Revisiting the temporal pattern of regret in action versus inaction: Replication of Gilovich and Medvec (1994) with extensions examining responsibility

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Kit wrote the pre-registrations, conducted data analyses, and wrote the manuscript, as part of his mPhil thesis. Gilad Feldman supervised Siu Kit Yeung throughout, conducted the pre-registrations, and ran data collection. Gilad and Kit jointly finalized the manuscript for journal submission.

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Contributor Roles Taxonomy

In the table below, we employ CRediT (Contributor Roles Taxonomy) to identify the roles of the contributors. Check https://www.casrai.org/credit.html for more information about the roles.

Role	Siu Kit Yeung	Gilad Feldman
Conceptualization	V	
Pre-registration	V	
Data curation		V
Formal analysis	V	
Funding acquisition		V
Investigation	V	
Pre-registration peer review / verification		V
Data analysis peer review / verification		
Methodology	V	
Project administration		V
Resources		
Software	V	
Supervision		V
Validation		
Visualization	V	
Writing-original draft	V	
Writing-review and editing		V

Abstract

The temporal pattern of regret is the phenomenon that people perceive or experience stronger regret over action compared to inaction in the short-term, yet stronger regret over inaction compared to action in the long term. Following mixed and null findings in the literature, we conducted replications and extension of Studies 1, 3, 4, and 5 in the classic Gilovich and Medvec (1994) which first demonstrated this phenomenon, with a single combined data collection in randomized display order with an online sample of Americans on MTurk (N = 988). We found support for the original findings using different designs in Studies 1, 3, and 4, yet with weaker effects. We failed to find support for such a pattern in Study 5. We discuss possible interpretations for these differences: our replication adjustments, the change in the meaning of action and inaction, or change in hypothetical versus real-life personal experiences. Extending the replications, we found support for stronger responsibility for action compared to inaction both in the short-term and the long-term. We conclude overall support for the effects, yet with follow-up work necessary to resolve the inconsistencies in the findings of the Study 5 replication. Pre-registration, materials, data, and code were made available on: https://osf.io/7m3q2/

Keywords: temporal pattern, judgment and decision-making, pre-registered replication, regret, action-inaction

Revisiting the Temporal Pattern of Regret:
Replication of Gilovich and Medvec (1994) with extensions examining responsibility

Background

The temporal pattern of regret regarding action and inaction was first demonstrated by Gilovich and Medvec (1994) who showed that whereas people tend to experience stronger regret for actions over inactions in the short term, they tend to experience stronger regret for things they did not do over things they did when reflecting back on their lives. A large body of literature has found consistent support for an action-effect, the phenomenon that people associate stronger regret with action compared to inaction (e.g. Gleicher et al., 1990; Kahneman & Tversky, 1982). However, Gilovich and Medvec (1994) suggested that this classic effect is moderated by temporal distance, such that when retrospectively recalling their lifetime and long-term regrets, people tend to associate stronger regret with inaction than with action.

Over the years the literature has seen many mixed findings on temporal patterns in regret (e.g. Bonnefon & Zhang, 2008; Byrne & McEleney, 2000; Feldman et al., 1999; Towers et al., 2016), possibly due to differences in methods and scenarios. This suggests the need for revisiting these classic effects with pre-registered replications.

We conducted direct replications and extensions of Studies 1, 3, 4, and 5 in Gilovich and Medvec (1994). Our first goal was to conduct independent direct pre-registered well-powered replications of the temporal pattern of regret. Our second goal was to use the same base methods to extend these findings and examine whether a similar action-inaction pattern of asymmetry would also be found regarding perceptions and experiences of personal responsibility.

We begin by introducing the literature on the action-effect and the temporal action-inaction effect. We then discuss the motivations for the current replication and outline replication hypotheses and designs, with an introduction of our extension to attributions of responsibility.

Temporal Pattern of Regret

Kahneman and Tversky (1982) were the first to demonstrate the action-effect, the stronger regret associated with action over inaction, with many successful follow-up demonstrations (e.g. Feeney & Handley, 2006; Gleicher et al., 1990; Landman, 1987). The action-effect has been previously explained using several paradigms, such as the higher perceived causality and responsibility associated with action (Kordes-de Vaal, 1996), and using norm theory suggesting that actions are perceived as an exception to the norm of not acting in such situations, and exceptions are more cognitively mutable than routines and therefore associated with higher regret (Kahneman & Miller, 1986).

The classic experiments by Kahneman and Tversky (1982) demonstrated the action effect by presenting participants with hypothetical short-term decision-making situations. Gilovich and Medvec (1994) tested whether these results would extend to evaluations of real-life long-term experiences. In their Studies 1 and 5, they found that for the retrospective and lifetime reflections the action-effect reversed into an inaction-effect, in that participants tended to report stronger regret for their inaction compared to action. In their Studies 3 and 4 they also demonstrated their findings using scenarios that were very similar to those of Kahneman and Tversky (1982) when manipulating short-term versus long-term reflections.

In follow-up work, Gilovich and Medvec (1995) proposed, investigated, and discussed several possible mechanisms for these effects, including mechanisms related to decrease in intensity of action regrets and increase in intensity of inaction regrets overtime For example,

they suggested that people engage in more compensatory behavior for action regrets compared to inaction regrets. Meaning, that people tend to do more to try and rectify their action mistakes compared to inaction mistakes, explaining why inaction regrets may be stronger in the long-run compared to action regrets which may be weakened over time. Another possible explanation is that over time people seem to become more confident that they would have succeeded if they had taken actions (Gilovich et al., 1993), as their memory and/or concerns regarding outcome uncertainties or risks of action diminished over time (Gilovich & Medvec, 1995). Furthermore, Gilovich and Medvec (1995) proposed that intensity of inaction regrets may increase overtime as people perceive inaction mistakes seem to result in more negative consequences, perhaps in a wider range of areas overtime (Rajagopal et al., 2006). Moreover, the debate with Kahneman led to a coauthored adversarial collaboration with three studies, in which Gilovich et al. (1998) concluded that action regrets tend to primarily elicit hot emotions (e.g., anger) whereas inaction regrets tend to elicit feelings of wistfulness (e.g., nostalgia) and despair (e.g., misery), which may be the cause of the temporal differences. A follow-up conceptual replication and extension by Leach and Plaks (2009) found support for the temporal pattern of regret, mediated by the higher level of abstraction of distant inaction regret. We note that we did not set out to investigate the mechanisms of the proposed temporal pattern of regret and to first focus on revisiting and reassessing the core phenomenon.

Choice of article for replication: Gilovich and Medvec (1994)

We chose the Gilovich and Medvec (1994) article based on several factors: the absence of direct replications, its impact, lack of statistical power in empirical evidence, and mixed or null findings.

We chose to replicate Studies 1a, 3, 4, and 5 as these studies focused on the intensity of regret rather than the number of action-inaction regrets, and were a better fit for our target sample, as Study 2 involved face-to-face interviews with several groups of participants. Study 1b examining greatest lifetime regrets overlapped with the more comprehensive Study 5, which manipulated temporal distance, and included questions on lifetime and past week's greatest regrets. Overall, the target studies for replication covered both scenario experiments (Studies 3 and 4) and surveys regarding real-life experiences (Studies 1 and 5).

To the best of our knowledge, there have been no published direct replications of these target studies. The article has been influential on research in social-cognitive psychology, emotions, and decision-making. At the time of writing (December 2021), there were 549 Google Scholar citations of the article and many important follow-up theoretical and empirical articles (e.g., Bonnefon & Zhang, 2008; Feldman et al., 1999; Gilovich & Medvec, 1995; Towers et al., 2016).

The original studies had small sample sizes (under 100 participants for 2-4 conditions), with similar samples in conceptual replications, and revisiting underpowered classics is valuable in addressing possible concerns over false-positive rates (Christley, 2010). In addition, findings were not always consistent with some of the original hypotheses. For example, Study 5 failed to find support for action-effect in the short-run, whereas Study 4 found support for action-effect in the short-run but failed to find support for a meaningful reversal to inaction-effect in the long run.

We aimed to revisit the original findings to try and address mixed findings in follow-up literature identifying boundary conditions, and findings that were not in support of the temporal pattern. Leach and Plaks (2009) conducted a successful conceptual replication of Gilovich and Medvec (1994) using scenario experiments, and found that the level of

abstraction mediated the temporal pattern of regret. Furthermore, Zeelenberg et al. (1998) found support for temporal pattern of regret with a series of studies that coded interpersonal regrets in the TV show "I Am Sorry" and real life regrets. Also, Bonnefon and Zhang (2008) asked participants to think of "something you personally regret" (p. 3, one single regret only, did not specify whether the event is the *most* regretful or not) and found that the difference for short-term regrets was minimal (48% inaction) whereas long-term regrets were more likely to be inactions. In contrast, several follow-up studies examining temporal patterns of the action-effect indicated limited generalizability and identified various possible boundary conditions. Byrne and McEleney (2000) failed to conceptually replicate scenario experiments Studies 3 and 4 in Gilovich and Medvec (1994) adapting Kahneman and Tversky's (1982) investor scenario. A plausible explanation is that in Byrne and McEleney (2000) scenario experiments, the factual and counterfactual consequences were matched for the actor whereas the counterfactual consequences might be perceived to possibly be better than factual consequences for the non-actor. Byrne and McEleney (2000) argued that the temporal pattern of action-inaction effect only occurs in "situations where the counterfactual consequences of mentally undone inactions are unknown, and possibly better than the factual consequences" (p. 1330). Moreover, Towers et al. (2016) asked participants about their single greatest regret in life and found action regrets were more intense than inaction regrets, contradicting Gilovich and Medvec (1994) findings. Towers et al. (2016) did not directly contrast actions versus inactions, but rather compared intensities of regret coded as action or inaction in reports of regretful events and measured temporal distance continuously but not categorically (lifetime vs recent). Another highly cited article by Feldman et al. (1999) asked participants about personal experiences of regrets and found that participants reported higher numbers of long-term inaction regrets compared to action regrets but failed to find support for difference

in intensity of action-inaction regret, which is the focus of our replication (Studies 1, 3, 4 and 5 of Gilovich and Medvec, 1994).

The above studies differ from Gilovich and Medvec (1994) in methods or scenarios, reaching different conclusions. It is unclear if the failure to support Gilovich and Medvec (1994) is due to original results being unreplicable or the differences in methods or scenarios.

Gilovich and Medvec (1994) inspired later work with important possible implications on regret. Later work proposed that inaction regrets may be more distressing and depressing over a longer period (Broomhall et al., 2017; Gilovich & Medvec, 1995), perhaps because negative feelings and senses of disquiet are stronger when one cannot fulfill the need for action (Roese et al., 1999). There appears to be evidence that in the long run, people tend to ruminate over inactions more compared to actions (Gilovich et al., 1995; Savitsky et al., 1997), possibly because they perceive or imagine more possibilities of counterfactual outcomes from inactions compared to actions with clearer links to outcomes (Leach & Plaks, 2009; Rajagopal et al., 2006). However, before getting into mechanisms and practical implications to sort out this literature, we believe it is essential to revisit the classic effects and assess their reliability and replicability (e.g., Brandt et al., 2014; Zwaan et al., 2018), with preregistered high-powered direct replications and extensions.

Methods, hypotheses, and findings of the target article

The original Study 1 was conducted with adult participants on the telephone, asking participants to compare intensity of their action and inaction regrets in general (Study 1A), and compare intensity of their greatest action regret and greatest inaction regret (Study 1B). The original Studies 3 (within-subject) and 4 (temporal distance as the between-subject factor) were conducted with undergraduates and using scenario experiments that asked participants to compare the intensity of regret of the decision-makers in the short run and the

long run. The original Study 5 was conducted with participants in public areas, asking participants to compare the intensity of regret of their greatest action regret and greatest inaction regret in the past week and in their lifetime. We did not include Study 1B in our replication, as it consisted of questions on greatest lifetime regret, which overlapped with those of Study 5.

We summarized the hypotheses in Table 1. The original authors hypothesized that there would be stronger regret for inaction in the long run and stronger regret for action in the short run. We provide more details regarding the original article in the supplementary. We calculated Cramer V based on the information provided, reported in Supplementary Table 4.

Table 1

Gilovich and Medvec (1994): Summary of hypotheses

Study	**Hypothesis**
Study 1 real-life Regret over past action-inactions	Participants are more likely to report having experienced regret for life's inactions compared to life's actions.
Study 3 (within-subject) Study 4 (between-subject) Hypothetical scenarios	Participants are more likely to associate stronger regret with recent actions than with recent inactions. Participants are more likely to associate stronger regret with distant past inactions than with distant past actions.
Study 5 real-life Regret over recent versus distant past action-inactions	Participants are more likely to experience stronger regret over their most regrettable recent action than over their most regrettable recent inaction. Participants are more likely to experience stronger regret over their most regrettable distant past inaction than over their most regrettable distant past action.

Extension: Responsibility

We aimed to extend the replication to investigate the generalizability of the temporal action-inaction effects in regret findings to responsibility. Regret is associated with evaluations of self-agency and self-blame, key components of responsibility (Frijda et al., 1989; Zeelenberg et al., 2002). Most of the evidence on the regret-responsibility link in the context of action-inaction is based on hypothetical scenario experiments. There are only few real-life experience surveys on regret-responsibility in the action-inaction literature, but there have been some real-life experience successful demonstrations on regret-responsibility link outside the action-inaction literature (e.g. Breugelmans et al., 2014).

We note that regret and responsibility are positively correlated yet separate constructs. Ordónez and Connolly (2000) argued that some people experience some levels of regret over outcomes that they have no agency over (e.g. the outcome was reached by computer reassignment). There are situations in which the decision-maker experiences limited responsibility but stronger regret, such as choosing a lesser-known product brand (Simonson, 1992). Another plausible key difference is that regret tends to be associated with counterfactual thoughts (Huang & Zeelenberg, 2012) compared to responsibility, which is more strongly associated with agency, causality, and morality (Connolly et al., 1997; Kordes-de Vaal, 1996). There may be discrepancies in action-inaction regret and responsibility findings, yet there are several studies reporting a positive regret-responsibility link (e.g. Ordónez & Connolly, 2000; Zeelenberg et al., 2000, 2002). To the best of our knowledge, there are no studies that compared long-term feelings of responsibility regarding action vs inaction. We expected findings for regret to extend similarly to responsibility. See Table 2 for the extension hypotheses.

Table 2

Summary of extension hypotheses

Study	**Hypothesis**
Study 1 real-life Responsibility for past action-inactions	Participants are more likely to report feeling more responsible for life's inactions compared to life's actions.
Study 3 (within-subject) Study 4 (between-subject) Hypothetical scenarios	Participants are more likely to associate stronger responsibility with recent actions than with recent inactions. Participants are more likely to associate stronger responsibility with distant past inactions than with distant past actions.
Study 5 real-life Responsibility for recent versus distant past action-inactions	Participants are more likely to experience stronger feelings of responsibility for their most responsible recent past action compared to their recent most responsible inaction. Participants are more likely to experience stronger feelings of responsibility for their most responsible distant past inaction compared to their most responsible distant past action.

