in measuring the participants’ level of guilt and shame. Rather, the aforementioned items and 10-point scale appeared to be developed by Smith and colleagues (2002) for the sole purpose of the study itself. Nonetheless, the reliability (Cronbach’s alpha) of said items were reported. (see pg.5, *Shame-Related Reactions* and *Guilt-Related Reactions*). Their values are reported as follows in Table 3:

Table 3

*Reliability of Smith and colleagues’ scales used in Study 1 (2002)*

Shame-related reactions	Guilt-related reactions
Reactions linked to public exposure -	Private reactions: $\alpha = .81$
I. Bodily changes: $\alpha = .89$	
II. Desire to escape from others: $\alpha = .83$	<u>Not real self</u> was measured with a
Embarrassed and Humiliated were measured with a single item.	single item.
Reactions linked to the self	Concerns over others being affected by the wrongdoing: $\alpha = .76$
I. Self-related thoughts and feelings of defectiveness and inferiority: $\alpha = .83$	Concerns over undoing the wrongful action: $\alpha = .85$
Anger	
I. Directed at others: $\alpha = .83$	
II. Directed at the self: $\alpha = .78$	

## Original article results

### Sample size before and after exclusions

There was no mentioning of data exclusion nor of any exclusion criteria in Study 1 of Smith et al. (2002).

In *Method, Participants and Design* (pg.4) of Study 1 of Smith et al. (2002), it was reported that 87 female and 81 male undergraduates participated in the study for credits.

### Included sample description (if reported)

- Age (mean, standard deviation) – not reported
- Gender composition -- male: 81, female: 87
- Location -- University of Kentucky, Lexington, Kentucky, US
- Sample type -- undergraduate students, in person experiment conducted in groups.

### Experimental design [2+ conditions experiments]

Report:

1. Descriptive statistics for each condition: gender composition and age statistics were not reported for each condition.
2. The statistical test result:
  - a. Three IVs: Three-way ANOVA (F statistic)
    - i. Tukey HSD was used for post-hoc analysis and confirming significance.
3. Effect-size and confidence intervals were not provided, we used MOTE package in R to manually enter and calculate all significant tests related to the two independent variables.

## Materials and scales used in the replication experiment

### Procedure

Participants will first read the information letter carefully, which includes the purpose, procedures, risks and benefits, compensation, confidentiality, and voluntary participation. Then they will provide informed consent if they wish to participate in the study.

Then, they will read study outline introducing the length the study as well as instructions for imagining the scenarios and answer several questions to ensure that they are eligible and willing to participate in the research. Next, participants will answer one demographic question asking their gender identity. Different from Smith et al. (2002), we provide the options *other* and *rather not disclose* in addition to the options *male* and *female*. Participants will be kindly informed that because of the nature of the replication study, only participants who identify as male or female should proceed with the study and those who choose *other* or *rather not disclose* should return the HIT.

Based on their gender (male or female), participants were randomly assigned to one of the six conditions matching their gender. Each condition includes three hypothetical accounts of transgression: (1) cheating on a lab report, 2) stealing, and 3) disobeying parents and participants will only complete one random account out of the three.

Then they will be provided with the randomly assigned scenario. Following Smith et al., (2002), moral belief manipulation is achieved by including information about the hypothetical individuals' self-view of their characters before the wrongful act. For example, in the cheating scenario, high moral belief will be manipulated by presenting that Julia [Jason] knows it would be very wrong to take the lab report, but, because of her desperation, she takes it. In the low moral belief condition, it will be presented that she resents that many of the students have an unfair advantage over her and thinks that, given the high stakes, it would not harm anyone for her to copy the report. For public exposure manipulation, after reading about the transgression, participants will read either that the individual in the account either came across or was reminded of someone who would not approve of his or her action (the implicit condition) or that the individual's transgression is actually discovered by someone who would not approve of his or her action (the explicit condition). In the private condition, no such information will be provided. Detailed description of each of the three hypothetical accounts have been provided in supplementary - *Analysis of the original article - Original article methods - Experimental design*. As mentioned, the original authors had the names of the hypothetical individuals highlighted in bold letters. With this in mind, our current replication has the names of the individuals bolded (e.g., **Jason**). Additionally, as the original authors failed to provide a detailed account of account 2 (disobeying parents), we therefore decided to develop an original account which is outlined below in Table 5.

Different from Smith et al. (2002), after reading the scenario, participants in all conditions will first answer two comprehension questions (e.g., "Did Julia consider it wrong to take the report?" and "Did Juila see anyone nearby right after taking the report?"). Only after that they have chosen the correct answer for both comprehension questions, participants will be reminded of the scenario and presented with a set of items depicting feelings or thoughts and indicate the degree to which they think the item was characteristic of the individual's experience over the transgression act (0 = *not at all characteristic* to 9 = *extremely characteristic*).

The main dependent measures are two manipulation checks for moral belief ("violated a personal value") and public exposure ("judged by others") respectively as well as three explicit measures of emotions of focus ("shame" and "guilt"). Following Smith et al. (2002), we will also include the measures for shame-related reactions and guilt related measures (see section *Analysis of the original*



*article-Dependent variables* for the categorization and specific items). The order of scales as well the order of items within each scale will be randomized.

Upon completion, participants will answer a number of funneling questions about the purpose of the study as well as whether they have participated in similar studies before. Then they will answer a set of demographic questions about their age, country of origin, country of residence, social class, and English proficiency regarding the experimental materials. Finally, participants will be debriefed about the detailed purpose of the study and compensated for their participation.

The funneling questions can be seen in the *Instructions and experimental material* below.

Table 5

*Our reconstruction of the disobeying parents scenario*

	Private	Implicit Public	Explicit Public
Low Moral Belief	<p>2) (M/F_2nd_L.M_PRI)</p> <p>Jill [Jake] is a teenager living with her parents. The parents tell her to help look after the neighbor's dog for a while. As she is talking to her parents, her best friends call her to go out and play volleyball. <u>Jill [Jake] knows that her parents only let her handle the dog because they trust her, but she thinks that they are worrying too much and the dog can handle itself for a while.</u> As she really enjoys playing volleyball with her friends, she goes out anyways, but leaves some food for the dog and hopes for the best.</p>	<p>2) (M/F_2nd_L.M_IP)</p> <p>Jill [Jake] is a teenager living with her parents. The parents tell her to help look after the neighbor's dog for a while. As she is talking to her parents, her best friends call her to go out and play volleyball. <u>Jill [Jake] knows that her parents only let her handle the dog because they trust her, but she thinks that they are worrying too much and the dog can handle itself for a while.</u> As she really enjoys playing volleyball with her friends, she goes out anyways, but leaves some food for the dog and hopes for the best. <b>Afterwards, she sees her parents starting their car from afar, as she leaves the house.</b></p>	<p>2) (M/F_2nd_L.M_EP)</p> <p>Jill [Jake] is a teenager living with her parents. The parents tell her to help look after the neighbor's dog for a while. As she is talking to her parents, her best friends call her to go out and play volleyball. <u>Jill [Jake] knows that her parents only let her handle the dog because they trust her, but she thinks that they are worrying too much and the dog can handle itself for a while.</u> As she really enjoys playing volleyball with her friends, she goes out anyways, but leaves some food for the dog and hopes for the best. <b>Afterwards, she bumps into her parents at the front gate as they have not left yet.</b></p>
High Moral Belief	<p>2) (M/F_2nd_H.M_PRI)</p> <p>Jill [Jake] is a teenager living with her parents. The parents tell her to help look after the neighbor's dog for a while. As she is talking to her parents, her best friends call her to go out and play volleyball. <u>Jill [Jake] knows that her parents only let her handle the dog because they trust her, and she does not want to break their trust.</u> However, as she really enjoys playing volleyball with her friends, she goes out anyways, but leaves some food for the dog and hopes for the best.</p>	<p>2) (M/F_2nd_H.M_IP)</p> <p>Jill [Jake] is a teenager living with her parents. The parents tell her to help look after the neighbor's dog for a while. As she is talking to her parents, her best friends call her to go out and play volleyball. <u>Jill [Jake] knows that her parents only let her handle the dog because they trust her, and she does not want to break their trust.</u> However, as she really enjoys playing volleyball with her friends, she goes out anyways, but leaves some food for the dog and hopes for the best. <b>Afterwards, she sees her parents starting their car from afar, as she leaves the house.</b></p>	<p>2) (M/F_2nd_H.M_EP)</p> <p>Jill [Jake] is a teenager living with her parents. The parents tell her to help look after the neighbor's dog for a while. As she is talking to her parents, her best friends call her to go out and play volleyball. <u>Jill [Jake] knows that her parents only let her handle the dog because they trust her, and she does not want to break their trust.</u> However, as she really enjoys playing volleyball with her friends, she goes out anyways, but leaves some food for the dog and hopes for the best. <b>Afterwards, she bumps into her parents at the front gate, as they have not left yet.</b></p>

*Note.* Parts that differ between the publicity conditions have been **bolded**. Parts that differ between the moral beliefs conditions have been underlined and italicized.

