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Doubling-Back Aversion: A Reluctance to Make Progress by Undoing It

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Abstract

Four studies (N = 2,524 U.S.-based adults recruited from the University of California, Berkeley, or Amazon Mechanical Turk) provide support for doubling-back aversion, a reluctance to pursue more efficient means to a goal when they entail undoing progress already made. These effects emerged in diverse contexts, both as participants physically navigated a virtual-reality world and as they completed different performance tasks. Doubling back was decomposed into two components: the deletion of progress already made and the addition to the proportion of a task that was left to complete. Each contributed independently to doubling-back aversion. These effects were robustly explained by shifts in subjective construals of both one's past and future efforts that would result from doubling back, not by changes in perceptions of the relative length of different routes to an end state. Participants' aversion to feeling their past efforts were a waste encouraged them to pursue less efficient means. We end by discussing how doubling-back aversion is distinct from established phenomena (e.g., the sunk-cost fallacy).

Keywords

judgment, decision-making, waste aversion, sunk-cost fallacy, subjective construal, goal pursuit

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Consider a New Yorker flying home from San Francisco with a stopover in Los Angeles. After landing in Los Angeles, they see their flight to New York is severely delayed. The airline gives them the option to switch to reroute through Denver, which would get them to New York three hours earlier. Although several previously identified psychological forces may discourage switching from the status quo, we suspect many travelers would take this time-saving detour.

Now imagine a twist. Instead of an alternate routing through Denver, the airline offers the opportunity to fly back to San Francisco before continuing nonstop to New York. Even if this change would also save three hours, we suspect enthusiasm for it would be lower. We propose this is because the option involves *doubling back*: the deletion or undoing of progress already made (flying back to San Francisco) such that one then has more of a journey to complete (the entire trip from San Francisco to New York instead of just the remaining portion). We propose people display *doubling-back aversion*, a preference to avoid doubling back even when doing so is a more efficient means to an end. Beyond documenting doubling-back aversion, we test whether each component of doubling back contributes to this effect.

Previous work has examined a general reluctance to deviate from the path one is on. For instance, people display a status quo bias (Dean et al., 2017; Kahneman et al., 1991; Samuelson & Zeckhauser, 1988), sticking with a current option even when alternatives dominate it (Suri et al., 2013). In part, this is because if a decision to change course proves unwise, people will especially regret their decision (Zeelenberg et al., 2002). People (and even nonhuman species; Magalhães & Geoffrey, 2016; Sweis et al., 2018) also unwisely persist because of a sunk-cost fallacy, continuing to invest resources into a failing proposition in the (unlikely) hope that they turn around a loss (Arkes & Blumer, 1985; Brockner, 1992; Feldman & Wong, 2018; Kazinka et al., 2021;

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Molden & Hui, 2011; Thaler, 1980; Vroom, 1964). Admitting defeat can threaten one's sense of competence for ever having headed down that road. This prospective threat prompts motivated distortions that downplay one's current (losing) trajectory (Arkes & Blumer, 1985; Festinger, 1962). Decision makers' fear of taking a wrong turn, or admitting to themselves that they already did, produces a counterproductive inertia.

These effects lend general plausibility to the doubling-back aversion hypothesis; however, these previously identified phenomena and mechanisms do not directly anticipate our effect. The status quo bias might discourage our New York–bound flyer from changing their itinerary but would not differentiate between whether that change involves doubling back or not. As the delays pile on such that more time has been spent waiting, the sunk-cost fallacy might only further encourage the traveler to remain on the flight from Los Angeles to New York. But again, this predicts a strengthened commitment to one's previous choices, not a distinct preference for a particular new means (i.e., one that avoids doubling back) to an end.

If people display doubling-back aversion, it will be for one of two general reasons. First, the prospect of doubling back may make a route seem objectively tougher. Two means to the same end can be objectively differentiated in terms of cost (for our purposes, the perceived duration of a particular route to an end state; e.g., Vroom, 1964). Although some researchers have suggested that people are fairly accurate in their cost–benefit analyses (Chong et al., 2017; Westbrook & Braver, 2015), others have found that forecasts of costs such as effort (Werner et al., 2016) and task duration (Buehler et al., 1994, 2010; Halkjelsvik & Jørgensen, 2012; König et al., 2015; Kruger & Evans, 2004) are malleable and thus subject to systematic distortion. One possibility is doubling back increases this perceived route length, thus explaining the reluctance to double back.

Second, the prospect of doubling back may change subjective construals of one's previous efforts and/or the efforts one has yet to undertake. The specific nature of these *route construals* likely vary somewhat depending on the context. Instead of developing a full taxonomy, we seek to test whether route construals offer incremental validity (beyond perceived route length) in explaining doubling-back aversion. We also test whether it is construals of one's past and/or future efforts that play a mediating role.

One route construal that likely has broad applicability is an aversion to viewing one's efforts as a waste. People are reluctant to abandon a project if their initial output will become mere scraps instead of input for another job, reflecting literal waste aversion (Arkes, 1996). In another study, interest in a Lego-building task waned once it was clear participants' creations would be destroyed upon completion (Ariely et al., 2008). Doubling back may thus cheapen one's past efforts by taking a (metaphorical) hammer to that work.