Method

Transparency and Openness

We report the determination of sample size, all data exclusions, all manipulations, and all measures in our studies (Simmons et al., 2012). This manuscript is in line with Appelbaum et al. (2018) Journal Article Reporting Standards (JARS) and Transparency and Openness Promotion (TOP) Guidelines (Nosek et al., 2015). We preregistered designs and analysis plans of all studies before data collection. Pre-registration, all data, code, and materials are available on the Open Science Framework (OSF): https://osf.io/342td/ and https://osf.io/7m3q2/. Open-science details, disclosures, original effects calculations, power analyses, and pre-exclusion results are provided in the supplementary. We analyzed data using RMarkdown (Xie et al., 2018, see RMarkdown output in site for analyses with the list of packages) with RStudio version 1.3.1073 (RStudio Team, 2021) and produced plots with the package *ggplot2* version 3.3.3 (Wickham, 2016).

Participants

We recruited US-American participants from Amazon Mechanical Turk (MTurk) with TurkPrime.com/CloudResearch (Litman et al., 2017). Based on our extensive 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 submission, prevent ballot stuffing, bot detection, security scan monitor, and relevant ID. MTurk has been shown to be a reliable platform for conducting studies in social psychology, judgment, and decision-making (Anderson et al., 2019; Buhrmester et al., 2011; Thomas &

Clifford, 2017). Several recent studies on the action-effect (e.g. Feldman, 2020; Feldman & Albarracín, 2017) and a recent large-scale collaborative project with over 80 replications of judgment and decision-making phenomena has shown MTurk, with TurkPrime.com/CloudResearch to be a highly suitable platform for this research design (Collaborative Open-science Research, 2022). Recently, Eyal et al. (2021) compared levels of attention, comprehension, and dishonesty of participants between several platforms and panels and found that CloudResearch and Prolific provided higher quality compared to other methods (Qualtrics, MTurk without CloudResearch, Dynata).

A total of 1017[1] participants completed the study. We excluded 29 participants based on our pre-registered exclusion criteria (see supplementary for details), resulting in a total sample of 988 participants (M_{age} = 43.94, *SD* = 13.62; 566 females, 408 males, 8 others, 6 prefer not disclosing their gender). We report full results comparing pre-exclusions versus post-exclusions in the supplementary. We provide a comparison of the target article samples and the replication samples in Table 3.

[1] 567 out of 1584 participants decided to drop out during the survey, likely because of the writing description task warnings.

Table 3

Differences and similarities between Gilovich and Medvec (1994) and our replication

	Gilovich and Medvec (1994)	Replication and extension
Sample size	Study 1A: 60, Study 1B: 30, Study 3: 80, Study 4: 76, Study 5: 32	Combined sample: 988 after exclusion
Geographic origin	United States	United States
Gender	Not reported	566 females, 408 males, 8 others, 6 prefer not disclosing their gender
Median age (years)	Not reported	42
Average age (years)	Study 1A: 40.3, Study 1B: 40.1. Not reported for other studies	43.94
Standard deviation age (years)	Not reported	13.62
Age range (years)	Not reported	18-89
Medium (location)	Telephone (Study 1), on the streets (Study 5), and lab (Study 3 and Study 4)	Computer (online), Amazon Mechanical Turk
Compensation	Not reported	Nominal payment: $0.8 USD/participant
Year	1994 or before	2021

To estimate the required sample size, we used pwr package version 1.3 (Champely et al., 2018) and conducted an a-priori power analysis for chi-square goodness of fit 50-50 tests, comparing the proportion of action with stronger regret versus inaction with stronger regret, and chi-square tests of association, testing the association between temporal distance and action-inaction regret. We calculated and reported the original effect sizes in Supplementary Table 4. Aiming for a statistical power of 95% with an alpha of .05, and based on the weakest meaningful effect ($V = 0.24$) that the original authors hypothesized and claimed to find

support for, with more participants perceiving stronger regret for inaction than for action in the long-term in Study 4 (but $p > .05$), the required sample was 920 participants. As we expected some participants to be excluded, we aimed for 1000 participants. We provide more details in the supplementary.

Design and procedure

We made adjustments to the design of the original studies. Extending the original studies and deviating from their procedures, we combined the replications of Studies 1A, 3, 4, and 5 into a singular design in one data collection, with added extensions examining responsibility. First, participants read the consent form. We first presented Study 5, followed by Study 1. Both were personal experience studies. We then randomized participants into either Study 3, a within-subject design, or Study 4, a between-subject design, as Studies 3 and 4 consisted of the same hypothetical scenario and questions. We placed Study 3/Study 4 at the end to prevent the stimuli in the scenario from affecting personal responses. We then presented participants with funneling and demographic questions, followed by a debriefing statement. See below sections for more specific and detailed information about all studies. We note that the study numbers below are based on the study numbers of the original article, but not the order of our replications.

We decided on this design in order to address possible concerns regarding the sample. Despite our ample experience and accumulated evidence in support of validity of our chosen MTurk/CloudResearch sample for replications of classics in judgment and decision-making, reviewers often expressed concerns about online samples regarding inattentiveness, suitability to context (time, setting, etc.), and overall data quality. When some of the findings replicate and others do not, combining the studies allows ruling out inattentiveness as a concern, adequacy of the target sample for these replications, or the adjustments to updated

context (time, setting, etc.), so that we can instead focus on the implications regarding specific designs and found effects. This design has been tested and shown to be successful in several recent replications (Adelina & Feldman, 2021; Chandrashekar et al., 2021; Chen et al., 2021; Ziano et al., 2021).

Deviations from original studies

We provided detailed information of designs (type of study, sample, variables, exact wordings) of the original studies in the Methods and Analyses of the original article section of the Supplementary. We note several deviations from the original, summarized in Table 3 and Table 4. We combined studies into a single survey, and we added responsibility questions as extensions. Finally, we recruited participants through MTurk online, instead of participants from New York and Chicago, or Cornell University students.

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	
Population (e.g. age)	Similar	Both with American participants. However, our replications consist of participants from Amazon Mechanical Turk, instead of adults from New York and Chicago, or Cornell University undergraduate students in the original
IV stimuli	Different for Study 5; Same for Studies 1, 3, and 4	Study 5: Minor changes to ensure the wordings across conditions and action vs inaction are consistent
DV stimuli	Different for Study 5; Same for Studies 1, 3, and 4	Study 5: Minor wording change to Study 5 regret question. We removed "which one would you "undo" if you could". We also asked participants to describe their regrets and responsibilities[2] in Study 5 (which was not required in the original), as this lowers the chance of quick irrelevant or random responses, ensuring participants are thinking about the task and responding seriously. We asked participants for brief descriptions and reminded them that they did not have to disclose information they did not feel comfortable with.
Procedural details	Different	We combined Studies 1, 3, 4, and 5 into a single Qualtrics survey. The original article used separate samples.
Physical settings	Different	Online data collection in our replication vs real-life and telephone data collection in the original
Contextual variables	Different	The original authors conducted their studies in the early 1990s whereas we conducted our replications in 2021.
Replication classification	Studies 1, 3, 4: Very close replication; Study 5: Close replication	For our Study 5, the IV stimuli and the DV stimuli are different from that of the original study.

[2] Additionally, we checked descriptions of participants and conducted exploratory analyses excluding incorrect and irrelevant descriptions of action-inaction regrets or responsibilities. The findings are reported in the Supplementary Exploratory Analyses of Study 5 section. Such findings are very similar to findings reported in the main manuscript.

Replications classification

We summarized Studies 1, 3, and 4 as "very close replications" and Study 5 as a "close replication" based on the criteria by LeBel et al. (2018) (see Figure S3 in the Supplementary), with our classification analysis provided in Table 4.

Study 5: Method

First, in Study 5, participants answered questions regarding their greatest regrets. Temporal distance (the past week vs entire life, in counterbalanced order) was the independent variable. We asked participants to think about and describe their greatest lifetime action-regret and greatest lifetime inaction-regret, as well as greatest past week action-regret and greatest past week inaction-regret. We then asked them which they regretted more. In the original study, participants were only required to think about but not describe their regrets. However, in our replication we asked participants to briefly write about their regrets. By having participants briefly describe their regrets, we felt they would be more likely to engage in effortful reflections, and less likely to respond randomly, thereby ensuring better data quality. We reminded participants that they do not need to disclose any information they feel uncomfortable sharing. We also went to great lengths to align expectations about the task – we made it clear in our study recruitment and with a specific question in the consent screen that the task involves brief writing and that the study is about life regrets (see "Study recruitment" and "Writing task expectation alignment in consent" in the supplementary).

We randomized participants to either answer the replication questions or extension questions. In the extension condition, we asked participants about the action decision that they felt most personally responsible for and the inaction decision that they felt most personally responsible for, in the past week and in their lifetime (in counterbalanced order). Similarly, we asked participants to very briefly describe these events. They then answered

which of those they felt more responsible for. Full details are provided in Table S5 in the supplementary.

Study 5: Results

Replication: Regret

For past week regrets, with the chi-square goodness-of-fit test, we failed to find support for a deviation from a 50-50 split in participants experiencing stronger regret for the action (52.34%) than inaction (47.66%), $z = 1.04$, $\chi 2$ (1, $N = 535$) = 1.17, $p = .280$, $V = 0.05$, 95% CI [0.00, 0.13] (see Figure 1 top left plot).

For lifetime regrets, with the chi-square goodness-of-fit test, we failed to find support for a deviation from 50-50 split in participants experiencing stronger regret for the action (52.15%) than inaction (47.85%), $z = 0.95$, $\chi 2$ (1, $N = 535$) = 0.99, $p = .320$, $V = 0.04$, 95% CI [0.00, 0.13] (see Figure 1 top right plot).

Comparing the proportion of participants experiencing stronger action regret in the past week and experiencing stronger inaction regret in lifetime (133/265, 265 is the total number of participants who showed reversal, 50.19%), versus the proportion of participants choosing inaction in the past week and choosing action in lifetime (132/265, 49.81%), we failed to find support for a deviation from 50-50 distribution, $z = 0.00$, $\chi 2$ (1, $N = 265$) = 0.00, $p = .951$, $V = 0.00$, 95% CI [0.00, 0.14]. We also conducted a McNemar test, and failed to find support for the association between temporal distance and inaction-action regret, $OR = 0.99$, 95% CI [0.77, 1.27], $p = 1$.

Extension: Responsibility

For the responsibility over the week, with the chi-square goodness-of-fit test, we found support for a deviation from 50-50 split in participants experiencing stronger responsibility

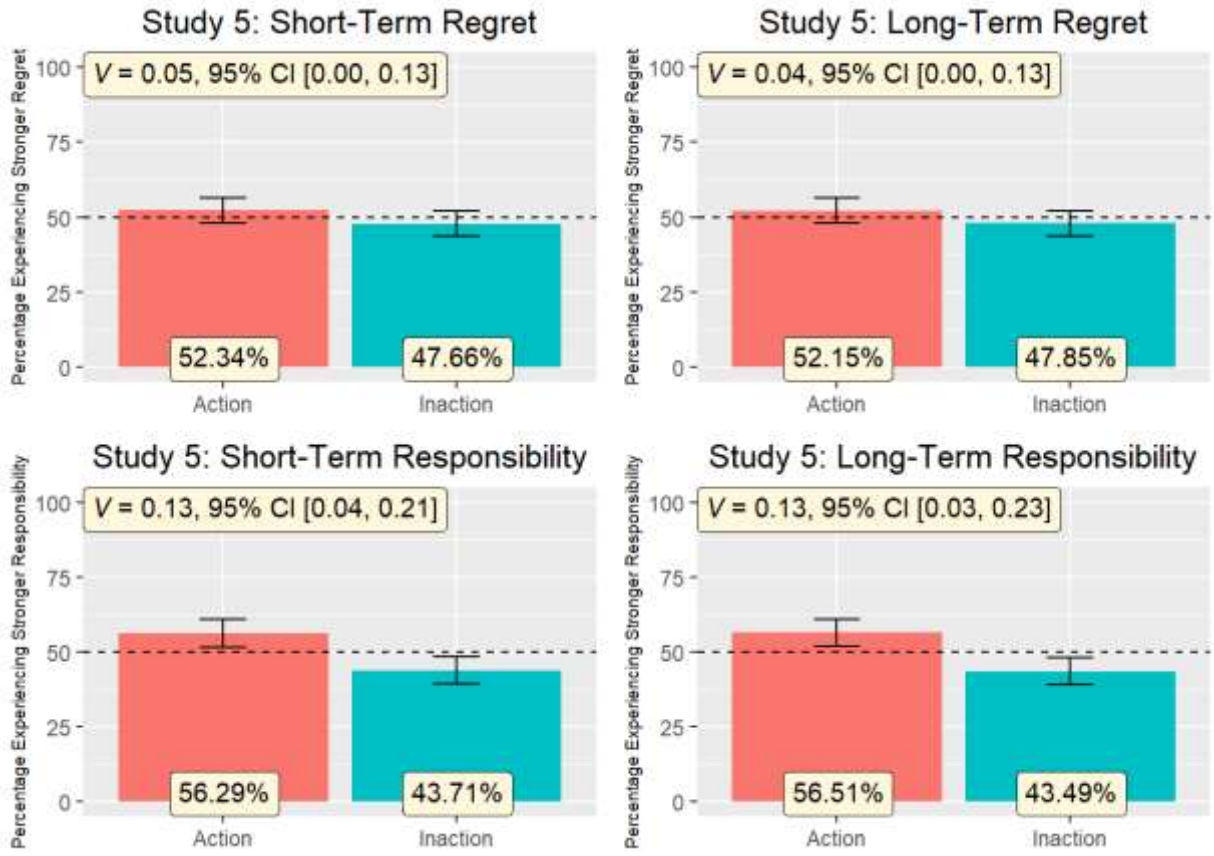
for the action (56.29%) versus participants experiencing stronger responsibility for the inaction (43.71%), $z = 2.63$, $\chi 2$ (1, $N = 453$) = 7.17, $p = .007$, $V = 0.13$, 95% CI [0.03, 0.22]. More participants felt stronger responsibility for action compared to inaction(see Figure 1 bottom left plot).

For the responsibility over the lifetime, with the chi-square goodness-of-fit test, we found support for a deviation from 50-50 split in participants experiencing stronger responsibility for the action (56.51%) versus participants experiencing stronger responsibility for the inaction (43.49%), $z = 2.73$, $\chi 2$ (1, $N = 453$) = 7.68, $p = .006$, $V = 0.13$, 95% CI [0.03, 0.22]. More participants felt stronger responsibility for action compared to inaction (see Figure 1 bottom right plot).

Comparing the proportion of participants experiencing stronger action responsibility in the past week and experiencing stronger inaction responsibility in lifetime (100/201, 49.75%), versus the proportion of participants choosing inaction in the past week and choosing action in lifetime (101/201, 50.25%), we failed to find support for a deviation from 50-50, $z = 0.00$, $\chi 2$ (1, $N = 201$) = 0.00, $p = .944$, $V = 0.00$, 95% CI [0.00, 0.16]. We also conducted a McNemar test, and failed to find support for the association between temporal distance and action-inaction responsibility, $OR = 1.01$, 95% CI [0.76, 1.35], $p = 1$.

Figure 1

Study 5: Action-inaction regret and responsibility - short-term (past week) and long-term (lifetime)



Note. Error bars denote 95% confidence intervals. Short term = past week. Long term = lifetime.