## Table of design

Table 6

*Table of design of the replication experiment on Smith et al. (2002) Study 1*

Study type	Participants are randomly assigned to conditions.
Blinding	Participants do not know the treatment group to which they have been assigned. Participants interact with the survey directly with no personnel.
Study design	<p>Our study design is a <math>3 \times 2 \times 3</math> between-subjects design with 3 factors: public exposure (<i>private; implicit public, explicit public</i>) and moral beliefs (<i>high, low</i>). Aside from the <math>3 \times 2 = 6</math> conditions available, our study also included three hypothetical accounts detailing different forms of moral transgressions--cheating, disobeying parents, and stealing. Thus, the study would consist of <math>3 \times 2 \times 3 = 18</math> groups.</p> <p>Participants would be randomly assigned to judge one of the 18 hypothetical scenarios available. Judgement would be done so through a series of scales either developed by the original authors.</p> <p>The entire experiment will be conducted online, wherein the survey was constructed on the Qualtrics platform, and participants were recruited through the online Amazon Mechanical Turk (MTurk) platform. Accounting for possible exclusions, and allowing for the potential of additional analyses, we aimed to recruit a sample of 1350 participants of various ages and American nationality (75 per condition).</p>
Randomization	<p>In the Qualtrics survey platform, we applied block condition randomization. Upon selecting their gender, participants will be directed to one randomly selected block. The details within the block should correspond to the participant's selected gender. Particularly, central figures appearing within the hypothetical accounts will always be the same sex as the participant's selected gender.</p> <p>We used the function '<i>Evenly present elements</i>' in Qualtrics.</p>

## Instructions and experimental material

### Codebook

All blocks were named in the following fashion: Gender\_Moral belief Condition\_Public Exposure Condition\_Scenario. See Table 7 for details.

Table 7

*Codebook for Qualtrics survey used in current replication experiment*

	Private	Implicit public	Explicit public
Low moral beliefs	Fe(male)_LowMoral_Priva te_Plagarize	Fe(male)_LowMoral_ImplicitPub lic_Plagarize	Fe(male)_LowMoral_ExplicitPub lic_Plagarize
	Fe(male)_LowMoral_Priva te_Steal	Fe(male)_LowMoral_ ImplicitPublic_Steal	Fe(male)_LowMoral_ ExplicitPublic_Steal
	Fe(male)_LowMoral_Priva te_Disobey	Fe(male)_LowMoral_ ImplicitPublic_Disobey	Fe(male)_LowMoral_ ExplicitPublic_Disobey
High moral beliefs	Fe(male)_HighMoral_Priva te_Plagarize	Fe(male)_HighMoral_ ImplicitPublic_Plagarize	Fe(male)_HighMoral_ ExplicitPublic_Plagarize
	Fe(male)_ HighMoral_Private_Steal	Fe(male)_ HighMoral_ ImplicitPublic_Steal	Fe(male)_ HighMoral_ ExplicitPublic_Steal
	Fe(male)_ HighMoral_Private_Disobe y	Fe(male)_ HighMoral_ ImplicitPublic_Disobey	Fe(male)_ HighMoral_ ExplicitPublic_Disobey

Table 8

*Instructions, funneling, and Demographics*

Category	Items
<b>Instruction</b>	<p><b>Attention:</b> Are you able to pay close attention to the details provided and carefully answer questions that follow? (Yes vs. No vs. Probably not)</p> <p><b>Check:</b> = WARNING: Survey includes attention and comprehension checks. If you do not like participating in surveys with checks, please return the HIT now. = Do you understand the study outline and are willing to participate in a survey with comprehension checks? (Yes vs. No vs. Probably not)</p> <p><b>Native:</b> This survey is only intended for native English speakers born and raised in the United States. Are you a native English speaker born, raised, and currently located in the US? (Yes vs. No)</p> <p><b>Scenario reading:</b> This survey involves reading a scenario with a very simple comprehension question verifying that you read and understood the scenario. Would you be able to carefully read the scenario and answer a comprehension question? (Yes vs. No vs. Probably not)</p> <p><b>Imagine:</b> Are you able to imagine what the person described in the provided scenarios would be thinking and feeling? (Yes vs. No vs. Probably not)</p>
<b>Funneling</b>	<p><b>Serious:</b> How serious were you when filling out this questionnaire? (1 = Not at all to 5 = Very much)</p> <p><b>SeenBefore:</b> Have you ever seen the materials used in this study or something similar before? (Yes vs. No)</p> <p>If yes - please indicate where. [text entry]</p> <p><b>Purpose:</b> What do you think the purpose of the study was? (one sentence) [text entry]</p> <p><b>Errors:</b> Help us improve for the next studies - Did you spot any errors? Anything missing or wrong? Something we should pay attention to in next runs? (briefly) [text entry]</p>
<b>Demographics</b>	<p><b>Age:</b> How old are you? [text entry]</p> <p><b>Gender:</b> Please indicate your gender (male, female, other, rather not disclose)</p> <p><b>Country of origin:</b> Which country are you originally from? (country of birth) [text entry]</p> <p><b>Country of residence:</b> In which country are you currently residing? [text entry]</p> <p><b>Social class:</b> Please estimate your family's social class : (Lower class, Working class, Lower middle class, Middle class, Upper middle class, Upper class)</p> <p><b>English Proficiency:</b> How would you generally rate your understanding of the English used in this study? (Very bad, Bad, Poor, Neither good nor bad, Fair, Good, Very Good)</p>

*Note.* The order of questions in the table is not the same as the order in the questionnaire.

### Scales used in the experiments

The scales used in Smith et al. (2002) were developed by the authors, for the purpose of the study. Various items regarding the shame, guilt, and their relevant bodily changes or feelings were listed for the participants, who were then required to: "Please indicate the degree to which you think the items below were characteristic of \_\_\_'s experience. (0 = *not at all characteristic*; 9 = *extremely characteristic*)". The items that were used within the experiment were outlined in the supplementary: *Analysis of original article - Dependent variables*.

## Software used in the study

Qualtrics

R 4.1.2 (2021-11-01)

## Exclusion criteria

### Generalized exclusion criteria

The default generalized exclusion criteria we use in our pre-registration is the following:

General criteria:

1. Participants indicating a low proficiency of English (self-report < 5, on a 1-7 scale).
  - A 7-point scale (1 - Very Bad; 7 - Very Good) was provided to the question: “How would you generally rate your understanding of the English used in this study?” in the survey block: *Demographics*
2. Participants who self-report not being serious about filling in the survey (self-report < 4, on a 1-5 scale).
  - A 5-point scale (1 - Not at all; 5 - Very much) was provided to the question: “How serious were you in filling out this questionnaire?” in the survey block: *Funneling*
3. Participants who have already seen or done the survey before
  - By selecting YES when asked the question in the survey block: *Funneling* -- “Have you ever seen the materials used in this study or similar before? If yes - please indicate where.”
  - if YES, a type-in box was provided wherein participants were told to indicate where they had seen such materials before
4. Participants who failed to complete the survey. (Finished == False)
5. Participants not from the US
  - Selecting No in the multiple-choice question regarding their country of birth and residence in the survey block: *Survey outline + instruction* -- “This survey is only intended for native English speakers born and raised in the United States. Are you a native English speaker, raised, and currently located in the US?”
6. Participants aged below 18. (there is a type-in answer box about participants’ age in our current survey).
  - There is a type-in answer box about participants’ age in our survey, enquiring: “How old are you?” in survey block: *Demographics*
  - Consent was obtained from participants, as well as their confirmation of age in survey block: *Consent* -- “Please select the message box below to indicate that you are 18 years old or older and have read and agree to the above”



### Missing or Incomplete data

We implemented the Qualtrics option “forced response” for all the questions in our survey. This would mean that there should be no missing data.