Doubling back may also (or only) contaminate route construals of future efforts. For an achievement goal, doubling back may contaminate one's sense that one can still score a win as opposed to getting mired in a tortured pathway toward an end state. For instance, as one reaches a dead end on a challenging hike, we suspect that the looming walk back may seem more like a slog than a glorious path to the mountain's pinnacle. Despite variability in which route construals most logically apply to any specific doubling-back context, the distinction between perceived route length and route construals—as between beliefs about objective costs versus subjective interpretations—has more universal applicability.

This article presents four studies that test for doubling-back aversion. Studies 1 and 2 identify the preference in qualitatively different contexts. In each study, participants are provided with a goal and are initially asked or induced to pursue it in a specific way. After some progress, participants then have the choice to switch to an easier means to complete the goal. Only sometimes does that switch require (or seem to require) doubling back. Studies 3 and 4 use framing manipulations to decompose the influence of each component of doubling back. We also test to what extent route construals and/or perceived route length explain doubling-back aversion.

Research Transparency Statement

General disclosures

Conflicts of interest: The second author is an associate editor at *Psychological Science*. The authors declare no other conflicts of interest. **Funding:** This research was not supported by external funding. **Artificial intelligence:** No AI-assisted technologies were used in this research or the creation of this article. **Ethics:** This research received approval from the University of California, Berkeley, Institutional Review Board (ID: 2022-05-15342).

Study 1 disclosures

Preregistration: The hypotheses, methods, and analysis plan were preregistered (https://aspredicted.org/8xft-zrff.pdf) on February 25, 2023, prior to data collection, which began on March 14, 2023. There were minor deviations from the preregistration (for details, see Table S1 in the Supplemental Material available online). **Materials:** All study materials are publicly available (https://osf.io/hswya/files/osfstorage). **Data:** All primary data are publicly available (https://osf.io/t7s3f/files/osfstorage). **Analysis scripts:** All analysis scripts are publicly available (https://osf.io/jyf4u/files/osfstorage). **Computational reproducibility:** The computational reproducibility of the results has been independently confirmed by the journal's STAR team.

Study 2 disclosures

Preregistration: The hypotheses, methods, and analysis plan were preregistered (https://aspredicted.org/6mjs-632t.pdf) on July 4, 2022, prior to data collection, which began on July 31, 2022. There were minor deviations from the preregistration (for details, see Table S1). **Materials:** All study materials are publicly available (https://osf.io/hswya/files/osfstorage). **Data:** All primary data are publicly available (https://osf.io/t7s3f/files/osfstorage). **Analysis scripts:** All analysis scripts are publicly available (https://osf.io/jyf4u/files/osfstorage). **Computational reproducibility:** The computational reproducibility of the results has been independently confirmed by the journal's STAR team.

Study 3 disclosures

Preregistration: The hypotheses, methods, and analysis plan were preregistered (https://aspredicted.org/6474-rdy2.pdf) on October 27, 2022, prior to data collection, which began on October 29, 2022. There were minor deviations from the preregistration (for details, see Table S1). **Materials:** All study materials are publicly available (https://osf.io/hswya/files/osfstorage). **Data:** All primary data are publicly available (https://osf.io/t7s3f/files/osfstorage). **Analysis scripts:** All analysis scripts are publicly available (https://osf.io/jyf4u/files/osfstorage). **Computational reproducibility:** The computational reproducibility of the results has been independently confirmed by the journal's STAR team.

Study 4 disclosures

Preregistration: The hypotheses, methods, and analysis plan were preregistered (https://aspredicted.org/fjsr-53mk.pdf) on May 26, 2023, prior to data collection, which began on May 30, 2023. There were minor deviations from the preregistration (for details, see Table S1). **Materials:** All study materials are publicly available (https://osf.io/hswya/files/osfstorage). **Data:** All primary data are publicly available (https://osf.io/t7s3f/files/osfstorage). **Analysis scripts:** All analysis scripts are publicly available (https://osf.io/jyf4u/files/osfstorage). **Computational reproducibility:** The computational reproducibility of the results has been independently confirmed by the journal's STAR team.

Study 1

Participants navigated a virtual-reality world built for this study. Early in traveling from Point A to Point B, participants reached a map. Before this point, participants did not know the available routes. For some participants, it became clear the fastest route required doubling back. We tested for doubling-back aversion by assessing whether this feature discouraged such efficiency.

Method

Participants and design. Undergraduates at an American university ($n = 202$) took part in exchange for course credit. Participants were randomly assigned to one of two conditions: doubling back or control. Because of errors with saving the data, five participants' data were missing. This left 197 participants in all analyses reported below. For more information on demographics and how many participants were assigned to each condition in all studies, see the Supplemental Material. The hypothesis, methods, and analysis plan were preregistered (https://aspredicted.org/8xft-zrff.pdf). This research was approved by the University of California, Berkeley, Committee for the Protection of Human Subjects.

Procedure. Participants completed the study in the lab in between two other unrelated studies. In fact, this study was not even presented to participants as a study at all. Instead, after the preceding study (completely administered by computer) had finished, participants learned they would need to walk (in a virtual-reality world) to the next study. More specifically, they needed to traverse a virtual trail to reach an office where they would be supplied with a code that would allow them to proceed to the next study.

After participants had moved forward a short distance (on the only route participants seemingly could go), they reached a map that identified two paths that led to the office. The map remained on screen until participants reached the endpoint and retrieved the code. Unbeknownst to participants, the key dependent variable was the route they took. The nature of one of the two pathways—and thus the maps—differed slightly by condition.