Study 1a: Method

After Study 5, we presented Study 1. We asked participants about their action and inaction regretful experiences - “When you look back on your experiences in life and think of those things that you regret, what would you say you regret more, those things that you did but wish you hadn't, or those things that you didn't do but wish you had?” (Gilovich & Medvec, 1994, p. 358). We asked another group of participants regarding their felt responsibility for life's personally responsible actions and inactions - "When you look back

on your experiences in life and think of those things that you feel personally responsible for, what would you say you feel personally responsible more, those things that you did but wish you hadn't, or those things that you didn't do but wish you had?".

Study 1a: Results

Replication: Regret

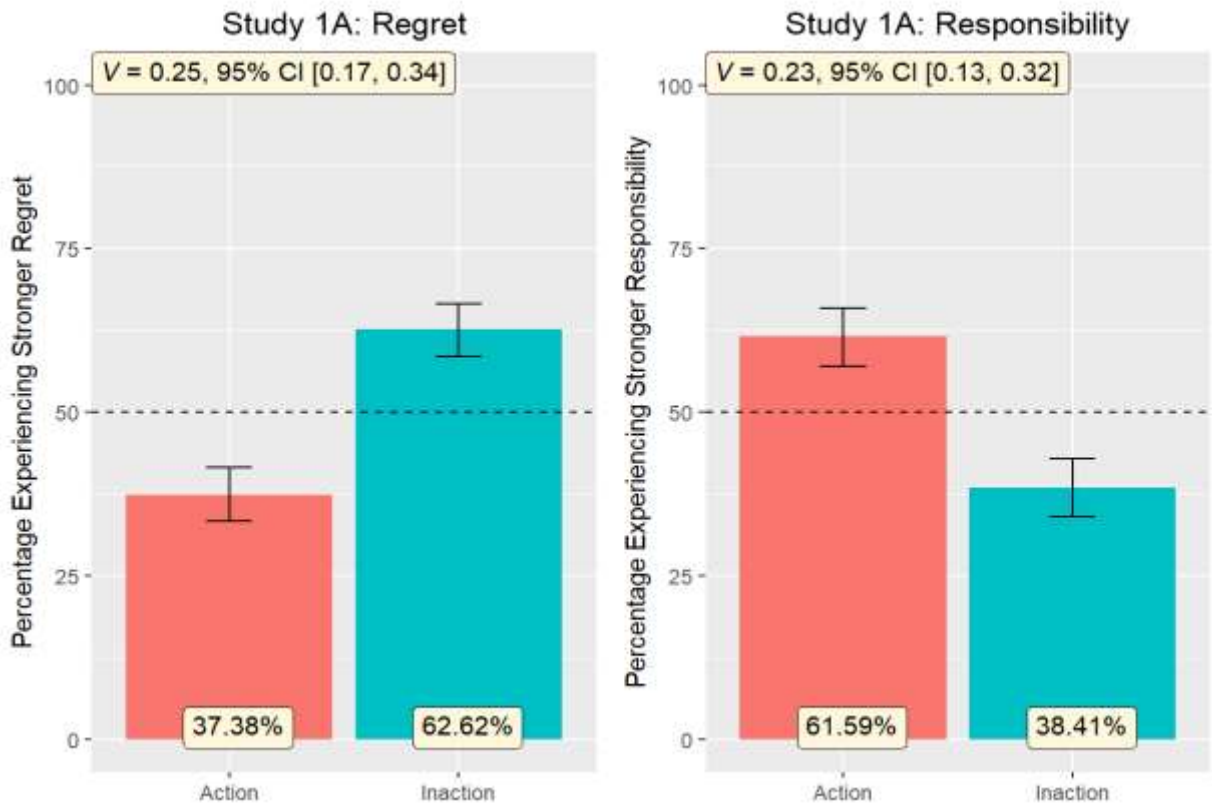
We began by examining regret, we conducted a chi-square goodness of fit test against a 50-50 action-inaction split , $z = -5.79$, $\chi 2$ (1, $N = 535$) = 34.07, $p < .001$, $V = 0.25$, 95% CI [0.17, 0.34], and found support for stronger regret for inactions; more participants reported experiencing stronger regret over lifelong inactions (62.62%) than those reporting experiencing stronger regret over lifelong actions (37.38%) (see Figure 2 left plot).

Extension: Responsibility

To examine our responsibility extension, we conducted a chi-square goodness of fit test against a 50-50 action-inaction split, $z = 4.89$, $\chi 2$ (1, $N = 453$) = 24.34, $p < .001$, $V = 0.23$, 95% CI [0.14, 0.32], and found that more participants reported stronger responsibility over lifelong regrettable actions (61.59%) than those reporting stronger responsibility for lifelong regrettable inactions (38.41%) (see Figure 2 right plot).

Figure 2

Study 1A: Action-Inaction Regret and Responsibility



Note. Error bars denote lower confidence intervals and upper confidence intervals (95%).

Studies 3 and 4: Method

After completing Studies 5 and 1a, we presented participants with scenario experiments on college decisions: Inaction Dave stayed in the same college whereas Action Jim switched to another college, and both were unsatisfied. We randomized participants into either a within-subject design as in Study 3 (participants compared feelings of regret and responsibility of Dave vs. Jim in both short-term and long-term), or a between-subject design as in Study 4 (participants answered short-term or long-term questions). In Studies 3 and 4,

participants answered both replication and extension questions. We provide more details on the designs of Studies 3 and 4 in the supplementary's Tables 7 and 8).

Study 4 (between-subject): Results

Replication: Regret

In the short-term condition of the between-subject design study, we conducted a chi-square goodness of fit test and found support for more participants perceiving stronger regret for action Jim (60.65%) than for inaction Dave (39.35%), $z = 3.69$, $\chi 2$ (1, $N = 247$) = 14.09, $p < .001$, $V = 0.24$, 95% CI [0.12, 0.36] (see Figure 3 top left for the plot).

In the long-term condition, we conducted a chi-square goodness of fit test and found that more participants perceiving stronger regret for inaction Dave (57.61%) than for action Jim (42.39%), yet this did not meet our pre-defined alpha leading us to conclude no support, $z = -1.59$, $\chi 2$ (1, $N = 248$) = 2.73, $p = .099$, $V = 0.10$, 95% CI [0.01, 0.23] (see Figure 3 top right for the plot).

We conducted a chi-square test of independence and found support for the association between temporal distance and action-inaction regret, $\chi 2$ (1, $N = 495$) = 14.68, $p < .001$, $V = 0.17$, 95% CI [0.08, 0.26]. We found that compared to short-term, long-term perspective was associated with stronger perceived regret for inaction.

Extension: Responsibility

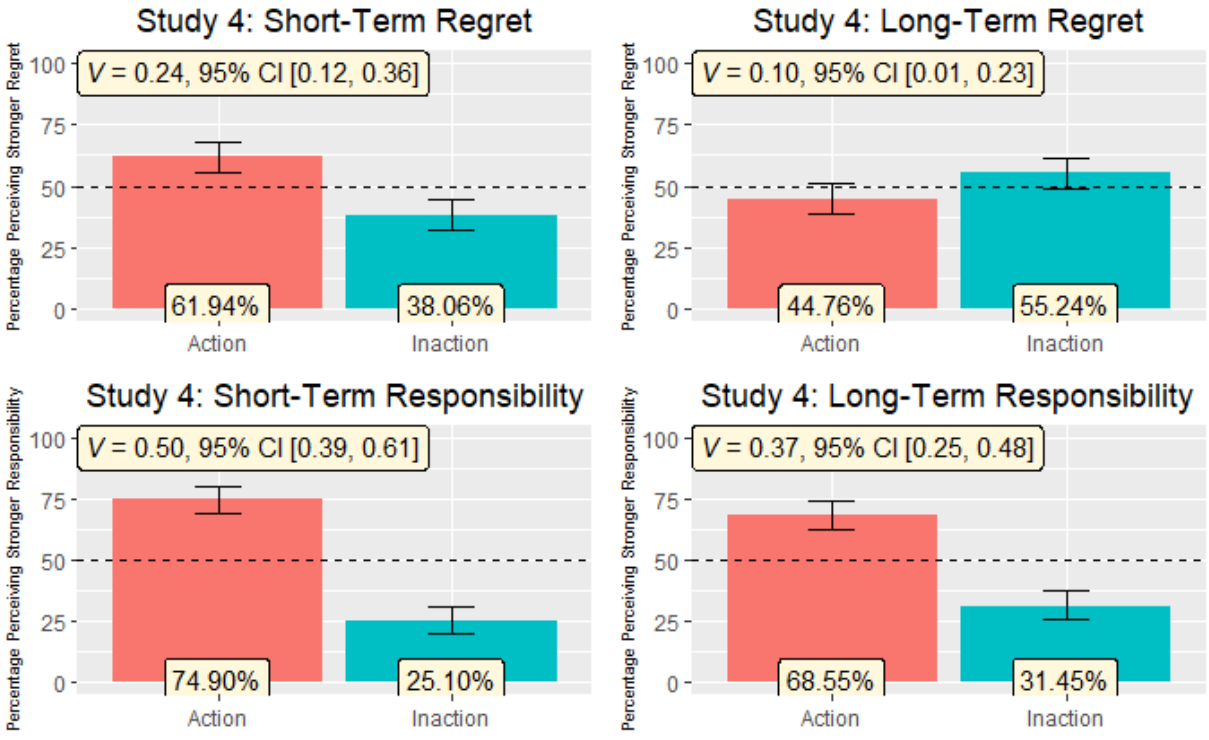
Examining responsibility in the short-term condition, we conducted a chi-square goodness of fit test and found support for more participants perceiving stronger responsibility for action Jim (61.94%) than for inaction Dave (38.06%), $z = 7.76$, $\chi 2$ (1, $N = 247$) = 61.25, $p < .001$, $V = 0.50$, 95% CI [0.39, 0.60] (see Figure 3 bottom left for the plot).

Examining responsibility in the long-term condition, we conducted a chi-square goodness of fit test and found support for more participants perceiving stronger responsibility for action Jim (74.90%) than for inaction Dave (25.10%), $z = 5.78$, $\chi 2$ (1, $N = 248$) = 34.13, $p < .001$, $V = 0.37$, 95% CI [0.25, 0.49] (see Figure 3 bottom right for the plot).

We conducted a chi-square test of independence and failed to find support for the association between temporal distance and action-inaction responsibility, $\chi 2$ (1, $N = 495$) = 2.46, $p = .117$, $V = 0.07$, 95% CI [0.00, 0.16].

Figure 3

Study 4: Short-Term and Long-Term Action-Inaction Regrets and Responsibilities Plots



Note. Error bars denote lower confidence intervals and upper confidence intervals (95%).

Study 3 (within-subject): Results

Replication: Regret

In the short-term condition of the within-subject design study, we conducted a chi-square goodness of fit test (meant to mirror the analyses for Study 4 to allow for a comparison) and found support for more participants perceiving stronger regret for action Jim (61.26%) than for inaction Dave (38.74%), $z = 4.95$, $\chi 2$ (1, $N = 493$) = 24.99, $p < .001$, $V = 0.23$, 95% CI [0.14, 0.31] (see Figure 4 top left plot).

In the long-term condition, we conducted a chi-square goodness of fit test and found support for more participants perceiving stronger regret for inaction Dave (57.61%) than for action Jim (42.39%), $z = -3.33$, $\chi 2$ (1, $N = 493$) = 11.41, $p < .001$, $V = 0.15$, 95% CI [0.06, 0.24] (see Figure 4 top right plot).

Comparing the proportion of participants choosing action Jim in the short term and choosing inaction Dave in the long term (113/133, the total number of participants who showed reversal in answers, 84.96%), versus the proportion of participants choosing inaction Dave in the short term and choosing action Jim in the long term (20/133, 15.04%), we found support for a deviation from 50-50, $z = 7.98$, $\chi 2$ (1, $N = 133$) = 65.03, $p < .001$, $V = 0.70$, 95% CI [0.56, 0.80]. More participants chose action in the short term and inaction in the long term, compared to inaction in the short term and action in the long term. We also conducted a McNemar test, and found support for the association between temporal distance and action-inaction regret, $OR = 0.18$, 95% CI [0.10, 0.29], $p < .001$.

Extension: Responsibility

Examining responsibility in the short-term condition, we conducted a chi-square goodness of fit test and found support for more participants perceiving stronger responsibility for action

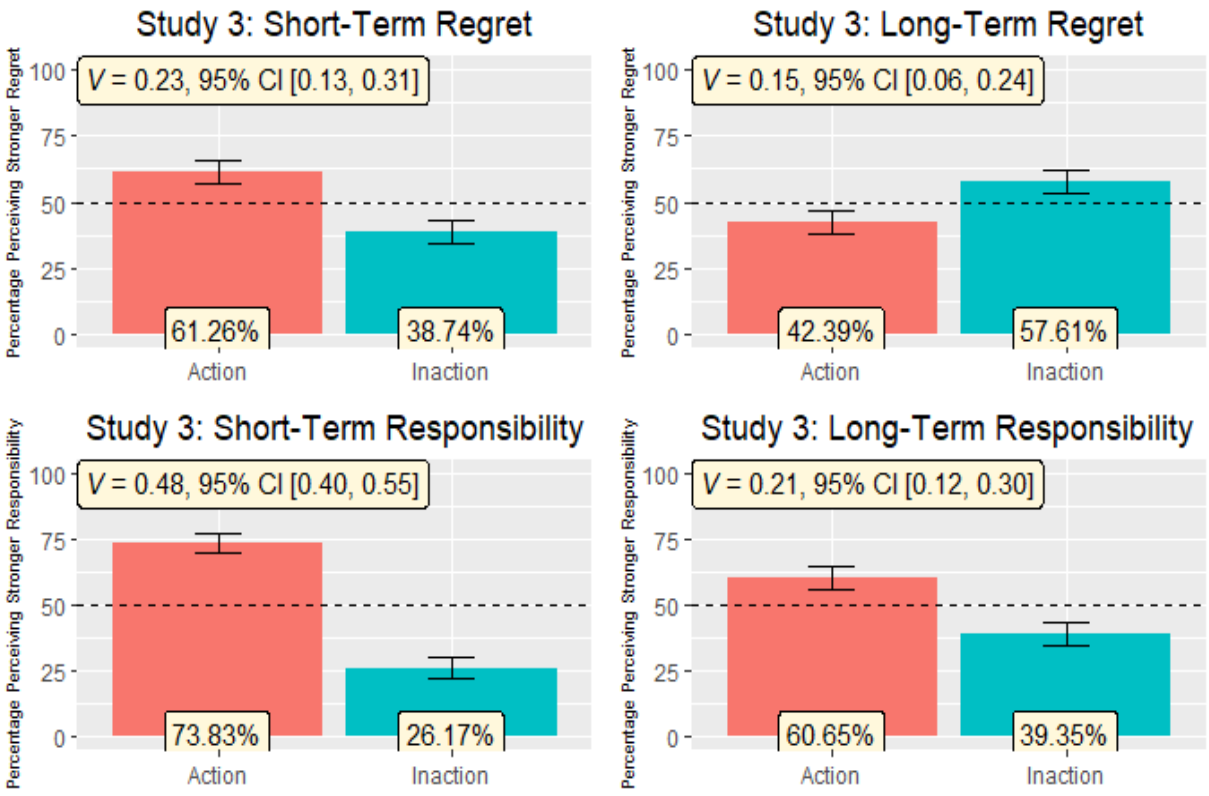
Jim (73.83%) than for inaction Dave (26.17%), $z = 10.54$, $\chi 2$ (1, $N = 493$) = 112.02, $p < .001$, $V = 0.48$, 95% CI [0.40, 0.55] (see Figure 4 bottom left plot).