[Should data be missing or incomplete from a participant’s response, we will first check whether or not such incompleteness is random or not. If the data that is missing can be related to its value, there is a possibility that the incompleteness was intentional and not random. For instance, if a participant failed to input their socio-economic status or sex, this could be attributed to their unwillingness to reveal their personal information. However, if the missing data is judged to be random, we will employ the method of listwise deletion.]

### Specific criteria

Our study did not include any specific criterion in excluding participants.

## Comparisons and deviations

### Original versus replication

Table 9

*Comparison of Smith et al. (2002) Study 1 and the replication*

	Original	Replication	Reason for change
Study design	i) Study was conducted in person ii) Participants were limited to university students enrolled in the University of Kentucky's Introduction to Psychology course	i) Study was conducted online ii) Participants were recruited on MTurk platform, and were not limited to university students within a certain area only (e.g., age, social class, education levels)	i) Reduce possibility of expectancy effect, which may arise when experiments / studies are conducted in person ii) Recruitment through an online platform allows for more diversity and representation within the sample. Online recruitment can also allow for more participants to be recruited under a short period of time
Conditions	Description of the second hypothetical account (i.e., disobeying parents) was not provided by the original authors	In light of the absence of description, we recreated our version of the manipulation	Lack of description provided by the original authors
Contextual variations	Original study is estimated to be conducted sometime between 2001-2002	Current replication is conducted online in 2022 during the COVID-19 pandemic	NA

## Pre-registration plan versus final report

Table 10

*Deviations report (To be added)*

Components in your preregistration (e.g., stopping rule, analyses, hypotheses, exclusion rules)	Location of 1) preregistered decision/plan and 2) rational for decision/plan [Location / link]	Were there deviations? What type? [no / minor / major]*	If yes - describe details of deviation(s) [brief description / location / link]	Rationale for deviation [brief description / location / link]	How might the results be different if you had/had not deviated [brief description / location / link]	Date/time of decision for deviation + stage	Any additional notes
Study design	Page 17 Line 11-Page 19 Line 13	No	-				
Measured variables	Page 20 Table 3	No					
Exclusion criteria	Page 22 Line 9-15	No					
IV	Page 20 Table 3	No					
DV	Page 20 Table 3	No					
Data analysis	Page 22 Line 1-Page 24 Line 10	Minor	We performed regression analyses for shame and guilt-related reactions with both explicit shame and guilt as IVs Page 25 Line 3-18	We aimed to further examine the associative patterns between the explicit emotions and the reactions Page 25 Line 3-18	Without the exploratory analyses, we would still conclude that the supposed shame and guilt-related reactions are not distinctively related to the emotions. Page 49 Line 8-14	2022.12.06/Stage 2 report writing	

*Note.* \*Categories for deviations: Minor - Change probably did not affect results or interpretations; Major - Change likely affected results or interpretations.

## Additional analyses and results

### Effect Size Calculation using Webpower

Website: <https://webpower.psychstat.org/models/means03/effectsize.php>

**Figure 1**

*Calculation for the Effect of Public Exposure on Shame*

#### Effect Size Calculator for One-way ANOVA

##### Method 1: Use between and within group variances

Between group variance	<input type="text" value=".1"/>
Within group variance	<input type="text" value=".9"/>

##### Method 2: Use group mean information

Number of groups:

Group	Sample size	Mean	Variance	
1	<input type="text" value="56"/>	<input type="text" value="8.11"/>	<input type="text" value="3.4225"/>	Explicit Public
2	<input type="text" value="56"/>	<input type="text" value="6.96"/>	<input type="text" value="7.6176"/>	Implicit Public
3	<input type="text" value="56"/>	<input type="text" value="5.71"/>	<input type="text" value="7.7284"/>	Private

##### Method 3: From empirical data analysis

Upload data file:

未选择任何文件

#### Effect size output

The overall effect size  $f = 0.3918$

The effect size for Group 1 vs Group 2 is  $f = 0.1877$

The effect size for Group 1 vs Group 3 is  $f = 0.3917$

The effect size for Group 2 vs Group 3 is  $f = 0.2040$

Last modified: December 26, 2018.

**Figure 2**

*Calculation for the Effect of Moral Belief on Guilt*

**Effect Size Calculator for One-way ANOVA****Method 1: Use between and within group variances**

Between group variance	<input type="text" value=".1"/>
Within group variance	<input type="text" value=".9"/>

**Method 2: Use group mean information**
 Number of groups:  

Group	Sample size	Mean	Variance	
1	<input type="text" value="84"/>	<input type="text" value="8.26"/>	<input type="text" value="1.69"/>	High Moral Belief
2	<input type="text" value="84"/>	<input type="text" value="7.14"/>	<input type="text" value="7.0225"/>	Low Moral belief

**Method 3: From empirical data analysis**

Upload data file:

 未选择任何文件 
**Effect size output**The overall effect size  $f = 0.2683$ The effect size for Group 1 vs Group 2 is  $f = 0.2683$ 

Last modified: December 26, 2018.

## Sensitivity Power Analyses for the Replication (Gpower)

[1] *Interactions and main effects -- Friday, April 15, 2022 -- 11:11:03*

**F tests** - ANCOVA: Fixed effects, main effects and interactions

**Analysis:** Sensitivity: Compute required effect size

**Input:**

$\alpha$ err prob	=	0.05
Power (1- $\beta$ err prob)	=	0.95
Total sample size	=	1260
Numerator df	=	4
Number of groups	=	18
Number of covariates	=	0

**Output:**

Noncentrality parameter $\lambda$	=	18.6427306
Critical F	=	2.3790942
Denominator df	=	1242
Effect size f	=	0.1216381

[2] *Contrasts between two groups of a three-level factor-- Friday, April 15, 2022 -- 11:11:59*

**t tests** - Means: Difference between two independent means (two groups)

**Analysis:** Sensitivity: Compute required effect size

**Input:**

Tail(s)	=	One
$\alpha$ err prob	=	0.05
Power (1- $\beta$ err prob)	=	0.95
Sample size group 1	=	420
Sample size group 2	=	420

**Output:**

Noncentrality parameter $\delta$	=	3.2923665
Critical t	=	1.6466740
Df	=	838
Effect size d	=	0.2271949

[3] *Contrasts between two groups of a two-level factor-- Friday, April 15, 2022 -- 11:12:18*

**t tests** - Means: Difference between two independent means (two groups)

**Analysis:** Sensitivity: Compute required effect size

**Input:**

Tail(s)	=	One
$\alpha$ err prob	=	0.05
Power (1- $\beta$ err prob)	=	0.95
Sample size group 1	=	630
Sample size group 2	=	630

**Output:**

Noncentrality parameter $\delta$	=	3.2914778
Critical t	=	1.6460658
Df	=	1258
Effect size d	=	0.1854538

## Sensitivity Power Analyses for the Replication (Morepower)

Figure 3

MorePower 6.0.4

<b>Analysis</b> <input checked="" type="radio"/> ANOVA <input type="radio"/> t <b>t-test of means</b> <input type="radio"/> 1 sample <input type="radio"/> 2 sample <b>z-test of proport.</b> <input type="radio"/> 1 sample <input type="radio"/> 2 sample	<b>Design Factors</b> RM 2 IM 2x2	<b>Effect of Interest</b> RM 2 IM 2
<b>Solve For</b> <input type="radio"/> Power <input checked="" type="radio"/> Effect Size <input type="radio"/> Sample Size	<b>Alpha 2-sides</b> .05 <input type="radio"/> <input checked="" type="radio"/>	<b>Sample</b> 1260
<b>Power</b> .95	<b>Effect Size</b> <input checked="" type="radio"/> $\eta^2$ .0102557 <input type="radio"/> F 13.014614	
<b>Variability</b> <input type="radio"/> S 2 <input checked="" type="radio"/> MSE 1		