One of the two pathways, which required participants to veer left and then ultimately loop around to the office, was the same in each condition. The length

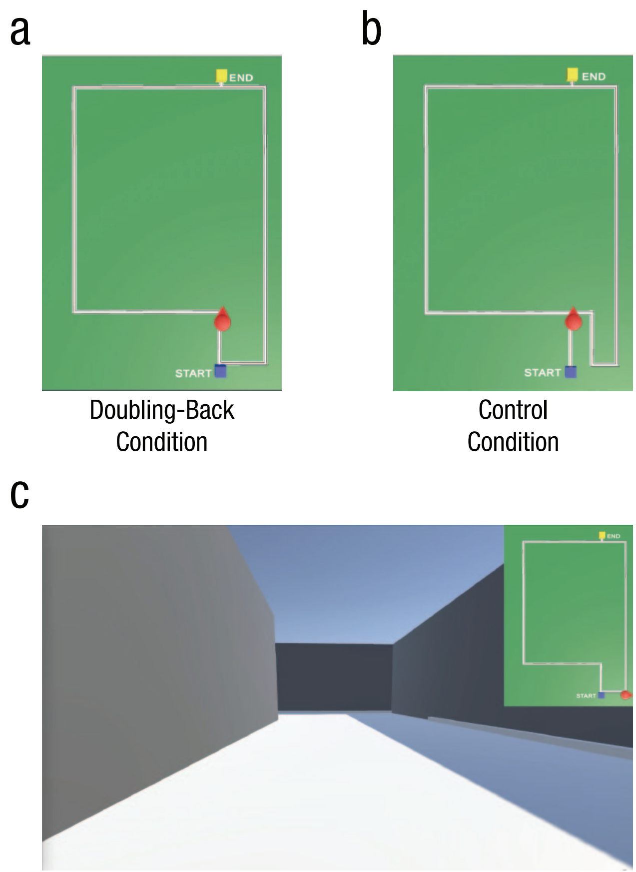

Fig. 1. Virtual-reality world navigated by participants in Study 1. In this study, participants were shown one of two maps (a or b) once they reached the point at which each red teardrop (indicating the participant's current location and orientation) is positioned. The longer route (the leftward route) was equivalent in both conditions, and the shorter route (the rightward route) was the same length in both conditions. Only in the doubling-back condition did the shorter route require undoing one's steps and beginning again from the starting point. The virtual-reality world (c), as seen by participants, could be navigated using the arrow keys. The route immediately available to the participants could be seen in the main window, whereas the more general paths were visible in the inset map.

of the other pathway was the same in the two conditions, approximately 20% shorter than the longer route; the specific form it took varied slightly by condition. In both conditions, taking this shorter path required participants to temporarily move in the opposite direction of the end state. But only for those in the *doubling-back* condition did the shorter pathway entail retracing the steps they had already taken. As a result, only in the doubling-back condition did the shorter route require that participants delete the progress they had already made and thus start the journey over from the beginning (see Fig. 1). In combination, this allowed us to disentangle an aversion to doubling back from an aversion to moving in the opposite direction from the endpoint (Soman & Shi, 2003).

After retrieving and entering the code, participants were reminded, "In the virtual world, when the map showed up, you could see where you were and where the office was. You then had to decide how to get to the office. Once you decided on a path to get to where the office was, you went along that path and reached the office." They were then asked, "Why did you choose that specific path to get to the office? Please explain in two or three sentences." Per our preregistration, we analyzed these responses to detect potentially artifactual reasons why people would display doubling-back aversion.

Results

All analyses in this and all subsequent studies were performed in R (Version 3.6.2; R Core Team, 2021).

Actual route-length differences. To begin, we conducted an exploratory analysis to test whether participants really did reach the destination more quickly if they took the shorter route on the right. We calculated the time (in seconds) it took participants, once they began moving, to get from the map to the destination. To reduce positive skew,[1] we log-transformed these times. Although we knew that the right path was 20% shorter, we also found that participants who took that path arrived at the end state more quickly (M = 5.14, SD = 0.13, back-transformed M = 171.05 s) than did those who took the longer route to the left (M = 5.40, SD = 0.18, back-transformed M = 222.38 s), $t(195) = 11.72$, $p < .001$, $d = 1.68$.

Doubling-back aversion. The shorter route—despite offering a more efficient means to the end—also sometimes required doubling back. We followed our preregistered analysis plan by first including all participants. A logistic regression showed that more participants chose to take the longer path when the shorter path would require doubling back (56.7%) than when it would not (31.0%), $z = 3.59$, $p < .001$, odds ratio (OR) = 0.34. Next, we proceeded with analyses that we preregistered as exploratory, which involved including increasingly stringent criteria for who was included.

Our second analytic approach was to exclude participants who said they did not double back because that pathway was blocked by a wall. (If participants in the doubling-back condition turned around before reaching the map, they could see only a wall behind them, not the turn that was actually available.) Two participants, both in the doubling-back condition, said they thought that path might be blocked off by a wall. Doubling-back aversion held even after excluding these two participants (55.8% vs. 31.0%), $z = 3.45$, $p = .001$, *OR* = 0.36. For the final analytic approach, we excluded participants who mistakenly indicated that there was only one path to the office, which means they did not recognize that they were even confronting a choice. There were five such participants: four in the doubling-back condition and one in the control condition. Doubling-back aversion held in this further-reduced sample (54.8% vs. 30.3%), $z = 3.40$, $p = .001$, $OR = 0.36$.