Examining responsibility in the long-term condition, we conducted a chi-square goodness of fit test and found support for more participants perceiving stronger responsibility for action Jim (60.65%) than for inaction Dave (39.35%) , $z = 4.68$, $\chi 2$ (1, $N = 493$) = 22.36, $p < .001$, $V = 0.21$, 95% CI [0.13, 0.29] (see Figure 4 bottom right plot).

Comparing the proportion of participants choosing action Jim in the short term and choosing inaction Dave in the long term (94/123, 76.42%), versus the proportion of participants choosing inaction Dave in the short term and choosing action Jim in the long term (29/123, 23.58%), we found support for a deviation from 50-50, $z = 5.77$, $\chi 2$ (1, $N = 123$) = 34.35, $p < .001$, $V = 0.53$, 95% CI [0.37, 0.67]. More participants chose stronger responsibility for action in the short term and for inaction in the long term, compared to stronger responsibility for inaction in the short term and for action in the long term. We also conducted a McNemar test, and found support for the association between temporal distance and action-inaction responsibility, $OR = 0.31$, 95% CI [0.20, 0.47], $p < .001$. Temporal distance had an impact on the choice distribution. The difference in the proportion between action and inaction was weaker in the long-term compared to that in the short-term. The effect was in the same direction as that in regret, but did not lead to a complete reversal of perceptions.

Figure 4

Study 3: Short-Term and Long-Term Action-Inaction Regrets and Responsibilities Plots



Note. Error bars denote lower confidence intervals and upper confidence intervals (95%).

Overall summary of findings All Studies

We summarized descriptive statistics of all studies in Table 5. We summarized the comparison of all effects of original studies versus our replications in Table 6, with an interpretation of the results based on the LeBel et al. (2019) replication results evaluation criteria.

Table 5

Summary of descriptive statistics for all studies for both regret and responsibility

Study	Action Count	Action Percentage	Inaction Count	Inaction Percentage
Study 1 General Regret	200/535	37.38%, 95% CI [33.39%, 41.56%]	335/535	62.62%, 95% CI [58.44%, 66.61%]
Study 1 General Responsibility	279/453	61.59%, 95% CI [57.03%, 65.95%]	174/453	38.41%, 95% CI [34.05%, 42.97%]
Study 3 Short Term Regret	302/493	61.26%, 95% CI [56.89%, 65.46%]	191/493	38.74%, 95% CI [34.54%, 43.11%]
Study 3 Long Term Regret	209/493	42.39%, 95% CI [38.11%, 46.80%]	284/493	57.61%, 95% CI [53.20%, 61.89%]
Study 3 Short Term Responsibility	364/493	73.83%, 95% CI [69.78%, 77.52%]	129/493	26.17%, 95% CI [22.48%, 30.22%]
Study 3 Long Term Responsibility	299/493	60.65%, 95% CI [56.27%, 64.86%]	194/493	39.35%, 95% CI [35.14%, 43.73%]
Study 4 Short Term Regret	153/247	61.94%, 95% CI [55.75%, 67.77%]	94/247	38.06%, 95% CI [32.23%, 44.25%]
Study 4 Long Term Regret	111/248	44.76%, 95% CI [38.70%, 50.98%]	137/248	55.24%, 95% CI [49.02%, 61.30%]
Study 4 Short Term Responsibility	185/247	74.90%, 95% CI [69.14%, 79.90%]	62/247	25.10%, 95% CI [20.10%, 30.86%]
Study 4 Long Term Responsibility	170/248	68.55%, 95% CI [62.52%, 74.01%]	78/248	31.45%, 95% CI [25.99%, 37.48%]
Study 5 Greatest Past Week Regret	280/535	52.34%, 95% CI [48.10%, 56.54%]	255/535	47.66%, 95% CI [43.46%, 51.90%]
Study 5 Greatest Lifetime Regret	279/535	52.15%, 95% CI [47.92%, 56.35%]	256/535	47.85%, 95% CI [43.65%, 52.08%]
Study 5 Greatest Past Week Responsibility	255/453	56.29%, 95% CI [51.69%, 60.79%]	198/453	43.71%, 95% CI [39.21%, 48.31%]
Study 5 Greatest Lifetime Responsibility	256/453	56.51%, 95% CI [51.91%, 61.00%]	197/453	43.49%, 95% CI [39.00%, 48.09%]

Table 6

Summary of statistical tests and comparison with the original effect sizes

	Chi-square	*p*	Replication Cramer V and CI	Original Cramer V and CI	Interpretation
Study 1 - Chi-Square Goodness of Fit Test					
General Regret	χ^2 (1, *N* = 535) = 34.07	< .001	*V* = 0.25, 95% CI [0.17, 0.34]	*V* = 0.50, 95% CI [0.27, 0.70]	Signal, inconsistent, smaller (successful replication)
Study 3 - Chi-Square Goodness of Fit Test					
Short Term Regret	χ^2 (1, *N* = 493) = 24.99	< .001	*V* = 0.23, 95% CI [0.14, 0.31]	*V* = 0.53, 95% CI [0.35, 0.70]	Signal, inconsistent, smaller (successful replication)
Long Term Regret	χ^2 (1, *N* = 493) = 11.41	< .001	*V* = 0.15, 95% CI [0.06, 0.24]	*V* = 0.28, 95% CI [0.05, 0.48]	Signal, inconsistent, smaller (successful replication)
Action-inaction vs. Temporal Change	χ^2 (1, *N* = 133) = 65.03	< .001	*V* = 0.70, 95% CI [0.56, 0.80]	Insufficient information	Signal, the effect size cannot be directly compared, but successful replication
Study 4 - Chi-Square Goodness of Fit Test and Test of Independence					
Short Term Regret	χ^2 (1, *N* = 247) = 14.09	< .001	*V* = 0.24, 95% CI [0.12, 0.36]	*V* = 0.53, 95% CI [0.24, 0.76]	Signal, inconsistent, smaller (successful replication)
Long Term Regret	χ^2 (1, *N* = 248) = 2.73	= .099	*V* = 0.10, 95% CI [0.01, 0.23]	*V* = 0.24, 95% CI [0.00, 0.52]	Unclear (see notes) (likely successful replication)
Action-inaction vs. Temporal Change	χ^2 (1, *N* = 495) = 14.68	< .001	*V* = 0.17, 95% CI [0.08, 0.26]	*V* = 0.38, 95% CI [0.16, 0.61]	Signal, inconsistent, smaller (successful replication)
Study 5					
Short Term Regret	χ^2 (1, *N* = 535) = 1.17	= .280	*V* = 0.05, 95% CI [0.00, 0.13]	*V* = 0.06, 95% CI [0.00, 0.44]	No signal, consistent (successful replication)
Long Term Regret	χ^2 (1, *N* = 535) = 0.99	= .320	*V* = 0.04, 95% CI [0.00, 0.13]	*V* = 0.56, 95% CI [0.25, 0.81]	No-signal, inconsistent (failed replication)
Temporal Distance and Action-Inaction Regret	χ^2 (1, *N* = 265) = 0.00	= .951	*OR* = 0.99, 95% CI [0.77, 1.27]	Insufficient information	No signal, likely failed replication

Note. 1) We conducted Chi-Square goodness of fit tests for the above studies, except for Study 4 association between Temporal Distance and Action and Inaction Regret, in which we conducted a Chi-Square test of independence. The interpretation of outcome is based on LeBel et al. (2019). 2) For Study 4 long-term regret part, LeBel et al. (2019) Criteria B does not account that it is possible for a finding to not reach significance and for the effect size CIs to not cover the original effect size. This can be considered as a case of "no signal, inconsistent".

Comparing replication findings to original findings and extensions

We successfully replicated and found support for the original findings in Studies 1, 3, and 4 (short-term regret and temporal effect) with smaller effect sizes. For our replication of Study 4's long-term regret, the CIs of the replication did not cover the original effect size, and we failed to find support for the effect (which was the case in both the original and the replication).

We failed to successfully replicate Study 5. We failed to find support for an action-effect in the short-term, and failed to find support for an inaction-effect in the long-term.

Regarding our responsibility extensions, we conclude stronger responsibility for action over inaction across all studies, for both short-term and long-term.

Discussion

We conducted a pre-registered replication of the temporal pattern of action-effect by Gilovich and Medvec (1994), with a more diverse (Buhrmester et al., 2011) and high-powered sample. We successfully replicated Study 1, which focused on general regrets, as well as Studies 3 and 4, which were scenario studies asking participants to compare regret for action versus inaction. More participants reported stronger regret for action in the short-run, but stronger regret for inaction in the long run.

In Study 5, we failed to find support for an action-effect in the short-term, failed to replicate findings for the long-term, and the proposed association between temporal distance and action-effect.

Possible reasons behind the discrepancy in findings of Studies 1, 3, and 4 versus Study 5

Why did the replication of Study 5 fail while the replication of the other studies succeeded?

Previous studies have shown MTurk to be a reliable platform for the study of action and inaction, and judgment and decision-making more broadly (e.g. Feldman, 2020; Feldman & Albarracín, 2017). Our design and the other successful replications of Studies 1, 3, and 4 address concerns regarding sample characteristics or time, given that they were conducted using the same sample. Therefore, we believe the more plausible explanations are the differences in methods and the likelihood of a false positive. We note that the sample size in the original Study 5 was 32, with a much higher likelihood of a false-positive. Our sample was substantially larger and well-powered, yet we were unable to detect the inaction-effect in the long run.

Why would the method used in Study 5 result in different findings? We believe this might have to do with the ways action and inaction are conceptualized in the different studies. In Study 5 action refers to “something they did” versus inaction as “something they did not do”. In Study 3 and Study 4, action is conceptualized as a switching behavior, a change to the status quo, versus inaction, which is sticking with the status quo. Unfortunately, these issues seem to be widespread in this literature, with recent reviews alerting that action and inaction are often ill-defined terms and in urgent need of clarifications (Feldman et al., 2021).

Our findings are consistent with a large body of literature showing support for an action effect in high-risk recent situations that result in negative outcomes. The typical action-effect scenarios refer to changing, switching, or deviating from a set reference point (e.g., past behavior, status quo) (e.g. Feldman & Albarracín, 2017; Gleicher et al., 1990; Landman, 1987), with norm theory (Kahneman & Miller, 1986) arguing that is likely due to

action being perceived as more abnormal than inaction (Feldman, 2020), and that exceptionality tends to elicit higher regret than normality (Kutscher & Feldman, 2019). The meaning of action and inaction in Studies 3 and 4 was closer to the typical action-effect and norm theory scenarios (Kahneman & Miller, 1986). However, in Study 5, the meaning of action was far broader with no clear reference to a norm or a reference point. Therefore, the differences between action as in doing and inaction as in not doing seem less clear and with no clear indication of what to compare to.

Beyond differences in meaning, another possible explanation is regarding the differences between perceptions of others' emotions in Studies 3 and 4 and the evaluation of personal actual experiences of emotions elicited in Study 5. Perceptions of emotions in others tend to be less accurate and differ from actual personal experiences, especially if there is no personal relevance to the situation evaluated in the presented scenario. The failed replication of Study 5 seems consistent with most studies that directly ask participants about their personal experiences (Bonnefon & Zhang, 2008; Feldman et al., 1999[3]; Towers et al., 2016), but inconsistent with Zeelenberg et al. (1998) studies, in which they found support for temporal pattern of regret in real life experiences for *interpersonal* regrets (they did not test other kinds of regrets).

Another possible explanation for our different findings in Study 5 is a change we made to the original study's design. We required participants to describe their regrets, whereas Gilovich and Medvec (1994) only required participants to recall their regrets without writing those down. We, however, find this explanation unlikely. The target's concern was that participants may be unwilling to describe their very embarrassing and shameful regrets,

[3] Feldman et al. (1999) found support for higher *frequencies* of inaction regrets compared to action regrets, but failed to find support for *intensity* differences between action and inaction regrets. Study 5 focuses on intensity but not frequency.

yet taking a closer look at the responses (found in our dataset), we found that many participants described highly personal, shameful, and somewhat tragic events, including events involving death, major career failures, major educational failures, major relationship failures, etc. However, we cannot completely rule out the possibility of such differences having an impact on the findings, and future research can further test this possibility by asking half of the participants to describe a major regret and asking other participants to simply think about a major regret.

Another possible explanation raised in the peer-review was that Study 5 may not have been suitable for our online MTurk target sample, given concerns of attentiveness and seriousness. As we discussed earlier, MTurk with CloudResearch/TurkPrime provides high-quality responses, in which participants are as if not more attentive than on other platforms (Eyal et al., 2021). The successful replications of the other studies in our unified design address concerns of attentiveness. We also addressed this concern by conducting additional exploratory analyses (see the Exploratory Analyses of Study 5 section in the Supplementary) excluding responses in which participants seem to have misunderstood or confused action and inaction, or participants reporting lifetime mistakes in past week mistakes questions (or vice versa), and non-regret/non-responsibility responses. We found that only a very low % of participants (ranging from 1.68% for lifetime regret, to 7.28% for past week responsibility) misclassified responses. Our results of the exploratory analyses with those participants excluded were consistent with results we reported above.

Studies 3 and 4 were also better controlled with specific scenarios, whereas Study 5 did not restrict the range of elicited regrets, which included many different domains in life, such as education, work, relationships, finance, etc.

What is puzzling about the above explanations is that although we failed to find support for lifetime recalls in Study 5, we did find support for the effects in Study 1. Both Study 1 and Study 5 asked participants about "things that they did" versus "things that they didn't do". Yet, one key difference was that Study 1 elicited general regrets and asked participants to evaluate those together rather than contrasting one most regrettable action against one most regrettable inaction. Therefore, it is possible that specificity is a moderating factor of the effect. The autobiographical memory framework by Davison and Feeney (2008) suggested that regret is about remembering past events with different levels of specificity and generality. They found that general regrets were more likely to be for inactions over action, yet specific regrets were more likely to be for actions than inactions.

The above proposed reasons for the discrepancies between studies in the same article are speculative, and we conclude that more work is needed to examine any of the proposed moderators with direct testing.

Responsibility Extension

Regret and responsibility are often positively related (e.g. Zeelenberg et al., 2000, 2002), -yet are distinct constructs. We found consistent support for stronger responsibility for action compared to inaction for the recent past, and the finding for responsibility in the recent past generally aligned with that of regret. However, while there was some support for differences between recent past and distant past for responsibility, the effect seems much weaker than for regret, and we did not find a full reversal toward stronger responsibility for inaction in the distant past. Instead, consistently across different designs, we also found support for stronger responsibility for action for the distant past events. Responsibility seems to be more strongly associated with morality, causality, and agency (Connolly et al., 1997). Changes in perceived responsibility intensity perhaps fluctuate less over time compared to

regret, which is a counterfactual emotion that may fluctuate over time more as people may feel more confident that they would have made it *if* they had taken actions, thereby regretting inaction more in the long-run (Gilovich et al., 1993; Gilovich & Medvec, 1995). That said, we note this explanation is speculative and more work comparing mechanisms of regret and responsibility in action-inaction studies is needed.