**Solve**

```

power = .95, sample = 1260
partial eta^2 = .0102557
Cohen's E' = .102

dBIC=-5.850, BF01=.054, BF10=18.634
p(H0|D) = .05093110, p(H1|D) = .94906890

J&H 95% CI ±.078, t(crit) = 1.962, df = 1256
mean difference = 0.287459
std. err. of difference = 0.079682
95% CI of difference ±0.156

[F(1,1256) = 13.015, p = .00032, MSE = 1.,
  
```

ANOVA Examples Clear Values Clear Output Clear Session Program Information

Session Calculations = 2



## Additional information about the study

1. Setting: The replication of Study 1 in Smith and colleagues' (2002) work was conducted online via the Qualtrics platform.
2. Time of Day: As the study was conducted online during a time when participants feel most available, there were no specific requirements on the exact time of day when sessions are conducted.
3. Data collection dates: June 10, 2022
4. Participant Recruitment: Participants were recruited from Amazon Mechanical Turk (MTurk) via CloudResearch.

### Data collection procedures:

This study was conducted on Amazon Mechanical Turk with US American participants. We imposed the following settings in recruiting our participants:

1. Participants were paid US\$0.7 as a fixed participation reward. This amount was determined by multiplying the expected completion time (in mins.) with the minimal federal wage in the U.S. (i.e., \$0.125 per minute).
2. The expected completion time was set at 5 minutes in advance.
3. The most time we allowed each worker to complete the study was 15 minutes.
4. We limited all workers' HIT Approval Rate to be between 95% and 100%.
5. We limited each worker's number of HITs approved to be above 5,000.
6. We blocked Suspicious Geocode Locations and Universal Exclude List Workers.
7. We blocked duplicate IP addresses and duplicate geolocation.
8. We enabled HyperBatch so that all eligible workers were able to participate in our HIT immediately after the survey was launched.
9. We restricted workers' location to be in the U.S.

## Details of the three-way ANOVAs on manipulation checks, explicit emotions, and emotion-related reactions

### Manipulation checks

#### Public Exposure Check

To test whether the experimental manipulations were successful, we ran three-way ANOVAs for the two manipulation checks. For public exposure check, there was a main effect of public exposure,  $F(2, 1254) = 299.65, p < .001, \eta_p^2 = .32, 95\% \text{ CI } [.28, .36]$  and a main effect of moral belief,  $F(2, 1254) = 49.97, p < .001, \eta_p^2 = .04, 95\% \text{ CI } [.02, .06]$ . We found no support for a main effect of scenarios on exposure check,  $F(2, 1254) = 0.72, p = .49, \eta_p^2 = .001, 95\% \text{ CI } [.00, .01]$ . We also found support for a two-way interaction between scenario and public exposure manipulation,  $F(4, 1254) = 10.28, p < .001, \eta_p^2 = .03, 95\% \text{ CI } [.02, .05]$  and a two-way interaction between public exposure manipulation and moral belief manipulation,  $F(2, 1254) = 3.02, p = .049, \eta_p^2 = .005, 95\% \text{ CI } [.00, .01]$ . No other effects reached statistical significance.

Pairwise comparison between different conditions of public exposure for each scenario revealed that for the plagiarize scenario, both the private (Cohen's  $d = -1.34, 95\% \text{ CI } [-1.67, -1.02]$ ) and implicit conditions (Cohen's  $d = -1.28, 95\% \text{ CI } [-1.60, -0.96]$ ) were lower than the explicit condition. There was no significant difference between the private and implicit conditions (Cohen's  $d = -0.06, 95\% \text{ CI } [-0.29, 0.17]$ ). For the score of public exposure check in the steal scenario, private condition scored lower than implicit exposure (Cohen's  $d = -0.80, 95\% \text{ CI } [-1.07, -0.53]$ ) which in turn scored lower than explicit condition (Cohen's  $d = -1.48, 95\% \text{ CI } [-1.82, -1.14]$ ). For the disobey condition, both the private (Cohen's  $d = -1.18, 95\% \text{ CI } [-1.48, -0.87]$ ) and implicit conditions (Cohen's  $d = -0.95, 95\% \text{ CI } [-1.23, -0.66]$ ) were lower than the explicit condition. The difference between the private and implicit conditions was relatively smaller (Cohen's  $d = -0.23, 95\% \text{ CI } [-0.46, 0.01]$ ).

Pairwise comparison between different conditions of public exposure for low and high moral belief conditions showed that in both low and high moral belief conditions, the private condition scored lower than the implicit condition (Low moral: Cohen's  $d = -0.41, 95\% \text{ CI } [-0.61, 0.21]$ ; High moral: Cohen's  $d = -0.29, 95\% \text{ CI } [-0.48, -0.09]$ ), which scored lower than the explicit condition (Low moral: Cohen's  $d = -1.34, 95\% \text{ CI } [-1.63, -1.04]$ ; High moral: Cohen's  $d = -1.16, 95\% \text{ CI } [-1.43, -0.88]$ ). But the effect of public exposure had a larger effect in the low moral condition ( $\eta_p^2 = .36, 95\% \text{ CI } [.30, .41]$ ) than in the high moral condition ( $\eta_p^2 = .28, 95\% \text{ CI } [.22, .33]$ ).

#### Moral Belief Check

For moral belief check, there was a main effect of public exposure,  $F(2, 1254) = 26.32, p < .001, \eta_p^2 = .04, 95\% \text{ CI } [.02, .06]$ , a main effect of moral belief,  $F(2, 1254) = 607.61, p < .001, \eta_p^2 = .33, 95\% \text{ CI } [.29, .36]$ , and a main effect of Scenario,  $F(2, 1254) = 23.65, p < .001, \eta_p^2 = .04, 95\% \text{ CI } [.02, .06]$ . There was a significant two-interaction between scenario and moral belief manipulation,  $F(2, 1254) = 12.32, p < .001, \eta_p^2 = .02, 95\% \text{ CI } [.01, .04]$  and a significant two-interaction between public exposure manipulation and moral belief manipulation,  $F(2, 1254) = 10.14, p < .001, \eta_p^2 = .02, 95\% \text{ CI } [.01, .03]$ . No other effects reached statistical significance.

Pairwise comparison between different conditions of moral belief manipulation for each scenario revealed that there was a significant effect of moral belief manipulation in all three scenarios (all  $ps < .001$ ). More specifically, for the plagiarize scenario, the manipulation check was higher in the high moral belief condition than in the low moral belief condition (Cohen's  $d = 1.39, 95\% \text{ CI } [1.08, 1.69]$ ). For the moral

belief manipulation check in the steal scenario, the score was higher in the high moral belief condition than in the low moral belief condition (Cohen's  $d = 1.72$ , 95%CI [1.38, 2.07]). For the disobey condition, the difference between high and moral belief conditions appeared to be smaller but still significant (Cohen's  $d = 0.97$ , 95%CI [0.72, 1.22]).

Pairwise comparison between different conditions of moral belief manipulation for each public exposure condition revealed that there was a significant effect of moral belief manipulation in all three conditions (all  $ps < .001$ ). The manipulation check was higher in the high moral belief condition than in the low moral belief condition in the private condition (Cohen's  $d = 1.65$ , 95%CI [1.31, 1.98]). For the moral belief manipulation check in the implicit exposure scenario, the score was higher in the high moral belief condition than in the low moral belief condition (Cohen's  $d = 1.36$ , 95%CI [1.07, 1.66]). For the explicit exposure condition, there is also a significant difference between high and moral belief conditions (Cohen's  $d = 1.05$ , 95%CI [0.79, 1.31]). The two-way interaction between moral belief and public exposure manipulation thus seems to suggest that the effect of moral belief manipulation was most prominent in the private condition ( $\eta_p^2 = .41$ , 95% CI [.34, .47]) and smallest in the explicit public condition ( $\eta_p^2 = .22$ , 95% CI [.15, .28]).