An alternative interpretation of these results is that people are not specifically averse to doubling back, but they may have a natural preference for taking novel routes. After all, making progress is typically naturally associated with seeing new things. Encountering the same intersection twice on a car trip is rarely a sign that one is going the right way. Our subsequent studies address this concern by using design features that allow the doubling-back route to be the one that entails more novelty.

A second alternative interpretation is that participants may have categorized the longer route as the path they were already on in the doubling-back condition, whereas participants in the control condition may not have been able to distinguish the two routes in this way. We tried to guard against a concern that participants in the doubling-back condition would simply continue to pursue what they had already committed to by not allowing participants to see the multiple routes that were available until they had reached the map. This meant that participants in the doubling-back condition did not already have knowledge of (and thus a preexisting commitment to) one particular route. That said, we aimed to more conclusively address this concern in our subsequent studies by actually presenting all participants with two equivalent routes that were merely described or framed in different ways.

Study 2

Study 2 tested doubling-back aversion in a qualitatively different context—one requiring cognitive (instead of physical) effort. Whereas Study 1 presented different participants with different possible pathways, Study 2 actually presented all participants with the same choice. But only for some participants did we frame one (metaphorical) route as requiring doubling back.

Method

Participants and design. CloudResearch-approved Americans (n = 402) were recruited from Amazon Mechanical Turk (AMT). Participants were randomly assigned to one of two *switch-frame* conditions: doubling back or control. Per our preregistered criterion, we excluded three participants from all analyses reported below who were unable to answer a memory-based attention check at the study's conclusion. These participants were unable to identify what they had been asked to do in the study (correct answer: "write words that begin with a certain letter"). This left 399 participants in all analyses reported below. The hypothesis, methods, and analysis plan were preregistered (https://aspredicted.org/6mjs-632t.pdf).

Procedure. Participants learned they would be asked to complete a task, such as solving anagrams (unscrambling four or six letters to form a real word), doing simple arithmetic problems (addition or multiplication), writing words that begin with a certain letter (words that start with "G" or "T"), or identifying objects in photographs (monochromatic or full-color pictures). Note that because both the general categories of tasks (e.g., generate words . . .) as well as two specific instantiations of each task (e.g., . . . that start with "G" or with "T") were described, participants could construe a switch from one specific instantiation of a task to another as continuing with the same task or doubling back and starting over. All participants learned that they would be completing the word-generation task. More specifically, they would have to think of 40 words that start with the letter "G." Participants also learned certain constraints: The 40 words would have to be unique English words and would need to come from their own memory instead of an external source (e.g., a dictionary, an Internet search). Each participant had to actively promise not to cheat in these ways.

Participants began generating words. They were shown a progress bar that updated after the submission of every five words to show what percentage of the task they had completed. Once participants had submitted 10 words (and thus had completed 25% of the task), participants were offered the key choice. All participants had what were essentially the same two options. One was to continue with their current task under the same instructions, which would require generating the remaining 30 words that started with "G." The other option was the same across conditions, but it was framed in one of two ways.

In the *doubling-back* condition, participants were told that choosing the other option would entail "throwing out the work you have done so far and starting over on a new task." That new task was to generate 30 words that started with the letter "T." In the *control* condition, participants were instead told that choosing this alternative option would mean they were "going to continue to work on the same task" but that "for the final 75%" they would instead generate words that start with the letter "T." In that way, only in the doubling-back condition was the same option to change course framed as undoing the work that had been done thus far and starting anew. We reinforced these equivalent but