These findings may hold important implications for the link between the action-effect and omission-bias. Omission bias extends the action-effect to reflect action-inaction asymmetries regarding responsibility and blame. More work is needed on the potential moderating effect of time with regret and responsibility examined together for both action-effect and omission-bias scenarios.

Our findings for responsibility in Study 3's within-subject design and Study 4's between-subject design were slightly different, with stronger effects for the within-subject design. There are quite a few judgment and decision-making effects that are stronger with within-subject design compared to between-subject design (Charness et al., 2012), and more work is needed to contrast the two regarding action-effect and omission-bias.

Possible limitations and future directions

We faced some challenges with the studies eliciting life events. A small number of participants (1.68% to 7.28%) wrote inaction events in the action description box or vice versa, with some participants reporting they did not experience any action or inaction regret or responsibility in the past week. In an online study we cannot rule out the possibility that some participants may have copy-pasted, and based on our experience there are indications that MTurk participants typically dislike writing tasks. However, we tend to think that the likelihood of this being an issue in our design is very low, as we adopted numerous quality control methods, aligned expectations in advance about the task, and only asked for brief

descriptions in one or two sentences. We checked all responses, and found that most responses were of high-quality. We also conducted exploratory non-pre-registered analyses excluding possibly irrelevant and incorrect responses (which were only a very small proportion of the entire sample) and the results (reported in the supplementary) were very similar to the results after pre-registered exclusion or full results. Therefore, we believe it is less likely that the null findings in Study 5 are due to this issue and find it more likely that such null findings are due to differences in meanings of action-inaction. To resolve the discrepancy in findings between Study 5 and Studies 1, 3, and 4, future studies can make adaptations to Study 5 by manipulating the definitions of action and inaction (Feldman et al., 2021). Also, we cannot completely rule out the possibility that our adjustments of adding brief writing to the Study 5 recall task may have impacted the results, and so future studies may also compare findings of recall tasks that involve versus do not involve writing the recalled memory, as well as test this phenomenon with other non-MTurk/CloudResearch samples to investigate if there are meaningful differences.

We note that a single replication of a single article is insufficient to answer all the questions in the literature with high certainty, and we call for more well-powered pre-registered replications of work in this domain, preferably by third-parties and in the form of Registered Reports.

We reported aggregated tendencies regarding temporal effects related to action and inaction yet there are individual differences factors that may play a role in moderating these effects (e.g. action-state orientation, Diefendorff et al., 2000; regulatory focus, Itzkin et al., 2016).

Many of the findings in this literature were conducted in mostly WEIRD settings (Western, Educated, Industrialized, Rich and Democratic; Henrich et al., 2010), and more

research is needed to study these effects in less WEIRD regions, and/or include cultural dimensions as potential moderators of these effects.

In our extension, we found differences in findings regarding regret and responsibility. Studies in the action-inaction literature rarely measure regret and responsibility together, and more work is needed to investigate the associations between the two constructs in the context of action-inaction effects.

We believe that more replications with extensions are needed to better understand the robustness of the findings in this literature and examine new directions, together with meta-analyses of the action-inaction related literature (e.g., action-effect: Yeung & Feldman, 2022; omission bias: Yeung et al., 2022), to examine possible moderating factors such as temporal distance, scenarios versus experience, between-subject versus within-subject study design comparison, and the used meanings of action versus inaction. We require a more comprehensive systematic aggregation of findings and insights to identify boundary conditions.

Conclusion

We conducted a replication and extension of Gilovich and Medvec (1994) revisiting the temporal pattern of regret in action versus inaction and adding extensions examining temporal pattern of responsibility. We found support for the original findings on regret with different designs both examining lifelong experiences in Study 1 and hypothetical scenarios in Studies 3 and 4, though with weaker effects. However, we failed to find support for such a pattern in Study 5, and we discussed possible explanations. We called for better conceptualizations of the terms action and inaction in the literature, with more replications and extensions of classic studies of the action-inaction literature and follow-up meta-analyses to help resolve inconsistencies in findings. We also reported the findings of an extension

examining temporal pattern regarding attributions of responsibility, and discussed the regret-responsibility link.

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Revisiting the Temporal Pattern of Regret: Replication of Gilovich and Medvec (1994) with extensions examining responsibility

Supplementary

Contents

Open Science disclosures

Data and code

We shared data and code using the Open Science Framework. Review link for data and code of the study: https://osf.io/7m3q2/

Pre-registrations and Qualtrics study designs

Link: https://osf.io/342td

Procedure and data disclosures

Data collection

We completed data collection before analyzing the actual data.

Conditions reporting

We reported all collected conditions.

Participant exclusions

We reported details in the Exclusion Criteria section of this document. We reported the comparison between full results and post-exclusion results in the Pre-exclusions versus post-exclusions section.

Variables reporting

We reported all variables and data collected for our studies.

Acknowledgement

We wrote some parts of the manuscript and the supplementary with reference to Feldman et al. (2021b) template.

Data files

Table S1

Contents of datafiles

Data Filename	Content
Datasets -> Gilovich and Medvec 1994 Replication Extension Dummy Data Analysis V2 K.Rmd	Pre-registered RMarkdown code file
Datasets -> Gilovich and Medvec 1994 Replication Extension Pre Exclusion Full Data Analysis.Rmd	RMarkdown code file before any exclusion
Datasets -> Gilovich-and-Medvec-1994-Replication-Extension-Pre-Exclusion-Full-Data-Analysis.html	Rmarkdown output file before any exclusion
Datasets -> Gilovich and Medvec 1994 Replication Extension Post Exclusion Data Analysis.Rmd	RMarkdown code file after exclusion based on pre-registered criteria and exploratory analyses of Study 5 after excluding irrelevant, incorrect, and no regret/responsibility responses
Datasets -> Gilovich-and-Medvec-1994-Replication-Extension-Post-Exclusion-Data-Analysis.html	RMarkdown output file after exclusion based on pre-registered criteria and exploratory analyses of Study 5 after excluding irrelevant, incorrect, and no regret/responsibility responses
Datasets -> Gilovich+and+Medvec+(1994)+replication+and+extension+V3-G_May+4,+2021_10.10.sav	Raw data in SAV format (used for final data analysis)
Datasets -> Gilovich+and+Medvec+(1994)+replication+and+extension+V3-G_May+4,+2021_10.09.csv	Raw data in CSV format
Datasets -> Gilovich+and+Medvec+(1994)+replication+and+extension+V3-G_May+4,+2021_10.10.xml	Raw data in XML format
Datasets -> data_gilovichmedvec1994.sav	Post-exclusion data in SAV format

Methods and Analyses of the original article

Original Article Study 1A Methods

Type of study

One-sample comparison study

One sample comparison study

The participants compared whether they regret action or inaction more.

"When you look back on your experiences in life and think of those things that you regret, what would you say you regret more, those things that you did but wish you hadn't, or those things that you didn't do but wish you had?" (p. 358).

Variable of Interest

Participants' choice - experiencing stronger action regret versus stronger inaction regret

Sample size before and after exclusions

The original article did not report if there were exclusions of participants. 60 Participants participated.

Included sample description

- Age: $M = 40.3$, *SD* was not reported
- Gender distribution was not reported
- Syracuse, New York, United States of America
- General population, random sample of adults, recruited through a telephone directory

Original Article Study 1B Methods

Type of study

One-sample comparison study

One sample comparison study

The participants compared whether they regret their greatest action regret more or their greatest inaction regret more.

Variable of Interest

Participants' choice - experiencing stronger action regret versus stronger inaction regret

Sample size before and after exclusions

The original article did not report if there were exclusions of participants. 30 Participants participated.

Included sample description

- Age: *M* = 40.1, *SD* was not reported
- Gender distribution was not reported
- Chicago metropolitan area, United States of America
- General population, random sample of adults, recruited through a telephone directory

Original Article Study 3 Methods

Type of study

One sample comparison study, within-subject

One sample comparison study

The participants compared whether Inaction Dave or Action Jim would experience stronger regret, initially and in the long run.

"Dave and Jim do not know each other, but both are enrolled at the same elite East Coast University. Both are only moderately satisfied where they are and both are considering transferring to another prestigious school. Each agonizes over the decision, going back and forth between thinking he is going to stay and thinking he will leave. They ultimately make different decisions: Dave opts to stay where he is and Jim decides to transfer. Suppose their decisions turn out badly for both of them: Dave still doesn't like it where he is and wishes he had transferred, and Jim doesn't like his new environment and wishes he had stayed."

They answered both of the questions below:

(a) Who do you think would regret his decision more on learning that it was a mistake? (b) Who do you think would regret his decision more in the long run?

(p. 360)

Independent variables (IV)

Action vs Inaction (comparison), Temporal Distance: Short Term vs Long Term (within-subject variable)

Dependent variables

Choice: The person who would experience stronger regret: Action Jim or Inaction Dave

Sample size before and after exclusions

The original article did not report if there were exclusions of participants. 80 Participants participated.

Included sample description

- Age: Not reported
- Gender distribution was not reported
- Cornell University, United States of America
- Undergraduate students sample

Original Article Study 4 Methods

Type of study

One sample comparison study, temporal distance as the between-subject factor

One sample comparison study

The participants compared whether Inaction Dave or Action Jim would experience stronger regret, initially and in the long run.

“Dave and Jim do not know each other, but both are enrolled at the same elite East Coast University. Both are only moderately satisfied where they are and both are considering transferring to another prestigious school. Each agonizes over the decision, going back and forth between thinking he is going to stay and thinking he will leave. They ultimately make different decisions: Dave opts to stay where he is and Jim decides to transfer. Suppose their decisions turn out badly for both of them: Dave still doesn't like it where he is and wishes he had transferred, and Jim doesn't like his new environment and wishes he had stayed.”

They were randomized and answered one of the questions below:

(a) Who do you think would regret his decision more on learning that it was a mistake? (b) Who do you think would regret his decision more in the long run? “

(p. 360)

Independent variables (IV)

Temporal Distance: Short Term vs Long Term (between-subject variable)

Dependent variables

Choice: The person who would experience stronger regret: Action Jim or Inaction Dave

Sample size before and after exclusions

The original article did not report if there were exclusions of participants. 34 participants in the short-term condition and 42 participants in the long-term condition. 76 participants in total

Included sample description

- Age: Not reported
- Gender distribution was not reported
- Cornell University, United States of America
- Undergraduate students sample

Original Article Study 5 Methods

Type of study

One-sample comparison study, within-subject

One sample comparison study

The participants compared the intensity of regret between their greatest action regret and their greatest inaction regret.

"In counterbalanced order, the questionnaire asked subjects to recall (but not write down) their single most regrettable action and inaction from both the past week and from their entire lives. Then, for each time period, the subjects were asked to indicate which they regretted more, the action or the inaction." (p. 361).

Independent variables (IV)

Action vs Inaction (comparison), temporal distance (short term: past week vs long term: entire life)

Dependent variables

Participants' choice - experiencing stronger action regret versus stronger inaction regret

Sample size before and after exclusions

The original article did not report if there were exclusions of participants. 32 Participants participated.

Included sample description

- Age: Not reported
- Gender distribution was not reported
- Ithaca, New York, United States of America
- Adult samples from public places

Original article reported results

Study 1A and Study 1B were both comparison studies based on participants' real-life experiences. Study 1A asked participants to compare if they regretted action or inaction more. Study 1B asked participants to compare if they regretted their greatest action regret or greatest inaction regret more. Study 3 and Study 4 are both scenario experiments with temporal distance (short term vs long term) as the independent variable, in which Study 3 uses a within-subject design and Study 4 uses a between-subject design. Study 5 asked participants about personal experiences of action-inaction regret, in the short run and in the long run. For more information about the methods of these studies, please check Method of the original article above.

Table S2

Descriptive Statistics and Reported Inferential Statistics of Original Article 1 Study 1

Study	*N*	Count of participants indicating stronger regret for action	% of participants indicating stronger regret for action	Count of participants indicating stronger regret for inaction	% of Inaction indicating stronger regret for inaction	Binomial *z*	*p*
Study 1A	60	15 (Calculated)	25% (Calculated)	45	75%	3.75	<.001
Study 1B	30	9 (Calculated)	30% (Calculated)	21	70%	2.01	<.05

Table S3

Descriptive Statistics and Reported Inferential Statistics of Original Article 1 Study 3, Study 4, and Study 5

Study	*N*	Count of participants indicating stronger regret for action	% of participants indicating stronger regret for action	Count of participants indicating stronger regret for inaction	% of Inaction indicating stronger regret for inaction	Binomial z / Chi square statistics	*p*
Study 3	80	Short-Term: 61 (calculated) Long-Term: 29 (calculated)	Short-Term: 76% Long-Term: 36% (calculated)	Short-Term: 19 (calculated) Long-Term: 51 (calculated)	Short-Term: 24% (calculated) Long-Term: 64%	$z = 2.35$	<.02
Study 4	76	Short-Term: 26 (calculated) Long-Term: 16 (calculated)	Short-Term: 76% Long-Term: 38 % (calculated)	Short-Term: 8 (calculated) Long-Term: 26 (calculated)	Short-Term: 24% (calculated) Long-Term: 62%	$x^2 = 11.2$	<.001
Study 5	32	Short-Term: 17 (calculated) Long-Term: 7 (calculated)	Short-Term: 53% Long-Term: 16% (calculated)	Short-Term: 15 (calculated) Long-Term: 25 (calculated)	Short-Term: 47% (calculated) Long-Term: 84%	$z = 2.94$	<.01

Effect Size and Confidence Interval Calculations of the original studies' effects

Original Article Study 1

Based on the below code (Mangiafico, 2020), for Study 1A goodness of fit test, x^2 (1) = 15.00, p < .001, V = 0.50 [0.27, 0.70].

```
library(rcompanion)
## Warning: package 'rcompanion' was built under R version 4.0.3
observed1a   = c( 45,    15)
expected1a   = c( 1/2,   1/2)
oneachisq <- chisq.test(x = observed1a, p = expected1a)
oneachisq
##
##  Chi-squared test for given probabilities
##
## data:  observed1a
## X-squared = 15, df = 1, p-value = 0.0001075
oneacramer <- cramerVFit(x = observed1a, p = expected1a, ci =
TRUE, conf = 0.95, type = "perc", R = 1000, reportIncomplete =
TRUE)
oneacramer
##   Cramer.V lower.ci upper.ci
## 1      0.5   0.2667      0.7
```

Based on the below code, for Study 1B goodness of fit test, x^2 (1) = 4.80, p = .028, V = 0.40 [0.07, 0.73].

```
library(rcompanion)
observed1b  = c( 21,    9)
expected1b   = c( 1/2,   1/2)
onebchisq <- chisq.test(x = observed1b, p = expected1b)
onebchisq
##
##  Chi-squared test for given probabilities
##
## data:  observed1b
## X-squared = 4.8, df = 1, p-value = 0.02846
onebcramer <- cramerVFit(x = observed1b, p = expected1b, ci = TRUE, conf
= 0.95, type = "perc", R = 1000, reportIncomplete = TRUE)
onebcramer
```

```
##   Cramer.V lower.ci upper.ci
## 1      0.4  0.06667   0.7333
```

Original Article Study 3

Based on the below code, for Study 3 goodness of fit test in the short-term, x^2 (1) = 22.05, p < .001, V = 0.53 [0.35, 0.70].

```
library(rcompanion)
observed3s   = c( 61, 19)
expected3s  = c( 1/2,   1/2)
threeschisq <- chisq.test(x = observed3s, p = expected3s)
threeschisq
##
##  Chi-squared test for given probabilities
##
## data:  observed3s
## X-squared = 22.05, df = 1, p-value = 2.656e-06
threescramer <- cramerVFit(x = observed3s, p = expected3s, ci =
TRUE, conf = 0.95, type = "perc", R = 1000, reportIncomplete =
TRUE)
threescramer
##   Cramer.V lower.ci upper.ci
## 1    0.525    0.325      0.7
```

Based on the below code, for Study 3 goodness of fit test in the long-term, x^2 (1) = 6.05, p < .001, V = 0.28 [0.05, 0.48].

```
library(rcompanion)
observed3l   = c( 29, 51)
expected3l  = c( 1/2,   1/2)
threelchisq <- chisq.test(x = observed3l, p = expected3l)
threelchisq
##
##  Chi-squared test for given probabilities
##
```

```
## data:  observed3l
## X-squared = 6.05, df = 1, p-value = 0.01391
threelcramer <- cramerVFit(x = observed3l, p = expected3l, ci =
TRUE, conf = 0.95, type = "perc", R = 1000, reportIncomplete =
TRUE)
threelcramer
##   Cramer.V lower.ci upper.ci
## 1    0.275    0.075 0.475
```

For the association between temporal distance and action-inaction, we cannot calculate as it is a within-subject study in which participants complete both questions so we cannot use the Chi Square test of independence. The authors compared the proportion of participants changing from short-term action with stronger regret to long-term inaction with stronger regret for Study 5 to detect the association. However, the authors did not report z statistics or other statistics that are necessary for effect size calculations in Study 3.