## Explicit emotions

### Explicit Shame

For explicit shame, there was a main effect of exposure,  $F(2, 1254) = 99.00$ ,  $p < .001$ ,  $\eta_p^2 = .14$ , 95% CI [.11, .17], a main effect of moral belief,  $F(2, 1254) = 612.00$ ,  $p < .001$ ,  $\eta_p^2 = .33$ , 95% CI [.29, .37], and a main effect of Scenario,  $F(2, 1254) = 43.06$ ,  $p < .001$ ,  $\eta_p^2 = .06$ , 95% CI [.04, .09]. There was a two-way interaction between exposure and moral belief manipulation,  $F(2, 1254) = 18.58$ ,  $p < .001$ ,  $\eta_p^2 = .03$ , 95% CI [.01, .05], a two-way interaction between scenario and exposure manipulation,  $F(4, 1254) = 11.72$ ,  $p < .001$ ,  $\eta_p^2 = .04$ , 95% CI [.02, .06], and a two-way interaction between scenario and moral belief manipulation,  $F(2, 1254) = 15.63$ ,  $p < .001$ ,  $\eta_p^2 = .02$ , 95% CI [.01, .04]. We did not find support for a three-way interaction,  $F(4, 1254) = 1.58$ ,  $p = .177$ ,  $\eta_p^2 = .005$ , 95% CI [.00, .01].

To better understand the effects of experimental manipulations on explicit shame, we ran 3 (Exposure: private vs. implicit public vs. explicit public)  $\times$  2 (Moral belief: high vs. low) two-way ANOVAs for explicit shame in each scenario.

Results showed that in the plagiarize conditions, there were a main effect of exposure,  $F(2, 414) = 4.36$ ,  $p = .013$ ,  $\eta_p^2 = .02$ , 95% CI [.00, .05], and a main effect of moral belief,  $F(1, 414) = 272.92$ ,  $p < .001$ ,  $\eta_p^2 = .40$ , 95% CI [.33, .46]. We did not find support for the interaction,  $F(2, 414) = 1.65$ ,  $p = .194$ ,  $\eta_p^2 = .008$ , 95% CI [.00, .03]. Explicit shame in the private condition and the implicit exposure condition did not differ from each other (Cohen's  $d = 0.02$ , 95%CI [-0.21, 0.26]) and neither were found to be different from the explicit shame in the explicit condition (Private: Cohen's  $d = -0.19$ , 95%CI [-0.43, 0.05]; Implicit: Cohen's  $d = -0.21$ , 95%CI [-0.45, 0.03]). Explicit shame in the high moral belief condition was higher than that in the low moral belief condition (Cohen's  $d = 1.59$ , 95%CI [1.26, 1.92]).

For explicit shame in the steal scenario, there was a main effect of exposure,  $F(2, 424) = 88.58$ ,  $p < .001$ ,  $\eta_p^2 = .29$ , 95% CI [.23, .36], a main effect of moral belief,  $F(1, 424) = 309.24$ ,  $p < .001$ ,  $\eta_p^2 = .42$ , 95% CI [.36, .48], and a two-way interaction,  $F(2, 424) = 16.78$ ,  $p < .001$ ,  $\eta_p^2 = .07$ , 95% CI [.03, .12]. In the high moral belief conditions, explicit shame in the private condition was lower than that in the implicit condition (Cohen's  $d = -0.47$ , 95%CI [-0.82, -0.13]), which in turn was lower than that in the explicit condition (Cohen's  $d = -0.59$ , 95%CI [-0.93, -0.24]). In the low moral belief conditions, we observed the same pattern with larger effects. Explicit shame in the private condition was also lower than that in the

implicit condition (Cohen's  $d = -0.51$ , 95%CI [-0.85, -0.17]), which in turn was lower than that in the explicit condition (Cohen's  $d = -1.40$ , 95%CI [-1.80, -0.99]).

For explicit shame in the disobey scenario, there was a main effect of exposure,  $F(2, 416) = 39.96$ ,  $p < .001$ ,  $\eta_p^2 = .16$ , 95% CI [.10, .22], a main effect of moral belief,  $F(1, 416) = 85.52$ ,  $p < .001$ ,  $\eta_p^2 = .17$ , 95% CI [.11, .23], and a two-way interaction effect,  $F(2, 416) = 5.49$ ,  $p = .004$ ,  $\eta_p^2 = .03$ , 95% CI [.00, .06]. In the high moral belief conditions, we did not find support that explicit shame in the private condition was lower than that in the implicit condition (Cohen's  $d = -0.24$ , 95%CI [-0.57, -0.09]). We did find support that explicit shame in the implicit public condition was lower than that in the explicit condition (Cohen's  $d = -0.44$ , 95%CI [-0.78, -0.09]). In the low moral belief conditions, explicit shame in the private condition was also lower than that in the implicit condition (Cohen's  $d = -0.36$ , 95%CI [-0.69, -0.02]), which in turn was lower than that in the explicit condition (Cohen's  $d = -1.04$ , 95%CI [-1.42, -0.66]).

### Explicit Guilt

For explicit guilt, there was a main effect of exposure,  $F(2, 1254) = 93.98$ ,  $p < .001$ ,  $\eta_p^2 = .13$ , 95% CI [.10, .16], a main effect of moral belief,  $F(2, 1254) = 691.00$ ,  $p < .001$ ,  $\eta_p^2 = .36$ , 95% CI [.32, .39], and a main effect of Scenario,  $F(2, 1254) = 20.52$ ,  $p < .001$ ,  $\eta_p^2 = .03$ , 95% CI [.01, .05]. We found support for a two-way interaction between exposure and moral belief manipulation,  $F(2, 1254) = 22.20$ ,  $p < .001$ ,  $\eta_p^2 = .03$ , 95% CI [.02, .06], a two-way interaction between scenario and exposure manipulation,  $F(4, 1254) = 11.87$ ,  $p < .001$ ,  $\eta_p^2 = .04$ , 95% CI [.02, .06], and a two-way interaction between scenario and moral belief manipulation,  $F(2, 1254) = 14.39$ ,  $p < .001$ ,  $\eta_p^2 = .02$ , 95% CI [.01, .04]. We did not find support for the three-way interaction,  $F(4, 1254) = 1.80$ ,  $p = .127$ ,  $\eta_p^2 = .006$ , 95% CI [.00, .01].

Two-way ANOVAs showed that for explicit guilt in the plagiarize scenario, there were a main effect of exposure,  $F(2, 414) = 3.52$ ,  $p = .031$ ,  $\eta_p^2 = .02$ , 95% CI [.00, .05], and a main effect of moral belief,  $F(1, 414) = 333.58$ ,  $p < .001$ ,  $\eta_p^2 = .45$ , 95% CI [.38, .51]. We did not find support for the two-way interaction,  $F(2, 414) = 2.93$ ,  $p = .054$ ,  $\eta_p^2 = .008$ , 95% CI [.00, .04]. Pairwise comparison showed that explicit shame did not differ in three conditions of exposure (Private-Implicit: Cohen's  $d = -0.05$ , 95%CI [-0.28, 0.18]; Implicit-Explicit: Cohen's  $d = -0.14$ , 95%CI [-0.37, 0.10]) and that explicit guilt was higher in the high moral belief conditions than that in low moral belief conditions (Cohen's  $d = 1.76$ , 95%CI [1.41, 2.11]).

In the steal conditions, there was a main effect of exposure,  $F(2, 424) = 88.21$ ,  $p < .001$ ,  $\eta_p^2 = .29$ , 95% CI [.22, .36], a main effect of moral belief,  $F(1, 424) = 316.09$ ,  $p < .001$ ,  $\eta_p^2 = .43$ , 95% CI [.36, .49], and a two-way interaction,  $F(2, 424) = 19.36$ ,  $p < .001$ ,  $\eta_p^2 = .08$ , 95% CI [.04, .14]. In the high moral belief conditions, explicit guilt in the private condition was lower than that in the implicit condition (Cohen's  $d = -0.48$ , 95%CI [-0.83, -0.14]), which in turn was lower than that in the explicit condition (Cohen's  $d = -0.55$ , 95%CI [-0.90, -0.21]). In the low moral belief conditions, we observed the same pattern with larger effects. Explicit guilt in the private condition was also lower than that in the implicit condition (Cohen's  $d = -0.56$ , 95%CI [-0.90, -0.22]), which in turn was lower than that in the explicit condition (Cohen's  $d = -1.36$ , 95%CI [-1.77, -0.96]).