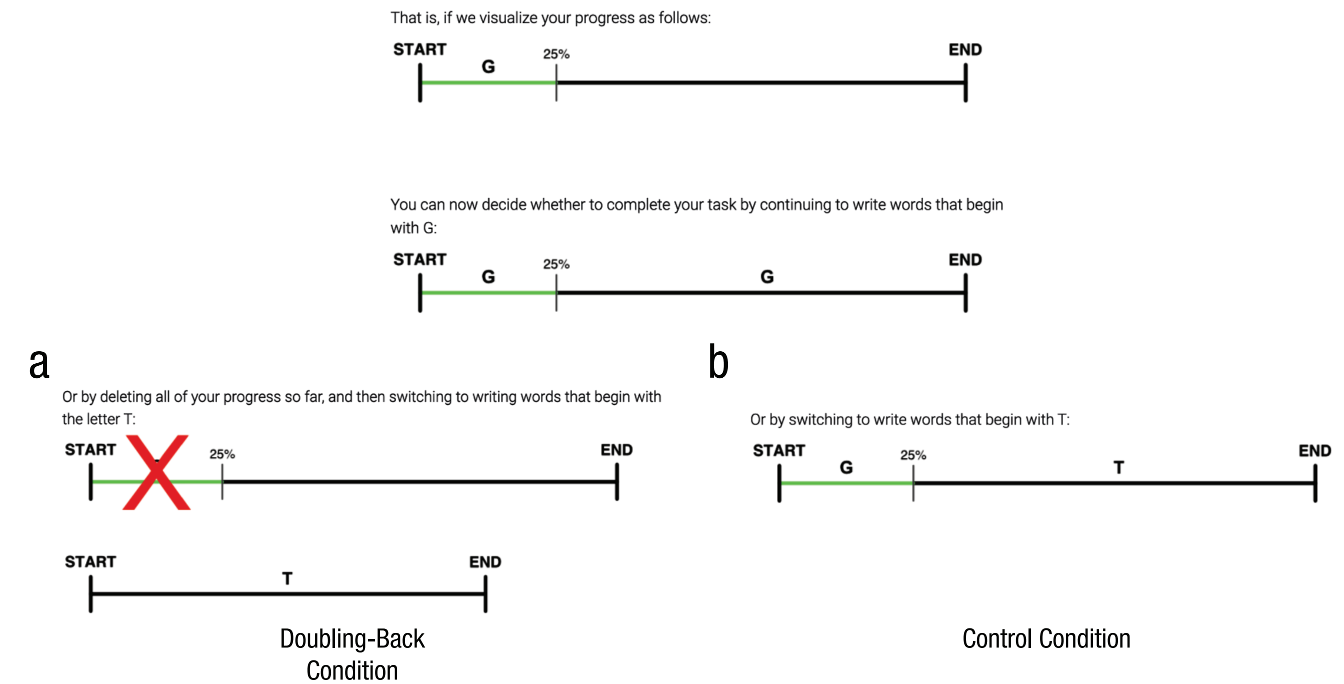

Fig. 2. How the decision to switch was visually represented in each condition (Study 2). Although participants' past progress and the option to continue on their current path were represented identically in the doubling-back and control conditions, only in the doubling-back condition (a), but not the control condition (b), was the decision to switch shown to entail the deletion of their past work and starting anew on the subsequent task (instead of simply completing the remaining 75% under new instructions).

differently framed choices with one of two graphics (see Fig. 2). Participants could take as long as they wanted to decide which task to proceed with.

Note how this manipulation is more conservative than the one used in Study 1. In that study, participants who chose to double back actually had to spend time and effort trying to re-traverse (in reverse) the route they had already traveled. In Study 2, participants who wished to double back could backtrack with the click of a button. If doubling-back aversion emerged in this paradigm, it meant the aversion was to the *decision* to double back (even when it could be accomplished immediately) instead of simply to the *process* of doubling back. Furthermore, if participants simply equated novelty with progress, then this would encourage participants in both conditions to switch tasks.

There are more words in the English language that start with "T" than that start with "G." Furthermore, because all participants had already generated 10 words that started with "G" (that they could not reuse), this also made staying the course more challenging. We expected this would make switching to generating "T" words the more efficient way to complete the study. All participants actually completed their selected task. Unbeknownst to participants, we measured how long participants took to complete the first (generating 10 words that start with "G") and second (generating 30 words that start with "G" or "T" depending on the participant's choice) parts of the task to determine whether switchers did indeed complete the task more quickly than did those who stayed the course. Per our preregistration, we log-transformed these times (because this transformation was better at reducing positive skew than a square-root transformation) for use in relevant analyses.

Results

Actual route-length differences. We conducted an exploratory analysis to test whether those who switched to the "T" task were indeed able to reach the end of the task more quickly than those who continued with the "G" task. Applying the same rule outlined in Study 1, we log-transformed these times (recorded in seconds) to reduce skew. Those who switched tasks were indeed able to complete the second part more quickly ($M = 5.12$, $SD = 0.45$, back-transformed $M = 166.64$ s) than those who stayed the course ($M = 5.51$, $SD = 0.48$, back-transformed $M = 247.36$ s), $t(397) = 8.44$, $p < .001$, $d = 0.85$. This supports the assumption that switching routes was indeed a more efficient route to completing the overall task.

Doubling-back aversion. To directly test for doubling-back aversion, we conducted a logistic regression in which the switch-frame condition (doubling back or control) predicted the decision to switch. As predicted, participants were less likely to switch when the new task was framed as requiring doubling back (throwing out one's work and starting over on a new task; 25.5%) than when it did not (75.4%), $z = 9.48$, $p < .001$, $OR = 0.11$. This illustrates doubling-back aversion in a new context. Note that a considerable number of participants in both conditions elected to take the longer path, which may reflect some form of a status quo bias or sunk-cost fallacy, but the robust difference in preferences between the conditions demonstrates doubling-back aversion.

Recall that each participant made the critical choice (to stay or switch) after completing 25% of the originally assigned task. We proceeded to test in a preregistered exploratory analysis whether evidence of doubling-back aversion would remain even once we controlled for the amount of time participants took to generate those first 10 words that start with a "G." That is, perhaps because of a failure of random assignment, those in the doubling-back condition simply happened to be especially quick on the initial task such that that rapidity—not the aversive prospect of doubling back—was responsible for their greater likelihood of staying the course.

In an expanded logistic-regression model, we regressed the decision to switch on the switch-frame condition, the (standardized) log-transformed initial task time, as well as its interaction with the switch-frame condition. Not only was the decision to switch not associated with the initial task-completion time, $z = 0.10$, $p = .923$, adjusted *OR* (*AOR*) = 1.01, but this association also did not vary by switch-frame condition, $z = 1.09$, $p = .276$, $AOR = 1.29$. Speaking to doubling-back aversion's robustness, we continued to observe a main effect of condition, $z = 9.48$, $p < .001$, $AOR = 0.11$. In other words, who did and did not choose to switch tasks was explained only by whether changing course entailed doubling back, not by how much participants were able to quickly complete the initial, prechoice task.