Original Article Study 4

Based on the below code, for Study 4 goodness of fit test in the short-term, x^2 (1) = 9.53, p = .002, V = 0.53 [0.24, 0.76].

```
library(rcompanion)
observed4s   = c( 26, 8)
expected4s  = c( 1/2,   1/2)
fourschisq <- chisq.test(x = observed4s, p = expected4s)
fourschisq
##
##  Chi-squared test for given probabilities
##
## data:  observed4s
## X-squared = 9.5294, df = 1, p-value = 0.002022
fourscramer <- cramerVFit(x = observed4s, p = expected4s, ci =
TRUE, conf = 0.95, type = "perc", R = 1000, reportIncomplete =
TRUE)
fourscramer
##   Cramer.V lower.ci upper.ci
## 1   0.5294   0.2353   0.8235
```

Based on the below code, for Study 4 goodness of fit test in the long-term, x^2 (1) = 2.38, p = .123, V = 0.24 [0.00, 0.52].

```
library(rcompanion)
observed4l   = c( 16, 26)
expected4l  = c( 1/2,   1/2)
fourlchisq <- chisq.test(x = observed4l, p = expected4l)
fourlchisq
##
##  Chi-squared test for given probabilities
##
## data:  observed4l
## X-squared = 2.381, df = 1, p-value = 0.1228
fourlcramer <- cramerVFit(x = observed4l, p = expected4l, ci =
TRUE, conf = 0.95, type = "perc", R = 1000, reportIncomplete =
TRUE)
fourlcramer
##   Cramer.V lower.ci upper.ci
## 1   0.2381        0   0.5238
```

Based on the below code (Signorell et al., 2020), for Study 4 test of association between temporal distance and action-inaction, x^2 (1) = 11.19, p < .001, V = 0.38 [0.16, 0.61].

```
library(DescTools)
## Warning: package 'DescTools' was built under R version 4.0.3
tab4 <- as.table(rbind(
  c(26, 8),
  c(16, 26)))
CramerV(tab4, conf.level = 0.95)
##  Cramer V    lwr.ci     upr.ci
## 0.3837535 0.1589251 0.6085721
Fourasso <- chisq.test(tab4, correct = FALSE)
Fourasso
##
##  Pearson's Chi-squared test
##
## data:  tab4
## X-squared = 11.192, df = 1, p-value = 0.0008214
```

Original Article Study 5

Based on the below code, for Study 5 goodness of fit test in the short-term, x^2 (1) = 0.13, p = .724, V = 0.06 [0.00, 0.44].

```
library(rcompanion)
observed5s   = c( 17, 15)
expected5s  = c( 1/2,   1/2)
fiveschisq <- chisq.test(x = observed5s, p = expected5s)
fiveschisq
##
##  Chi-squared test for given probabilities
##
## data:  observed5s
## X-squared = 0.125, df = 1, p-value = 0.7237
fivescramer <- cramerVFit(x = observed5s, p = expected5s, ci =
TRUE, conf = 0.95, type = "perc", R = 1000, reportIncomplete =
TRUE)
fivescramer
##   Cramer.V lower.ci upper.ci
## 1   0.0625         0   0.4359
```

Based on the below code, for Study 5 goodness of fit test in the long-term, x^2 (1) = 10.13, p = .001, V = 0.56 [0.25, 0.81].

```
library(rcompanion)
observed5l   = c( 7,  25)
expected5l  = c( 1/2,   1/2)
fivelchisq <- chisq.test(x = observed5l, p = expected5l)
fivelchisq
##
##  Chi-squared test for given probabilities
##
## data:  observed5l
## X-squared = 10.125, df = 1, p-value = 0.001463
fivelcramer <- cramerVFit(x = observed5l, p = expected5l, ci =
TRUE, conf = 0.95, type = "perc", R = 1000, reportIncomplete =
TRUE)
fivelcramer
##   Cramer.V lower.ci upper.ci
```

```
## 1   0.5625    0.25   0.8125
```

Based on the below code, for Study 5 test of difference in the proportion of participants changing from action with stronger regret in the short term to inaction in the long term to participants changing from inaction with stronger regret in the short term to action with stronger regret in the long term, x^2 (1) = 8.64, p = .002. We are not able to find Cramer V as the original authors did not report the number of participants with different responses to the short term and long term questions.

```
#Study 5 Comparing Action to Inaction versus Inaction to Action, z
= 2.94, calculate chi square

chisqstudy5chan <- 2.94^2
chisqstudy5chan
## [1] 8.6436
pvalue <- pnorm(-abs(2.94))
pvalue
## [1] 0.001641061
```

Power analysis of original studies' effects to assess required sample for replication

We conducted our power analysis based on meaningful effects that the original study found, aiming for 95% power with .05 as the significance level. One tricky issue is that, in Study 4 comparison between action regret and inaction regret in the long term, there was an effect of $V = 0.24$. However, it didn't reach statistical significance. That said, the authors described the result as "With some distance, it is often a person's failures to act that cause more distress" (p. 361), and summarized "Actions cause more pain in the short-term, but inactions are regretted more in the long run. Support for this contention was obtained in 2 scenario experiments…" (Abstract, p. 357). It was possible that significance was not reached due to a lack of statistical power. Therefore, the minimum sample size, in the long-term condition, required to detect such an effect would be 230. We randomly randomized participants into either Study 3 or Study 4, meaning around half of all participants participated in Study 4 and half of all participants participated in Study 3. Then within the half of participants participating in Study 4, half of those participants went through the long-term condition. Also, considering that we may exclude participants due to various reasons, we aimed to recruit at least 1000 participants. We expected that we would exclude 80 participants, leading to 920 participants. Half of 920 participants (460 participants) participated in Study 4, and half of 460 participants (230) participated in the long-term condition.

Table S4

Power Analysis and Minimum Sample Size Required

Study	Effect size	R Code and Outputs / G*Power Outputs (Faul et al., 2007)	Sample Required

Study 1A	*V* = 0.5	`library(pwr)`
		`pwr.chisq.test(w = 0.5, df = 1, power = 0.95, sig.level = 0.05)`
		`Output: N = 51.97884`
			52

Study 3 Short Term	*V* = 0.525	`library(pwr)`
		`pwr.chisq.test(w = 0.525, df = 1, power = 0.95, sig.level = 0.05)`
		`Output: N = 47.14635`
			48

Study 3 Long Term	*V* = 0.275	`library(pwr)`
		`pwr.chisq.test(w = 0.275, df = 1, power = 0.95, sig.level = 0.05)`
		`Output: N = 171.8308`
			172

Study 3 Association	Insufficient info	Insufficient information, not applicable	

Study 4 Short Term	*V* = 0.5294	`library(pwr)`
		`pwr.chisq.test(w = 0.5294, df = 1, power = 0.95, sig.level = 0.05)`
		`Output: N = 46.36591`
			47

Study 4 Long Term	*V* = 0.2381	`library(pwr)`
		`pwr.chisq.test(w = 0.2381, df = 1, power = 0.95, sig.level = 0.05)`
		`Output: N = 229.2175`
			230

Study 4 Association	*V* = 0.3837535	`library(pwr)`
		`pwr.chisq.test(w = 0.3837535, df = 1, power = 0.95, sig.level = 0.05)`
		`Output: N = 88.23928`
			89

Study 5 Short Term	*V* = 0.0625*	`library(pwr)`
		`pwr.chisq.test(w = 0.0625, df = 1, power = 0.95, sig.level = 0.05)`
		`Output: N = 3326.646`
			3327*

Study 5 Long Term	*V* = 0.5625	`library(pwr)`
		`pwr.chisq.test(w = 0.5625, df = 1, power = 0.95, sig.level = 0.05)`
		`Output: N = 41.0697`
			42

Study	Effect size	R Code and Outputs / G*Power Outputs (Faul et al., 2007)			Sample Required
Study 5 Association	Cohen's g = 0.43	**Exact -** Proportion: Sign test (binomial test)			11
		Analysis:	A priori: Compute required sample size		
		Input:	Tail(s)	= One	
			Effect size g	= 0.43	
			α err prob	= 0.05	
			Power (1-β err prob)	= 0.95	
		Output:	Lower critical N	= 9.0000000	
			Upper critical N	= 9.0000000	
			Total sample size	= 11	
			Actual power	= 0.9630207	
			Actual α	= 0.0327148	

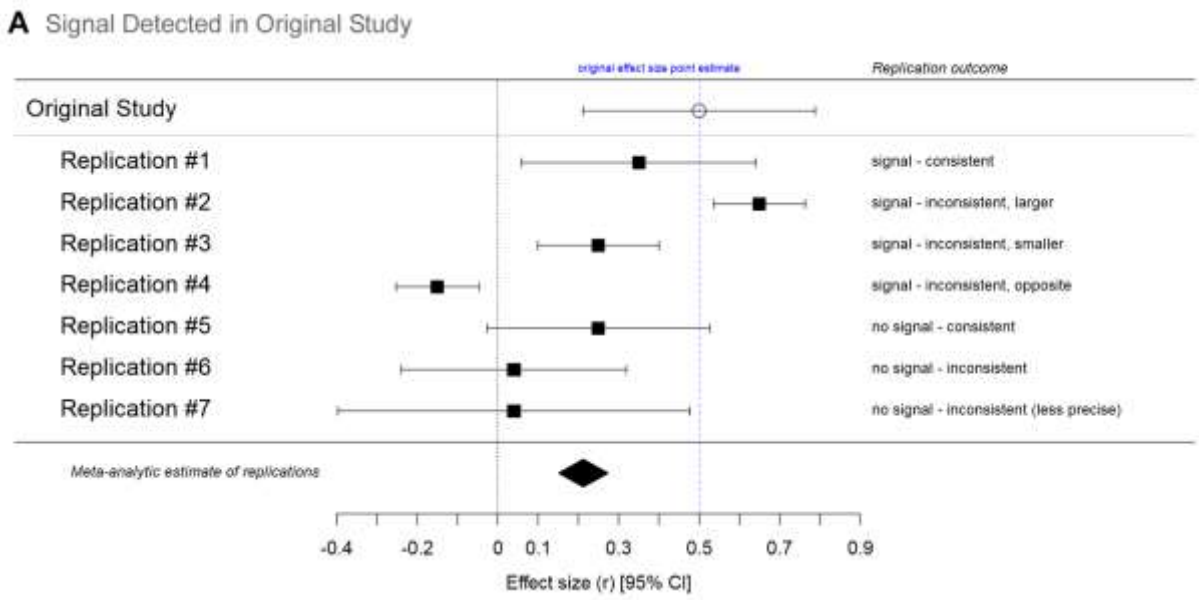
Note. 1) *As the original article found a minimal effect, we do not determine our sample size based on the sample size calculation from Study 5 Short-Term action-inaction regret comparison. 2) We reported confidence intervals in the Effect Size and Confidence Interval Calculations of the original studies' effects section. We used effect size calculated, without rounding, to conduct our power analyses.

Evaluation criteria for replication findings

We aimed to compare the replication effects with the original effects in the target article using the criteria set by LeBel et al. (2019) (see Figure S1 and Figure S2).

Figure S1

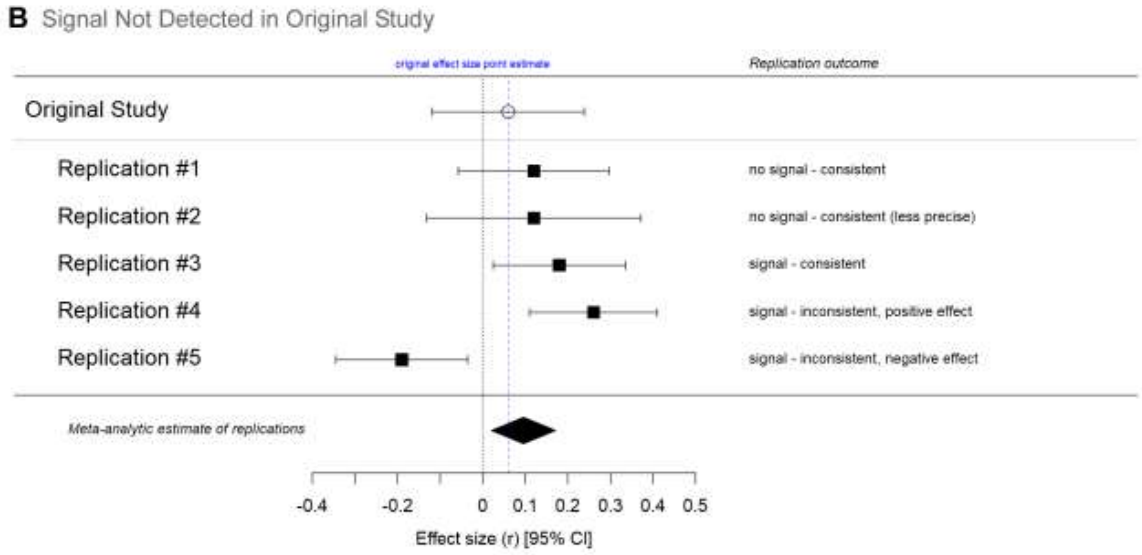
Interpretation criteria for evaluation of replications outcomes by LeBel et al. (2019)



Note. For comparison of replication effect size confidence intervals with original effect size. Applicable if the original study detected a signal.

Figure S2

Interpretation criteria for evaluation of replications outcomes by (LeBel et al., 2019)



Note. Applicable if the original study did not detect a signal.