For explicit guilt in the disobey scenario, there was a main effect of exposure,  $F(2, 416) = 34.27$ ,  $p < .001$ ,  $\eta_p^2 = .14$ , 95% CI [.08, .20], a main effect of moral belief,  $F(1, 416) = 102.56$ ,  $p < .001$ ,  $\eta_p^2 = .20$ , 95% CI [.13, .26], and a two-way interaction,  $F(2, 416) = 5.64$ ,  $p = .004$ ,  $\eta_p^2 = .03$ , 95% CI [.00, .06]. In the high moral belief conditions, explicit guilt in the private condition was not lower than that in the implicit condition (Cohen's  $d = -0.22$ , 95%CI [-0.55, 0.11]). But both conditions had lower scores than explicit exposure condition (Private-Explicit: Cohen's  $d = -0.63$ , 95%CI [-0.99, -0.27]; Implicit-Explicit: Cohen's

$d = -0.41$ , 95%CI [-0.75, -0.07]). In the low moral belief conditions, we observed the same pattern with larger effects. Explicit guilt in the private condition was not lower than that in the implicit condition (Cohen's  $d = -0.27$ , 95%CI [-0.61, 0.06]). But both conditions had lower scores than explicit exposure condition (Private-Explicit: Cohen's  $d = -1.25$ , 95%CI [-1.64, -0.86]; Implicit-Explicit: Cohen's  $d = -0.41$ , 95%CI [-1.35, -0.61]). We summarized the estimated marginal means for each condition in Table 9 in the manuscript.

## Emotion-related reactions

Figure 4

*The effects of Exposure and Moral Belief Manipulation on Explicit Shame in Different Scenarios*

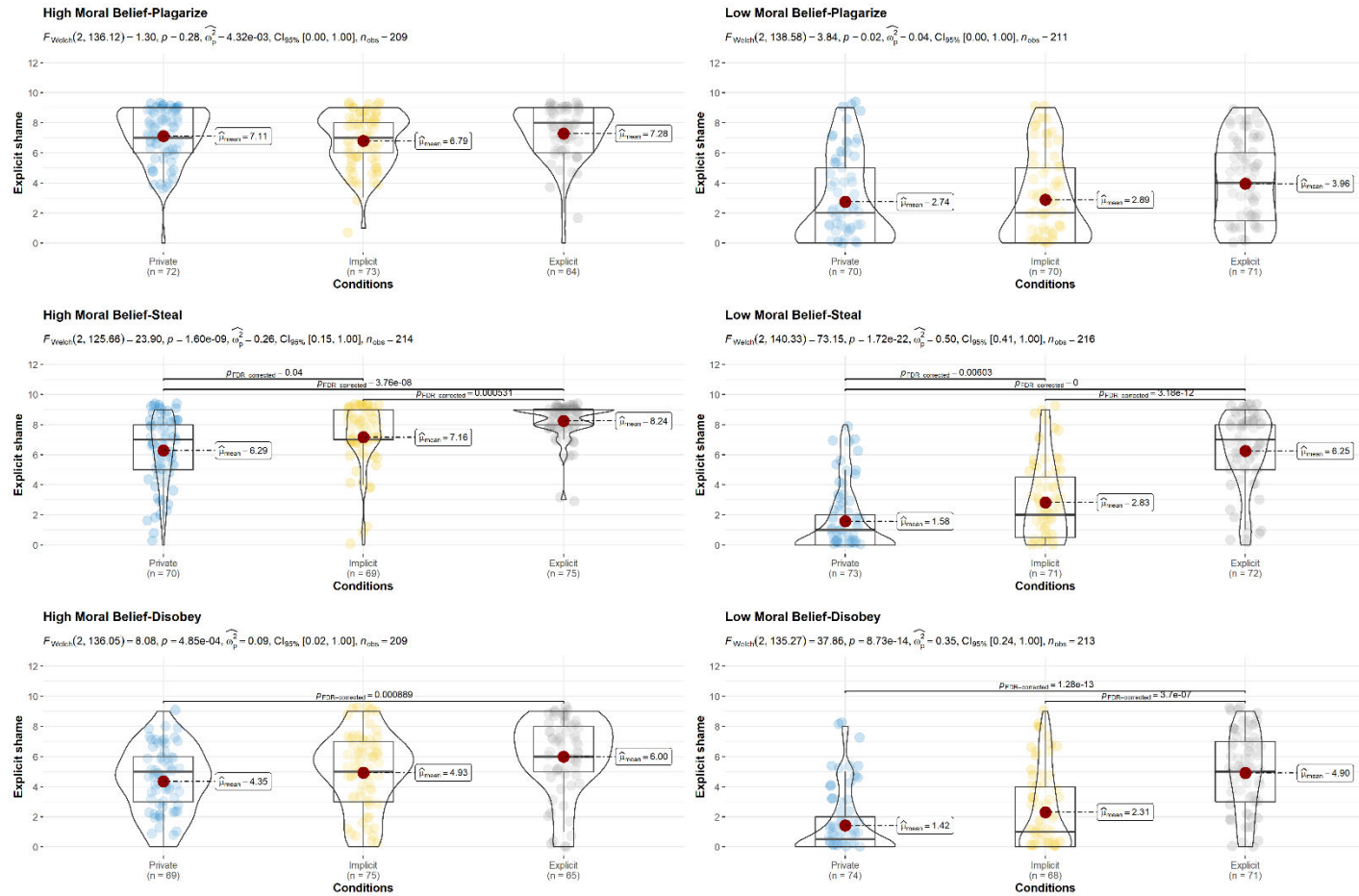
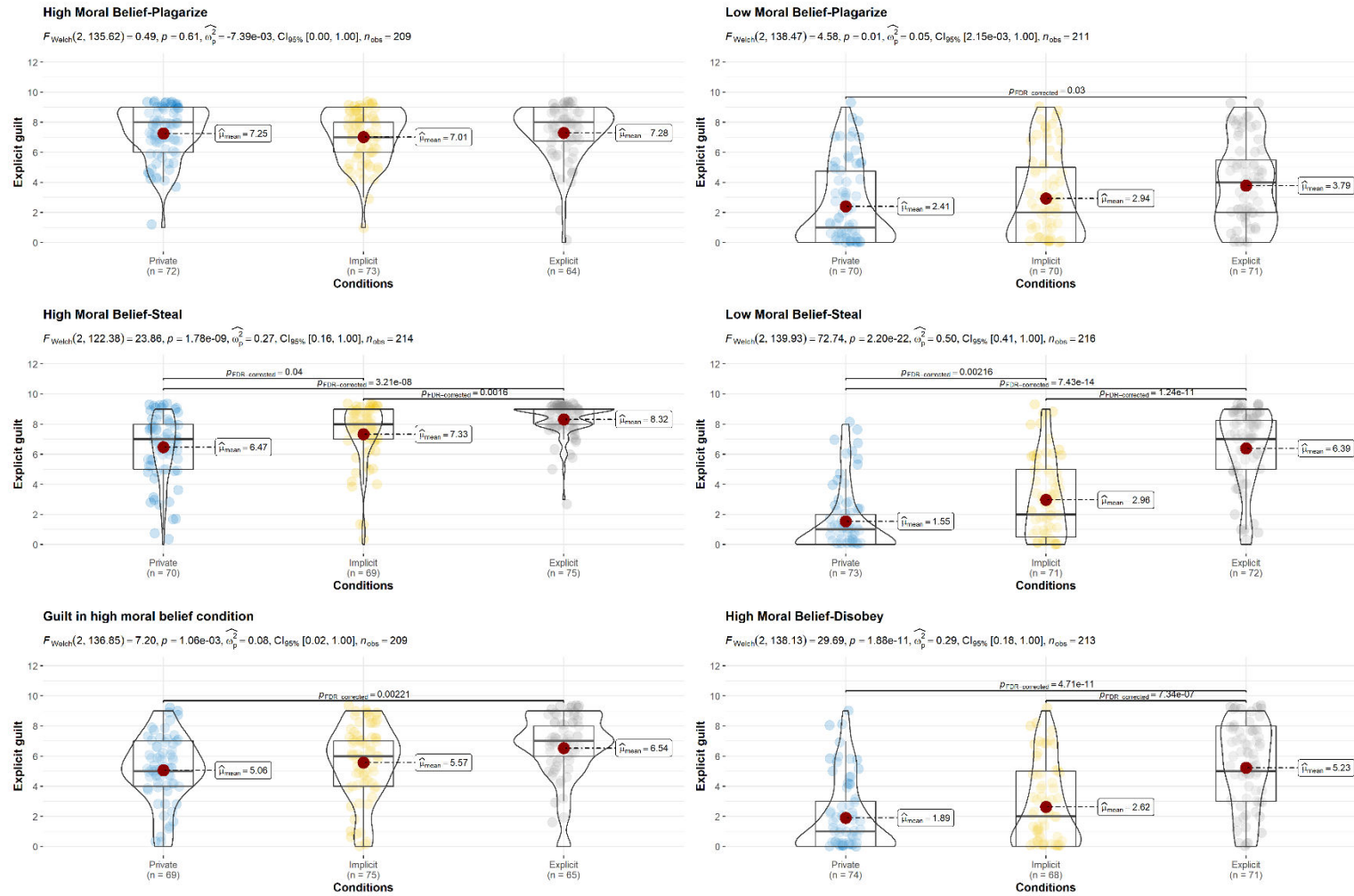