Study 3

Using a new choice context, Study 3 extended on Study 2 by decomposing the two elements of doubling back: undoing or *deleting* one's efforts and having all as opposed to only some of a *task remaining*. Study 3 also tested (a) whether each element contributes to doubling-back aversion and (b) whether perceived route length and/or route construals statistically mediates such effects.

Method

Participants and design. CloudResearch-approved Americans ($n = 722$) were recruited from AMT. Participants were randomly assigned to one of four conditions in a 2 (deletion: deletion or no deletion) × 2 (task remaining: some or all) full-factorial design. We applied two preregistered exclusion criteria. First, we excluded seven participants who failed a memory-based attention check that required participants to identify what they had been asked to do during the study. Second, we excluded nine participants who were identified as outliers because their responses were more than three standard deviations from the mean on a particular composite measure (perceived relative route length; see below). The hypotheses, methods, exclusion criteria, and analysis plan were preregistered (https://aspredicted.org/6474-rdy2.pdf).

Procedure. The basic two-part structure mirrored that used in Study 2. That is, to begin, participants saw four different tasks they might be asked to do. In actuality, all participants were initially assigned the same task: to write down 40 objects one can find in a doctor's office. This exercise was subject to certain constraints. Each answer had to be a unique English word and refer to a physical object (thus excluding abstract words such as "happiness"). We emphasized the importance of not cheating by consulting outside sources to assist with the recall. Each participant was required to affirm that they would not do this.

Choice. After participants had written down 10 objects (such that a progress bar tracking their performance had reached 25%), they were offered a choice. They could continue under the original instructions and write an additional 30 objects that could be found in a doctor's office, or they could switch and complete a variant—writing down 30 objects that could be found in a school—that we expected would be easier. As in all studies, participants were not given a time limit by which they needed to decide. We varied how the alternative (to switch to writing objects that could be found in a school) was framed. But instead of simply framing this choice as entailing doubling back or not (as in Study 2), we instead independently varied whether each component of doubling back was present.

Deletion

This manipulation was meant to change participants' construal of the work they had done thus far should they choose to change course. Those in the *deletion* condition were told that changing course involved "throwing out the work you have done thus far" and that "the objects you already generated will be deleted." Those in the *no-deletion* condition were instead told that changing course entailed "submitting the work you have done thus far" and that "the objects you already generated will be submitted." In this way, we framed participants' initial efforts as either being undone (deletion) or preserved (no deletion). Note that although this frame may have changed the way that participants construed their past work, it did not alter any objective details of what each option entailed. By analogy, the walker who decides to do an about-face could think of the walk backward as deleting the steps they have taken thus far or (much as one's fitness tracker would see it) as a continuation of one's already-logged journey. Participants' initial efforts still happened regardless of whether they were said to be thrown out or submitted.

Task remaining

This manipulation was meant to change participants' construal of the work that was left to do. More specifically, those in the *some* condition were told they could "continue working on the task" or could instead choose to change the category of the objects they were listing "for the remaining 75%." In contrast, those in the *all* condition were told that changing course would entail "starting over on a new task." This manipulation was meant to change whether participants would construe their remaining work—should they switch to the new instructions—as the final three quarters of the task they had been working on all along or instead as a completely new task. Crucially, this manipulation also had no bearing on what, objectively, participants who chose this option would concretely do. By analogy, the walker who decides to take a U-turn could think of this as choosing a brand new course or completing the final *X*% of their journey using a new route. We reinforced these manipulations using visuals that remained on the screen until the time of choice.

Perceived route length. After choosing whether to stick with their current task or switch to the alternative, but before completing their task of choice, participants completed measures that were designed to identify what might statistically explain the influence of the manipulations on choice. The first of these aimed to understand participants' beliefs about the objective challenge posed by each option. More specifically, we had participants estimate the time it would take to complete each of the two possible tasks. Having found in Study 2 that a log transformation reduced skew better than a square-root transformation, Study 3's preregistration committed to using a log transformation (as long as it did indeed reduce skew). We thus followed this preregistered rule and used a (natural) log transformation. We then took the time estimate associated with staying the course and subtracted off the time estimate associated with switching courses to calculate the *perceived relative route length*. Higher numbers thus reflected a perception that staying would prolong the work left to do.

Route construal. For Study 3, we then used a route-construal measure that would capture the extent to which participants subjectively characterized the choice to switch as doubling back and starting over. More specifically, we asked them, "If you changed to generating objects that are found in schools, how much would that feel like starting over as opposed to simply modifying your approach to the same task?" Participants responded on a scale from 1 to 7 (1 = *definitely starting over*, 4 = *both equally*, 7 = *definitely modifying approach to same task*). We reverse-coded this item so that higher numbers would reflect a subjective perception of starting over. We wait until Study 4 to introduce more specific route-construal measures that have the potential to offer more insight into how switching routes may change one's construal of one's past and future efforts.

Results

Actual and perceived route-length differences.

Actual differences. Study 3 used a new decision context, so we first conducted an exploratory analysis that could help speak to the wisdom of switching. That is, we checked whether participants who chose to switch (to generating items found in a school) were able to get through the remaining work more quickly than those who chose to stay the course (by continuing to generate items found in a doctor's office). Applying the same rules used in the previous studies, we log-transformed the task-completion time (measured in seconds) to best reduce skew. And indeed, those who chose to switch completed the subsequent recall more quickly ($M = 5.28$, $SD = 0.44$, back-transformed $M = 195.96$ s) than those who chose to stay the course ($M = 5.65$, $SD = 0.48$, back-transformed $M = 285.05$ s), $t(704) = 10.80$, $p < .001$, $d = 0.81$.