Method of the replication + extension

Please see the exported Qualtrics file for all materials: https://osf.io/342td/files (Gilovich_and_Medvec_1994_replication_and_extension_V3-G.qsf)

Method Tables of All Studies

Table S5

Study 5: Greatest Lifetime and Past Week Regret and Responsibility Design

Greatest Regret Comparison Studies: The presentation of questions and choices are in random order. Participants complete both questions below. We randomized participants into the regret condition or the responsibility condition, to prevent participants from describing the same event.	
Temporal Distance as Within-Subject Independent Variable: Lifetime Condition Replication on Regret: Action: Now we want you to think of your single biggest regret of **action** of your **entire life**, **something you did, that in retrospect you wish you had not done**. Take a moment to think of your biggest regret of this type. Inaction: Now we want you to think of your single biggest regret of **inaction** from your **entire life**, **something you did not do, that in retrospect you wish you had done**. Take a moment to think of your biggest regret of this type. Extension on Responsibility: Action: We would like you to think about an **action** that resulted in a negative outcome that you feel most **personally responsible for** in your **entire life**. Take a moment to think of a negative outcome that resulted from **you taking action**, something you did that led to an	**Temporal Distance as Within-Subject Independent Variable: Last Week Condition** Replication on Regret: Action: Now we want you to think of your single biggest regret of **action** of your **past week**, **something you did, that in retrospect you wish you had not done**. Take a moment to think of your biggest regret of this type. Inaction: Now we want you to think of your single biggest regret of **inaction** from your **past week**, **something you did not do, that in retrospect you wish you had done**. Take a moment to think of your biggest regret of this type. Extension on Responsibility: Action: We would like you to think about an **action** that resulted in a negative outcome that you feel most **personally responsible for** in **the past week**. Take a moment to think of a negative outcome that resulted from **you taking action**, something you did that led to an

undesired outcome you felt most responsible for.	undesired outcome you felt most responsible for.
Inaction: We would like you to think about an **inaction** that resulted in a negative outcome that you feel most **personally responsible for** in your **entire life**. Take a moment to think of a negative outcome that resulted from you **not taking action**, something you did not do that led to an undesired outcome you felt most responsible for.	Inaction: We would like you to think about an **inaction** that resulted in a negative outcome that you feel most **personally responsible for** in **the past week**. Take a moment to think of a negative outcome that resulted from you **not taking action**, something you did not do that led to an undesired outcome you felt most responsible for.

Dependent Variable: Stronger Action or Inaction Regret and Responsibility

Participants will be asked optionally to describe their regrets and responsibilities before comparing their regrets/responsibilities below.

Two replication regret questions (one for the past week, one for lifetime): You've thought about two biggest regrets of the past week, if you could change only one of them, which one would it be?

- Change biggest regret of action
- Change biggest regret of inaction

Two extension responsibility questions (one for the past week, one for lifetime): You've thought about those two decisions you feel very responsible for, which decision do you feel most personally responsible for?

- The action that you feel most personally responsible for the negative outcome
- The inaction that you feel most personally responsible for the negative outcome

For each of the above questions, we also asked participants to explain why

Note. The above design is a replication of Study 5 of the original article, in which we added questions on responsibility as the extension.

Table S6

Study 1A: General Regret and Responsibility Design

Study 1A – General Regret and Responsibility Comparison Study: The presentation of questions and choices are in random order. Participants complete both questions below.
Replication Question on Regret: This part is about your **overall general** regret experiences in your life. When you look back on your experiences in life and think of those things that you **regret**, what would you say you **regret** more, those things that you **did** but wish you hadn't, or those things that you **didn't do** but wish you had? ● Things that I did ● Things that I did not do **Extension Question on Responsibility**: This part is about your **overall general** experiences that you feel personally responsible for in your life. When you look back on your experiences in life and think of those things that you **feel personally responsible for**, what would you say you **feel personally responsible more**, those things that you **did** but wish you hadn't, or those things that you **didn't do** but wish you had? ● Things that I did ● Things that I did not do

Table S7

Study 3 Scenario Experiment Design

Scenario
"Dave and Jim do not know each other, but both are enrolled at the same elite East Coast University. Both are only moderately satisfied where they are and both are considering transferring to another prestigious school. Each agonizes over the decision, going back and forth between thinking he is going to stay and thinking he will leave. They ultimately make different decisions: Dave opts to stay where he is and Jim decides to transfer. Suppose their decisions turn out badly for both of them: Dave still doesn't like it where he is and wishes he had transferred, and Jim doesn't like his new environment and wishes he had stayed." (p. 360 from Gilovich & Medvec, 1994)

Temporal Distance as Within-Subject Independent Variable: Short Term condition	**Temporal Distance as Within-Subject Independent Variable: Long Term condition**
Question: "Who do you think would **regret** his decision more on learning that it was a mistake?" (p. 360) Extension Question: "Who do you think would feel more **responsible** for learning that it was a mistake?"	Question: "Who do you think would **regret** his decision more in the **long run**?" (p. 360) Extension Question: "Who do you think would feel more **responsible** for in the **long run**?"

Dependent Variable

Comparison of intensity of regret (replication) and intensity of responsibility (extension) between action Jim and inaction Dave. For both of the above conditions, participants chose between:

1) Jim (who transferred)
2) Dave (who stayed)

Table S8

Study 4 Scenario Experiment Design

Scenario
"Dave and Jim do not know each other, but both are enrolled at the same elite East Coast University. Both are only moderately satisfied where they are and both are considering transferring to another prestigious school. Each agonizes over the decision, going back and forth between thinking he is going to stay and thinking he will leave. They ultimately make different decisions: Dave opts to stay where he is and Jim decides to transfer. Suppose their decisions turn out badly for both of them: Dave still doesn't like it where he is and wishes he had transferred, and Jim doesn't like his new environment and wishes he had stayed." (p. 360 from Gilovich & Medvec, 1994)

Temporal Distance as Between-Subject Independent Variable: Short Term condition	**Temporal Distance as Between-Subject Independent Variable: Long Term condition**
Replication Question: "Who do you think would **regret** his decision more on learning that it was a mistake?" (p. 360) Extension Question: "Who do you think would feel more **responsible** for learning that it was a mistake?"	Replication Question: "Who do you think would **regret** his decision more in the **long run**?" (p. 360) Extension Question: "Who do you think would feel more **responsible** for in the **long run**?"

Dependent Variable

Comparison of intensity of regret (replication) and intensity of responsibility (extension) between action Jim and inaction Dave. For one of the above conditions, participants chose between:

1) Jim (who transferred)
2) Dave (who stayed)

Exclusion criteria

Generalized exclusion criteria

We pre-registered the below general criteria for exclusion:

1. Participants indicating a low proficiency of English (self-report < 5, on a 1-7 scale)
2. Participants who self-reported not being serious about filling in the survey (self-report < 4, on a 1-5 scale).
3. Participants who correctly guessed the hypotheses of this study in the funnelling section. This means including 3 or more of these terms or terms with similar meanings: “action inaction”, “regret”, “time”/”temporal”.
4. Participants who had already seen or done the survey before.
5. Participants who failed to complete the survey.
6. Participants who are not from the United States.

We report post-exclusion results in the main manuscript and pre-exclusion results in the supplementary.

Comparisons and deviations

Original versus replication

Table S9

Original vs Replication Method Comparison

	Original	Replication	Reason for change
Stimuli	1) The wordings across conditions (action and inaction, one week versus lifetime) in Study 5 are not consistent. See photo screenshots from the original authors. 2) Study 5 regret comparison question consists of "which one would you "undo" if you could"	1) We ensured the (non-manipulated) wordings across the conditions (e.g. noting that participants do not need to disclose information they don't feel comfortable, asking participants to take a moment to think) are consistent 2) Removed "which one would you "undo" if you could"	1) To prevent any possible effect due to differences in wordings between conditions 2) The term "undo" seems only suitable for action but not inaction, as undoing inaction does not make sense
Procedure	Study 1, Study 3, Study 4, and Study 5 are separately given to different groups of participants	We combined them into a single survey	This is more convenient and efficient

Figure S3

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				

Note. A classification of relative methodological similarity of a replication study to an original study. IV = independent variable. DV = dependent variable. “Everything controllable” refers to design facets over which a researcher has control over. Procedural details refer to minor experimental aspects (e.g. wording and font). We added the "Similar" category to the LeBel et al. (2018) typology, referring to minor deviations aimed to adjust the studies to our target sample that likely do not have substantial influences on the replication results.

We classified Studies 1, 3, and 4 as very close replications and Study 5 as a close replication.

Results Comparison Between Pre-exclusion and Post-exclusion

Table S10

Summary Table of Pre-Exclusion (full results) and Post-Exclusion Results

	Full Results			**Post-Exclusion Results**		
Study	Chi-Square	Effect Size	*p*	Chi-Square	Effect Size	*P*
Study 1 Regret	$\chi 2$ (1, N = 546) = 33.88	V = 0.25, 95% CI [0.17, 0.33]	< .001	$\chi 2$ (1, N = 535) = 34.07	V = 0.25, 95% CI [0.17, 0.34]	< .001
Study 1 Responsibility	$\chi 2$ (1, N = 471) = 25.23	V = 0.23, 95% CI [0.14, 0.32]	<.001	$\chi 2$ (1, N = 453) = 24.34	V = 0.23, 95% CI [0.14, 0.32]	<.001
Study 3 Short-Term Regret	$\chi 2$ (1, N = 498) = 27.41	V = 0.23, 95% CI [0.14, 0.31]	< .001	$\chi 2$ (1, N = 493) = 24.99	V = 0.23, 95% CI [0.14, 0.31]	< .001
Study 3 Long-Term Regret	$\chi 2$ (1, N = 498) = 13.24	V = 0.16, 95% CI [0.08, 0.24]	< .001	$\chi 2$ (1, N = 493) = 11.41	V = 0.15, 95% CI [0.06, 0.24]	< .001
Study 3 Temporal Distance and Action-Inaction Regret	$\chi 2$ (1, N = 142) = 70.42	OR = 0.17, 95% CI [0.10, 0.28]	< .001	$\chi 2$ (1, N = 133) = 65.03	OR = 0.18, 95% CI [0.10, 0.29]	< .001
Study 3 Short-Term Responsibility	$\chi 2$ (1, N = 508) = 117.20	V = 0.48, 95% CI [0.40, 0.56]	< .001	$\chi 2$ (1, N = 493) = 112.02	V = 0.48, 95% CI [0.40, 0.55]	< .001
Study 3 Long-Term Responsibility	$\chi 2$ (1, N = 508) = 22.96	V = 0.21, 95% CI [0.13, 0.30]	< .001	$\chi 2$ (1, N = 493) = 22.36	V = 0.21, 95% CI [0.13, 0.29]	< .001
Study 3 Temporal Distance and Action-Inaction Responsibility	$\chi 2$ (1, N = 123) = 36.70	OR = 0.30, 95% CI [0.19, 0.46]	< .001	$\chi 2$ (1, N = 123) = 34.35	OR = 0.31, 95% CI [0.20, 0.47]	< .001
Study 4 Short-Term Regret	$\chi 2$ (1, N = 254) = 16.13	V = 0.25, 95% CI [0.12, 0.37]	< .001	$\chi 2$ (1, N = 247) = 14.09	V = 0.24, 95% CI [0.12, 0.36]	< .001
Study 4 Long-Term Regret	$\chi 2$ (1, N = 255) = 3.30	V = 0.11, 95% CI [0.01, 0.23]	.069	$\chi 2$ (1, N = 248) = 2.73	V = 0.10, 95% CI [0.01, 0.23]	.099
Study 4 Regret Temporal Distance and Action-Inaction Test of Independence	$\chi 2$ (1, N = 509) = 17.10	V = 0.18 95% CI [0.10, 0.27]	< .001	$\chi 2$ (1, N = 495) = 14.68	V = 0.17, 95% CI [0.08, 0.26]	< .001

	Full Results			Post-Exclusion Results		
Study	Chi-Square	Effect Size	*p*	Chi-Square	Effect Size	*P*
Study 4 Short-Term Responsibility	χ^2 (1, *N* = 254) = 62.50	*V* = 0.50, 95% CI [0.38, 0.60]	< .001	χ^2 (1, *N* = 247) = 61.25	*V* = 0.50, 95% CI [0.39, 0.60]	< .001
Study 4 Long-Term Responsibility	χ^2 (1, *N* = 255) = 36.90	*V* = 0.38, 95% CI [0.26, 0.50]	< .001	χ^2 (1, *N* = 248) = 34.13	*V* = 0.37, 95% CI [0.25, 0.49]	< .001
Study 4 Responsibility Temporal Distance and Action-Inaction Test of Independence	χ^2 (1, *N* = 509) = 2.11	*V* = 0.06, 95% CI [0.00, 0.15]	.147	χ^2 (1, *N* = 495) = 2.46	*V* = 0.07, 95% CI [0.00, 0.16]	.117
Study 5 Past Week Regret	χ^2 (1, *N* = 546) = 0.89	*V* = 0.04, 95% CI [0.00, 0.13]	.346	χ^2 (1, *N* = 535) = 1.17	*V* = 0.05, 95% CI [0.00, 0.13]	.280
Study 5 Lifetime Regret	χ^2 (1, *N* = 546) = 0.89	*V* = 0.04, 95% CI [0.00, 0.13]	.346	χ^2 (1, *N* = 535) = 0.99	*V* = 0.04, 95% CI [0.00, 0.13]	.320
Study 5 Temporal Distance and Action-Inaction Regret	χ^2 (1, *N* = 270) = 0.00	*OR* = 1.00, 95% CI [0.78, 1.28]	1	χ^2 (1, *N* = 265) = 0.00	*OR* = 0.99, 95% CI [0.77, 1.27]	.951
Study 5 Past Week Responsibility	χ^2 (1, *N* = 471) = 6.90	*V* = 0.12, 95% CI [0.03, 0.21]	.009	χ^2 (1, *N* = 453) = 7.17	*V* = 0.13, 95% CI [0.03, 0.22]	.007
Study 5 Lifetime Responsibility	χ^2 (1, *N* = 471) = 8.43	*V* = 0.13, 95% CI [0.04, 0.22]	.004	χ^2 (1, *N* = 453) = 7.68	*V* = 0.13, 95% CI [0.03, 0.22]	.006
Study 5 Temporal Distance and Action-Inaction Responsibility	χ^2 (1, *N* = 207) = 0.04	*OR* = 1.03, 95% CI [0.78, 1.37]	.835	χ^2 (1, *N* = 201) = 0.00	*OR* = 1.01, 95% CI [0.76, 1.35]	.944