Figure 5

*The effects of Exposure and Moral Belief Manipulation on Explicit Guilt in Different Scenarios*



Emotions related reactions

In Tables 11 and 12, we briefly summarized the three-way ANOVA results for shame-related and guilt-related actions. We also provide the estimated marginal means and standard errors for each condition in Tables 13 and 14.

Table 11

*Effect sizes for Shame-related Reactions*

Dependent	Exposure (E)	Moral Belief(MB)	Scenario	E*MB	E*Scenario	MB*Scenario	E*MB*Scenario
Body change	$F = 180.05$	$F = 227.82$	$F = 107.93$	$F = 4.25$	$F = 14.19$	$F = 15.65$	$F = 1.21$
	$p < .001$	$p < .001$	$p < .001$	$p = .014$	$p < .001$	$p < .001$	$p = .305$
	$\eta_p^2 = .22$	$\eta_p^2 = .15$	$\eta_p^2 = .15$	$\eta_p^2 = .007$	$\eta_p^2 = .04$	$\eta_p^2 = .02$	$\eta_p^2 = .004$
Desire to escape	$F = 155.31$	$F = 179.67$	$F = 134.72$	$F = 3.99$	$F = 9.64$	$F = 13.73$	$F = 1.69$
	$p < .001$	$p < .001$	$p < .001$	$p = .019$	$p < .001$	$p < .001$	$p = .150$
	$\eta_p^2 = .20$	$\eta_p^2 = .13$	$\eta_p^2 = .18$	$\eta_p^2 = .006$	$\eta_p^2 = .03$	$\eta_p^2 = .02$	$\eta_p^2 = .005$
Embarrassed	$F = 240.20$	$F = 292.35$	$F = 64.52$	$F = 13.35$	$F = 8.92$	$F = 17.56$	$F = 1.89$
	$p < .001$	$p < .001$	$p < .001$	$p < .001$	$p < .001$	$p < .001$	$p = .109$
	$\eta_p^2 = .28$	$\eta_p^2 = .19$	$\eta_p^2 = .09$	$\eta_p^2 = .02$	$\eta_p^2 = .03$	$\eta_p^2 = .03$	$\eta_p^2 = .006$
Humiliated	$F = 227.66$	$F = 185.83$	$F = 85.59$	$F = 2.24$	$F = 15.79$	$F = 15.50$	$F = 0.42$
	$p < .001$	$p < .001$	$p < .001$	$p = .106$	$p < .001$	$p < .001$	$p = .796$
	$\eta_p^2 = .27$	$\eta_p^2 = .13$	$\eta_p^2 = .12$	$\eta_p^2 = .004$	$\eta_p^2 = .05$	$\eta_p^2 = .01$	$\eta_p^2 = .001$
Inferior self	$F = 93.98$	$F = 228.88$	$F = 225.14$	$F = 2.74$	$F = 13.87$	$F = 8.00$	$F = 1.44$
	$p < .001$	$p < .001$	$p < .001$	$p = .065$	$p < .001$	$p < .001$	$p = .220$
	$\eta_p^2 = .13$	$\eta_p^2 = .15$	$\eta_p^2 = .26$	$\eta_p^2 = .004$	$\eta_p^2 = .04$	$\eta_p^2 = .01$	$\eta_p^2 = .005$
Anger at other	$F = 10.63$	$F = 100.08$	$F = 194.93$	$F = 3.16$	$F = 1.18$	$F = 76.52$	$F = 1.20$
	$p < .001$	$p < .001$	$p < .001$	$p = .043$	$p = .316$	$p < .001$	$p = .310$
	$\eta_p^2 = .02$	$\eta_p^2 = .07$	$\eta_p^2 = .24$	$\eta_p^2 = .005$	$\eta_p^2 = .004$	$\eta_p^2 = .11$	$\eta_p^2 = .004$
Anger at self	$F = 77.68$	$F = 215.70$	$F = 90.15$	$F = 11.35$	$F = 5.74$	$F = 7.16$	$F = 1.15$
	$p < .001$	$p < .001$	$p < .001$	$p < .001$	$p < .001$	$p < .001$	$p = .331$
	$\eta_p^2 = .11$	$\eta_p^2 = .15$	$\eta_p^2 = .13$	$\eta_p^2 = .02$	$\eta_p^2 = .02$	$\eta_p^2 = .01$	$\eta_p^2 = .004$

Table 12

*Effect sizes for Guilt-related Reactions*

Dependent	Exposure (E)	Moral Belief(MB)	Scenario	E*MB	E*Scenario	MB*Scenario	E*MB*Scenario
Guilty conscience	$F = 85.90$	$F = 648.32$	$F = 24.02$	$F = 13.93$	$F = 10.71$	$F = 13.22$	$F = 1.34$
	$p < .001$	$p < .001$	$p < .001$	$p < .001$	$p < .001$	$p < .001$	$p = .254$
	$\eta_p^2 = .12$	$\eta_p^2 = .34$	$\eta_p^2 = .04$	$\eta_p^2 = .02$	$\eta_p^2 = .03$	$\eta_p^2 = .02$	$\eta_p^2 = .004$
Not real self	$F = 20.07$	$F = 272.29$	$F = 57.61$	$F = 4.65$	$F = 1.13$	$F = 10.00$	$F = 0.54$
	$p < .001$	$p < .001$	$p < .001$	$p = .010$	$p = .340$	$p < .001$	$p = .710$
	$\eta_p^2 = .03$	$\eta_p^2 = .18$	$\eta_p^2 = .08$	$\eta_p^2 = .007$	$\eta_p^2 = .004$	$\eta_p^2 = .02$	$\eta_p^2 = .002$
Hurt others	$F = 83.88$	$F = 290.37$	$F = 10.59$	$F = 0.03$	$F = 5.60$	$F = 0.44$	$F = 3.63$
	$p < .001$	$p < .001$	$p < .001$	$p = .972$	$p < .001$	$p < .001$	$p = .006$
	$\eta_p^2 = .12$	$\eta_p^2 = .19$	$\eta_p^2 = .02$	$\eta_p^2 < .001$	$\eta_p^2 = .02$	$\eta_p^2 < .001$	$\eta_p^2 = .01$
Undo wrong	$F = 201.42$	$F = 348.61$	$F = 34.67$	$F = 3.57$	$F = 7.53$	$F = 5.80$	$F = 3.08$
	$p < .001$	$p < .001$	$p < .001$	$p = .028$	$p < .001$	$p = .003$	$p = .015$
	$\eta_p^2 = .24$	$\eta_p^2 = .22$	$\eta_p^2 = .05$	$\eta_p^2 = .006$	$\eta_p^2 = .02$	$\eta_p^2 = .009$	$\eta_p^2 = .01$