Perceived differences. Of course, just because those who switched tasks spent less time on the remaining work than those who did not does not mean that, in general, participants anticipated this cost savings. Additional analyses confirmed they did: Participants thought that switching would save them time on the second part ($M = 4.85$, $SD = 1.03$, back-transformed $M = 127.93$ s) compared with staying with the same task ($M = 5.21$, $SD = 1.06$, back-transformed $M = 182.26$ s), paired $t(705) = 17.15$, $p < .001$, $d = 0.34$. More nuanced analyses that examine how the size of this perceived time savings may have varied as a function of our doubling-back manipulations are reported below.

Doubling-back aversion. We proceeded to test whether our two manipulations—each reflecting a component of doubling back—served to discourage switching course. We conducted a logistic regression in which the deletion manipulation (deletion: +0.5; no deletion: −0.5), the task-remaining manipulation (all: +0.5; some: −0.5), as well as their interaction all predicted the decision to switch to the easier route. This analysis revealed a main effect of

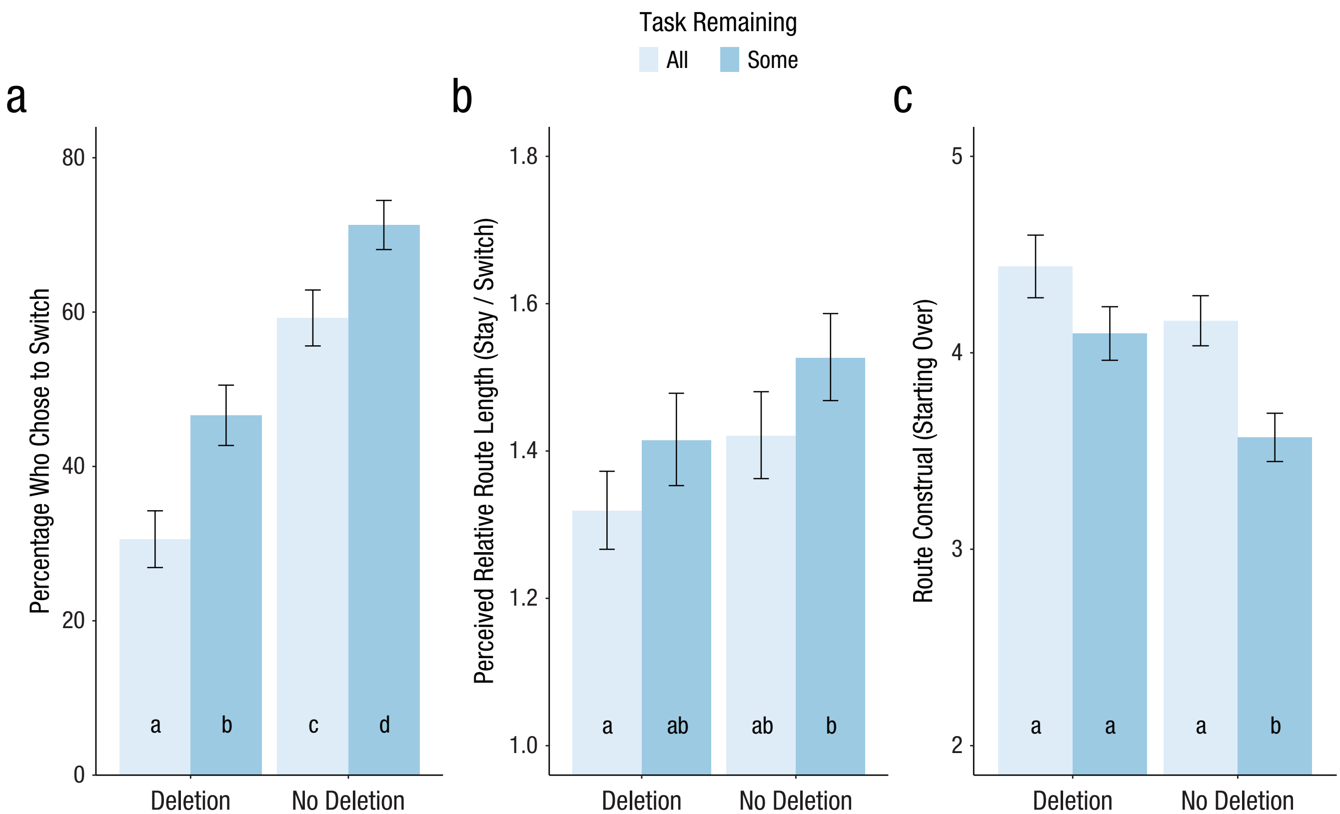

Fig. 3. Choice, perceived relative route length, and route construal by condition (Study 3). The two main effects shown for (a) choice suggest that each component of doubling back contributes to doubling-back aversion. The plotted values for (b) perceived relative route length are the back-transformed means of the difference score of the two log-transformed estimates; this can be interpreted as the ratio of the two estimates. The (c) route-construal measure was reverse-scored so that 1 = *definitely modifying approach to same task* and 7 = *definitely starting over*. Error bars reflect ± 1 *SE* from the mean. Bars in the same graph that do not share a letter are significantly different at the $p < .05$ level.