Descriptive Statistics

Table S11

Full sample: Descriptive statistics without exclusion

Study	Action Count – Stronger Regret or Responsibility	Action Percentage – Stronger Regret or Responsibility	Inaction Count – Stronger Regret or Responsibility	Inaction Percentage – Stronger Regret or Responsibility
Study 1 General Regret	205/546	37.55%, 95% CI [33.58%, 41.68%]	341/546	62.45%, 95% CI [58.32%, 66.42%]
Study 1 General Responsibility	290/471	61.57%, 95% CI [57.10%, 65.85%]	181/471	38.43%, 95% CI [34.15%, 42.90%]
Study 3 Short Term Regret	313/508	61.61%, 95% CI [57.31%, 65.74%]	195/508	38.39%, 95% CI [48.69%, 60.54%]
Study 3 Long Term Regret	213/508	41.93%, 95% CI [37.71%, 46.26%]	295/508	58.07%, 95% CI [53.74%, 62.29%]
Study 3 Short Term Responsibility	376/508	74.02%, 95% CI [70.03%, 77.64%]	132/508	25.98%, 95% CI [22.36%, 29.97%]
Study 3 Long Term Responsibility	308/508	60.63%, 95% CI [56.32%, 64.78%]	200/508	39.37%, 95% CI [35.22%, 43.68%]
Study 4 Short Term Regret	159/254	62.60%, 95% CI [56.50%, 68.32%]	95/254	37.40%, 95% CI [31.68%, 43.50%]
Study 4 Long Term Regret	113/255	44.31%, 95% CI [38.35%, 50.45%]	142/255	55.69%, 95% CI [49.55%, 61.65%]
Study 4 Short Term Responsibility	190/254	74.80%, 95% CI [69.12%, 79.75%]	64/254	25.20%, 95% CI [20.25%, 30.88%]
Study 4 Long Term Responsibility	176/255	69.02%, 95% CI [63.10%, 74.38%]	79/255	30.98%, 95% CI [25.62%, 36.90%]
Study 5 Greatest Past Week Regret	284/546	52.01%, 95% CI [47.82%, 56.18%]	262/546	47.99%, 95% CI [43.82%, 52.18%]
Study 5 Greatest Lifetime Regret	284/546	52.01%, 95% CI [47.82%, 56.18%]	262/546	47.99%, 95% CI [43.82%, 52.18%]
Study 5 Greatest Past Week Responsibility	264/471	56.05%, 95% CI [51.54%, 60.47%]	207/471	43.95%, 95% CI [39.53%, 48.46%]
Study 5 Greatest Lifetime Responsibility	267/471	56.69%, 95% CI [52.18%, 61.09%]	204/471	43.31%, 95% CI [38.91%, 47.82%]

Exploratory Analyses of Study 5

We did not pre-register the following analyses. We realized that for Study 5 participants' descriptions of past week and lifetime action and inaction regrets and responsibilities, some participants entered irrelevant responses in which participants described past week regrets/responsibilities in lifetime regrets/responsibilities box or participants described lifetime regrets/responsibilities in past week regrets/responsibilities box, incorrect responses in which participants described actions in the inaction description box or described inactions in the action description box[1], or responses not stating a personal responsibility or a personal regret of a certain type (past week/lifetime action/inaction – e.g. no regret / no responsibility responses, the participant is not the actor/the non-actor, events with positive outcomes, or completely not related to regret or responsibility). In the following, we first report the proportion of participants excluded, and then we report the findings (Table S13 and Table S14), which are very similar to findings after pre-registered exclusion and full results without any exclusion reported above.

To summarize, for lifetime regret, 9 out of 535 (1.68%) responses were excluded due to above reasons, whereas for past week regret, 20 out of 535 (3.74%) responses were excluded. For lifetime responsibility, 15 out of 453 (3.31%) responses were excluded, whereas for past week responsibility, 33 out of 453 (7.28%) responses were excluded. This demonstrates that data quality is decent overall, with only a low % of participants not following the instructions. For more specific information regarding proportions of responses excluded due to different reasons mentioned above (past-week-lifetime reversal, action-inaction reversal, non-regret/non-responsibility responses), please see Table S12. We note that *both* action and inaction responses of a number of participant(s) were/was excluded, so the overall number of *participants* excluded is smaller than the sum of *responses* excluded. For example, for lifetime action regret, 7 responses were excluded whereas for lifetime inaction regret, 3 responses were excluded, but overall, only 9 participants were excluded as 1 participant did not provide appropriate responses for both action and inaction regrets.

[1] We understand that action and inaction are sometimes not clearly defined. Sometimes a response involves an action and an inaction, and sometimes a response involves insufficient action which can be considered as action or inaction. In this exploratory analysis, we did not exclude those responses, and we only excluded responses that are clearly incorrect using any definition of action and inaction discussed in Feldman et al. (2021a).

Table S12

Proportions of Participants Excluded in the Exploratory Analyses due to Irrelevant/Incorrect/Non-Regret/Non-Responsibility Responses

Study/Temporal Distance/Action or Inaction/Regret or Responsibility	Past Week-Lifetime Reversals	Action-Inaction Reversals	Non-Regret / Non-Responsibility Responses	Excluded Proportion
Study 5 Lifetime Action Regret	0/535 (0%)	7/535 (1.31%)	0/535 (0%)	7/535 (1.31%)
Study 5 Lifetime Inaction Regret	0/535 (0%)	1/535 (0.19%)	2/535 (0.37%)	3/535 (0.56%)
Study 5 Past Week Action Regret	1/535 (0.19%)	5/535 (0.93%)	10/535 (1.87%)	16/535 (2.99%)
Study 5 Past Week Inaction Regret	0/535 (0%)	2/535 (0.37%)	6/535 (1.12%)	8/535 (1.50%)
Study 5 Lifetime Action Responsibility	0/453 (0%)	8/453 (1.50%)	2/453 (0.44%)	10/453 (2.21%)
Study 5 Lifetime Inaction Responsibility	0/453 (0%)	6/453 (1.32%)	3/453 (0.66%)	9/453 (1.99%)
Study 5 Past Week Action Responsibility	0/453 (0%)	14/453 (3.09%)	14/453 (3.09%)	28/453 (6.18%)
Study 5 Past Week Inaction Responsibility	0/453 (0%)	3/453 (0.66%)	16/453 (3.53%)	19/453 (4.19%)

Table S13

Inferential Statistics after Excluding Irrelevant/Incorrect/Non-Regret/Non-Responsibility Responses

Study/Temporal Distance/Regret or Responsibility	Chi-Square	Effect Size	*p*
Study 5 Past Week Regret	$\chi 2$ (1, N = 515) = 1.63	V = 0.06, 95% CI [0.00, 0.15]	.201
Study 5 Lifetime Regret	$\chi 2$ (1, N = 526) = 1.29	V = 0.05, 95% CI [0.00, 0.14]	.257
Study 5 Temporal Distance and Action-Inaction Regret	$\chi 2$ (1, N = 262) = 0.06	OR = 0.97, 95% CI [0.76, 1.25]	.805
Study 5 Past Week Responsibility	$\chi 2$ (1, N = 420) = 6.94	V = 0.13, 95% CI [0.04, 0.22]	.008
Study 5 Lifetime Responsibility	$\chi 2$ (1, N = 438) = 7.68	V = 0.13, 95% CI [0.05, 0.22]	.006
Study 5 Temporal Distance and Action-Inaction Responsibility	$\chi 2$ (1, N = 193) = 0.02	OR = 0.97, 95% CI [0.72 1.30]	.886

Table S14

Descriptive Statistics after Excluding Irrelevant/Incorrect/No Regret/Responsibility Responses

Study/Temporal Distance/Regret or Responsibility	Action Count – Stronger Regret or Responsibility	Action Percentage – Stronger Regret or Responsibility	Inaction Count – Stronger Regret or Responsibility	Inaction Percentage – Stronger Regret or Responsibility
Study 5 Greatest Past Week Regret	272/515	52.82%, 95% CI [48.50%, 57.09%]	243/515	47.18%, 95% CI [42.91%, 51.50%]
Study 5 Greatest Lifetime Regret	276/526	52.47%, 95% CI [48.20%, 56.71%]	250/526	47.53%, 95% CI [43.29%, 51.80%]
Study 5 Greatest Past Week Responsibility	237/420	56.43%, 95% CI [51.65%, 61.09%]	183/420	43.57%, 95% CI [38.91%, 48.35%]
Study 5 Greatest Lifetime Responsibility	251/447	56.15%, 95% CI [51.52%, 60.68%]	196/446	43.85%, 95% CI [39.32%, 48.48%]

Pre-registration plan versus final report

We completed Preregistration Planning and Deviation Documentation (PPDD) (Van't Veer et al., 2019) below.

Table S15

Preregistration Planning and Deviation Documentation

Components in your pre-registration (e.g., stopping rule, analyses, hypotheses, exclusion rules)	**Location of 1) pre-registered decision/plan and 2) rationale 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**
Data analysis	Manuscript: https://osf.io/342td/files/ Results section 1) It did not specify any exploratory analysis 2) For plots of Study 3, Study 4, and Study 5, we separated plots with regret and plots with responsibility. The pre-registered plots did not include error bars, effect sizes, middle line, and proportions of action-inaction.	Yes, minor.	1) For Study 5, we conducted additional analyses excluding responses that are irrelevant, incorrect, or no regret/no responsibility responses. 2) We combined plots of regret and plots of responsibility into the same plot. We also included error bars, effect sizes, middle line, and proportions in the plots. Location: See results section of the final main manuscript.	1) We want to test if there are any differences in results based on this exclusion, compared to full results or pre-registered exclusion results 2) It is much more reader-friendly and clearer for readers, reviewers, and examiners.	1) No meaningful difference, check Exploratory Analyses of Study 5. 2) No difference.	1) May 2021 Post data collection data analysis stage 2) June 2021 Post data collection data analysis stage

Other Limitations and Constraints of Generality

In terms of the temporal constraint of generality, we conducted our replications during COVID-19, a pandemic in which many people stayed indoors more often than before. A proportion of participants reported "not doing exercise", an inaction, in line with recent studies (Constandt et al., 2020). There may be minor effects on only short-term regrets. But we doubt the impact is substantial, as we did not investigate the frequency of action and inaction regrets, but whether people experience stronger regret for action or inaction.

Moreover, even though MTurk samples are more diverse and representative than the samples in the original article, we recruited only American participants. Relying on WEIRD (Western, Educated, Industrialized, Rich, and Democratic) samples is often criticized as a key problem in psychology (Henrich et al., 2010). Chen et al. (2006) and Gilovich et al. (2003) found that for lifetime regrets based on actual experiences, findings in non-WEIRD regions are generally consistent with findings in the United States. That said, it is uncertain if other findings, especially on short-term regret, temporal pattern of regret, responsibility, and hypothetical scenario experiment findings, are generalizable to other non-WEIRD regions.

Future directions for broader action-inaction literature

We emphasized that the differences in meanings of "action" (e.g. switch versus "doing something") and "inaction" (e.g. no change versus "not doing something") between studies may explain the mixed or contradictory findings. On a macro level of action-inaction effects, future articles should clarify the meanings of "action" and "inaction" used in their studies (Feldman et al., 2021a), and consider this factor as a plausible explanation for discrepancies in findings when interpreting or discussing the findings. Also, when explaining to participants, researchers should clarify the meanings of "action" and "inaction", so that participants' understandings of these terms are in line with researchers' intended meanings. Also, researchers may consider conducting their studies with different meanings of "action" and "inaction" to test if such differences would elicit different or similar results.

Moreover, it is possible that differences between hypothetical scenarios comparing others' regret intensity, and personal experiences may account for the discrepancy in our studies. Future studies should carefully consider this factor when designing studies and explaining their results. Both types of studies have their merits and limitations. Hypothetical scenario studies ensure the consequences of both action and inaction are the same, but may not capture actual feelings of regret of participants themselves. Real-life experience studies may be higher in ecological validity, but do not control for the possible differences in consequences between action and inaction.

Future directions for replications evaluation

We adopted LeBel et al. (2019) to assess the replicability of the findings. LeBel et al. (2019) criteria are based on correlation coefficient, a bi-directional effect size. Since our replications adopted binary choice questions, we adopted Cramer V, a one-directional effect size. This means that the effect size never falls below 0. Future meta-science work can consider setting criteria for other effect sizes to facilitate comparison of effect sizes between original studies and replication studies.

A related issue we encountered is that Criteria B (for comparing null findings in the original with the replication) of LeBel et al. (2019) does not take into account that it is possible for the replication to have no signal and the confidence intervals of the replication to not cover the original effect size, which is the case for Study 4 long-term regret part, meaning that LeBel et al. (2019) Criteria B does not have "No-signal, inconsistent" (present in Criteria A) as a category for replication-original results comparison. Perhaps future studies can consider this, and future meta-science work can consider more possibilities for differences between original and replication.

Future research should also recognize that classifying a replication into "successful" and "failed" may be simplistic and unclear (LeBel et al., 2019). An article, like Gilovich and Medvec (1994), may consist of several studies with different methods. We successfully replicated Study 1, Study 3, and Study 4, but failed to replicate most of the results in Study 5. This can be considered as a mostly successful replication, depending on methods.

Data Collection Information

We conducted the studies on Amazon Mechanical Turk with mostly American participants. We imposed the following settings in recruiting our participants to ensure high data quality (adapted from Feldman et al., 2021b template):

1. The fixed participation reward was USD$0.8. We determined this amount by multiplying the expected completion time (in minutes) with the minimum federal wage in the U.S. ($0.125 per minute).
2. We set the expected completion time at 4 to 6 minutes in advance.
3. We collected data from 21/04/2021 to 04/05/2021.
4. The maximum time we allowed each worker to complete all studies was 30 minutes.
5. We ensured all workers' HIT Approval Rates to be between 95% and 100%.
6. We ensured all workers' number of HITs approved to be between 5,000 and 100,000.
7. We blocked Suspicious Geocode Locations and Universal Exclude List Workers.
8. We blocked duplicate IP addresses and duplicate geolocations.
9. We enabled HyperBatch so that all eligible workers were able to participate in our HIT immediately after we launched the survey.
10. We restricted workers' location to be in the U.S.

Study recruitment

Regrets and responsibility -has comprehension checks & brief writing- (US resident born & raised)(~ 6 minutes)

Description: Regrets and responsibility: Reflection and evaluations =WARNING: has 6 brief writing (1-2 sentences) & includes comprehension checks= (native English, US born & raised and in US only)

Instructions

IMPORTANT:

1) This survey is **only** intended for **Americans currently residing, born and raised in the US.**

2) **WARNING**: **This HIT involves reflecting, carefully reading and evaluating scenarios, answering 6 brief writing tasks (1-2 sentences), and includes comprehension checks.** You'll need to carefully read, reflect, and make evaluations.

To participate, you must be a native English speaker, born, raised, and currently located in the United States. The survey software will attempt to verify this before you start the survey.

Please note :

- This survey takes ~4-6 minutes. Please make sure you can complete the questionnaire in one go without any interruptions and note that submission time is limited. Please do not accept the HIT unless you're certain you're dedicated to the task.
- This HIT is an academic study conducted by university researchers and is intended to shed light on psychological processes. Please take your time to carefully review and answer the questions. There are no anticipated risks in this study. You will not be required to reveal any identifying information and your responses will remain entirely confidential.
- Please make sure you only complete this survey once, as to prevent any automatic rejections by the system.
- Should you have any concerns or questions, please email **giladfel@gmail.com before** accepting this HIT. When in doubt, better not accept the HIT.

THANK YOU VERY MUCH FOR YOUR PARTICIPATION

Go to Link and follow the study instructions. Note the secret key found at the end of the study which you will need to complete the HIT.

* 1. **Enter the SECRET KEY (not your Worker ID) found at the end of the linked survey. Do not add any comment or text here**

Writing task expectation alignment in consent

writing
This survey includes 6 questions that require **brief writing, each question a sentence or two, minimum 20 character per questions**.

We require participants who are have the patience and are able to seriously answer these brief writing questions. If you don't like taking these tasks, please return the HIT now.

Are you able to seriously answer 6 brief writing questions?

- ○ Yes (1)
- ○ No (0)

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