Table 13

*Estimated Marginal Means for Shame-related Reactions*

	Private		Implicit Public		Explicit Public	
	High moral	Low moral	High moral	Low moral	High moral	Low moral
<b>Plagiarize</b>						
Body change	5.54 (0.25)	2.50 (0.26)	5.28 (0.25)	2.81 (0.26)	6.08 (0.27)	4.45 (0.25)
Desire to escape	5.43 (0.27)	2.60 (0.27)	5.38 (0.27)	3.01 (0.27)	6.37 (0.29)	4.67 (0.27)
Embarrassed	5.99 (0.29)	2.30 (0.30)	5.93 (0.29)	2.57 (0.30)	7.42 (0.31)	5.31 (0.29)
Humiliated	5.28 (0.29)	2.24 (0.30)	4.74 (0.29)	2.04 (0.30)	6.69 (0.31)	4.69 (0.29)
Inferior self	5.91 (0.23)	3.91 (0.23)	5.53 (0.23)	3.99 (0.24)	5.87 (0.23)	4.95 (0.23)
Anger at other	2.12 (0.22)	4.25 (0.22)	2.05 (0.22)	5.06 (0.22)	2.28 (0.23)	5.71 (0.22)
Anger at self	4.64 (0.23)	2.53 (0.23)	4.39 (0.23)	2.98 (0.23)	4.94 (0.24)	4.25 (0.23)
<b>Steal</b>						
Body change	3.69 (0.26)	0.84 (0.25)	5.06 (0.26)	2.78 (0.25)	6.99 (0.25)	2.46 (0.25)
Desire to escape	4.21 (0.27)	1.54 (0.27)	5.94 (0.28)	3.45 (0.27)	7.18 (0.26)	6.10 (0.27)
Embarrassed	5.06 (0.30)	1.01 (0.29)	6.04 (0.30)	2.76 (0.29)	8.32 (0.29)	7.11 (0.29)
Humiliated	3.14 (0.30)	0.51 (0.29)	4.57 (0.30)	2.09 (0.29)	7.84 (0.29)	6.11 (0.29)
Inferior self	3.83 (0.23)	1.15 (0.23)	4.66 (0.23)	2.25 (0.23)	6.25 (0.23)	4.60 (0.23)
Anger at other	1.13 (0.22)	1.48 (0.23)	1.33 (0.22)	1.71 (0.22)	1.69 (0.22)	2.32 (0.22)
Anger at self	3.51 (0.23)	0.93 (0.23)	4.30 (0.23)	1.59 (0.23)	5.23 (0.22)	4.10 (0.23)
<b>Disobey</b>						
Body change	1.61 (0.26)	0.84 (0.25)	2.39 (0.25)	1.44 (0.26)	4.54 (0.27)	3.69 (0.25)
Desire to escape	1.54 (0.28)	0.79 (0.27)	2.37 (0.26)	1.68 (0.28)	4.54 (0.28)	3.65 (0.27)
Embarrassed	2.45 (0.30)	1.07 (0.29)	3.40 (0.29)	1.94 (0.30)	5.92 (0.31)	5.13 (0.29)
Humiliated	1.51 (0.30)	0.54 (0.29)	1.93 (0.29)	1.25 (0.30)	4.51 (0.31)	3.73 (0.29)
Inferior self	2.05 (0.23)	0.86 (0.23)	2.35 (0.23)	1.28 (0.24)	3.99 (0.24)	2.58 (0.23)
Anger at other	1.26 (0.23)	1.08 (0.22)	1.25 (0.22)	0.81 (0.23)	1.31 (0.23)	1.45 (0.22)
Anger at self	2.37 (0.23)	1.02 (0.22)	2.67 (0.22)	1.19 (0.23)	3.33 (0.24)	2.57 (0.23)

*Note.* The statistics outside the parentheses are estimated marginal means and the statistics inside the parentheses are corresponding standard errors.

Table 14

*Estimated Marginal Means for Guilt-related Reactions*

	Private		Implicit Public		Explicit Public	
	High moral	Low moral	High moral	Low moral	High moral	Low moral
<b>Plagiarize</b>						
Guilty conscience	6.64 (0.26)	2.68 (0.26)	6.66 (0.26)	2.85 (0.26)	6.91 (0.27)	3.92 (0.26)
Not real self	4.72 (0.29)	2.37 (0.29)	4.73 (0.29)	2.56 (0.29)	5.12 (0.31)	3.27 (0.29)
Hurt other	2.91 (0.25)	1.24 (0.25)	3.82 (0.25)	1.18 (0.25)	4.19 (0.25)	1.97 (0.25)
Undo wrong	3.63 (0.26)	1.50 (0.27)	4.16 (0.26)	1.72 (0.27)	6.11 (0.28)	3.33 (0.26)
<b>Steal</b>						
Guilty conscience	5.93 (0.26)	1.45 (0.26)	6.93 (0.27)	2.75 (0.26)	7.95 (0.25)	5.77 (0.26)
Not real self	6.27 (0.29)	2.27 (0.29)	6.23 (0.30)	3.38 (0.29)	6.97 (0.28)	4.57 (0.29)
Hurt other	2.60 (0.25)	0.66 (0.25)	3.11 (0.25)	1.71 (0.25)	5.46 (0.25)	3.00 (0.25)
Undo wrong	4.61 (0.27)	1.11 (0.26)	5.71 (0.27)	2.57 (0.26)	7.80 (0.26)	6.10 (0.26)
<b>Disobey</b>						
Guilty conscience	4.76 (0.27)	1.82 (0.26)	5.04 (0.26)	2.82 (0.27)	6.01 (0.27)	4.42 (0.26)
Not real self	3.75 (0.30)	1.64 (0.29)	3.89 (0.28)	2.35 (0.30)	4.28 (0.30)	3.13 (0.29)
Hurt other	3.63 (0.25)	1.07 (0.25)	3.96 (0.25)	2.00 (0.25)	4.94 (0.25)	3.63 (0.25)
Undo wrong	3.95 (0.27)	1.62 (0.26)	4.12 (0.26)	2.28 (0.27)	5.94 (0.28)	4.82 (0.26)

*Note.* The statistics outside the parentheses are estimated marginal means and the statistics inside the parentheses are corresponding standard errors.

## Replication evaluation

### Replication closeness

A classification of relative methodological similarity of a replication study to an original study. “Same” (“different”) indicates the design facet in question is the same (different) compared to an original study. IV = independent variable. DV = dependent variable. “Everything controllable” indicates design facets over which a researcher has control. Procedural details involve minor experimental particulars (e.g., task instruction wording, font, font size, etc.).

"Similar" category was added to the LeBel et al. (2018) typology to refer to minor deviations or extensions aimed to adjust the study to the target sample that are not expected to have major implications on replication success.

Table 15

*Criteria for evaluation of replications by LeBel et al. (2018).*

Target similarity	Highly similar			Highly dissimilar	
Category	Direct replication			Conceptual replication	
Design facet	Exact replication	Very close replication	Close replication	Far replication	Very far replication
Effect/hypothesis	Same/similar	Same/similar	Same/similar	Same/similar	Same/similar
IV construct	Same/similar	Same/similar	Same/similar	Same/similar	Different
DV construct	Same/similar	Same/similar	Same/similar	Same/similar	Different
IV operationalization	Same/similar	Same/similar	Same/similar	Different	
DV operationalization	Same/similar	Same/similar	Same/similar	Different	
Population (e.g. age)	Same/similar	Same/similar	Same/similar	Different	
IV stimuli	Same/similar	Same/similar	Different		
DV stimuli	Same/similar	Same/similar	Different		
Procedural details	Same/similar	Different			
Physical setting	Same/similar	Different			
Contextual variables	Different				

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