deletion, $z = -7.03$, $p < .001$, $AOR = 0.33$, a main effect of task remaining, $z = -3.83$, $p < .001$, $AOR = 0.54$, but no interaction, $z = -0.47$, $p = .639$, $AOR = 0.86$. As depicted in Figure 3a, those who were led to construe a switch as throwing out their past efforts were less likely to switch (38.8%) than those encouraged to construe the same switch as still preserving their initial work (65.5%). In addition, those encouraged to see the switch as leaving them with a full, complete task ahead of them were less likely to switch (46.0%) than those led to conceive of the switch as still leaving them with only some (three-quarters) of the task to do (60.3%). These results suggest that an aversion to throwing out or deleting one's past efforts, as well as a perception that one would have an entire task ahead of them, contributed to doubling-back aversion. The absence of an interaction effect is consistent with the idea that each component of doubling back independently contributes to doubling-back aversion.

Perceived relative route length. We then proceeded to determine whether the manipulations affected perceptions of relative route length. We conducted a two-way analysis of variance (ANOVA) to evaluate the effects of the deletion manipulation, task-remaining manipulation, and their interaction on the time-estimate difference score. In this case, we observed a marginally significant effect of deletion, $F(1, 702) = 3.31$, $p = .069$, $\eta_p^2 = .005$, a marginally significant effect of task remaining, $F(1, 702) = 2.95$, $p = .086$, $\eta_p^2 = .004$, but no hint of an interaction, $F(1, 702) = 0.00$, $p = .982$, $\eta_p^2 < .001$ (see Fig. 3b). These effects did not offer clear evidence that either component of doubling back increased how objectively daunting the alternative seemed compared with sticking with the status quo. Although these effects did not reach the traditional threshold of statistical significance, the fact that there were hints of effects here means both that we will be interested in using the perceived relative route length as a covariate (to understand the nature of our effects that cannot be attributed to perceptions of route lengths) and in testing these effects again in the next study.

Route construal. We now turn to whether the manipulations affected the route construals of switching, encouraging it to feel more like starting over (as opposed to continuing with the same task). We used the same two-way ANOVA as that used on the perceived route-length measure, but this time we predicted the route-construal item. This model returned a main effect of deletion, $F(1, 702) = 8.75$, $p = .003$, $\eta_p^2 = .012$, a main effect of task remaining, $F(1, 702) = 11.79$, $p = .001$, $\eta_p^2 = .017$, but no interaction, $F(1, 702) = 0.86$, $p = .354$, $\eta_p^2 = .001$. As shown in Figure 3c, those encouraged to see switching as involving the deletion of their previous efforts were more likely to construe switching as involving starting over ($M = 4.27$, $SD = 1.88$) than those led to see switching as still preserving their past work ($M = 3.85$, $SD = 1.76$). Furthermore, those led to see switching as meaning they had an entire task ahead of them were more likely to construe switching as starting anew ($M = 4.29$, $SD = 1.86$) than those encouraged to see switching as having no implications for how much of the task they had left to complete ($M = 3.81$, $SD = 1.76$).

Consideration of the two mediators.

Statistical mediation. Next, we examined whether the two manipulations' effects on the choice to switch could be statistically explained by their (sometimes marginal, sometimes significant) effects on perceptions of the relative route length and the route construal of switching. Note that we intentionally chose to look at how our manipulations changed participants' perceptions of route lengths and route construals instead of simply asking participants to consider the role these factors had in making their decision. This allowed us to test the extent to which each mediator was affected by our manipulations and then predicted participants' choice, regardless of whether participants were willing or even able to disclose the reasons behind their choices.

We entered the deletion manipulation, the task-remaining manipulation, their interaction, as well as the perceived relative route length (time difference score) and the route-construal measure in a logistic regression predicting the decision to switch. We observed main effects of both the perceived relative route length (time difference score), $z = 6.87$, $p < .001$, $AOR = 2.04$, and the route-construal measure, $z = -6.69$, $p < .001$, $AOR = 0.54$. These effects showed that participants' decision to switch was predicted by their perception that completing the task under the modified instructions would take less time than completing the task under the initial instructions and independently by a perception that such a switch would entail starting over. With these covariates controlled, the effects of the deletion, $z = -6.27$, $p < .001$, $AOR = 0.34$, and task-remaining, $z = -2.65$, $p = .008$, $AOR = 0.63$, manipulations were reduced but remained significant. When we followed our preregistration by allowing the two manipulations (deletion and task remaining) to interact with our candidate mediators (perceived relative route length and route construal), we found that one of these four interaction terms was significant. Although the full results are reported in the Supplemental Material, the one significant interaction reflected that perceived relative route length predicted the decision to switch somewhat more when such a switch would entail the deletion of one's past efforts, $z = 2.42$, $p = .016$, $AOR = 1.69$.

Before proceeding with our mediation analyses, consider why it is important that participants' decisions were predicted by their estimates of which route was shorter. Participants were not monetarily incentivized to make a certain choice. But in keeping with the idea that "time is money," participants were naturally incentivized to choose the option that would allow them to complete the task more quickly and efficiently. After all, in real-life tasks for which participants must decide whether to double back, the reward for doing so is savings in time and effort. That participants were partially sensitive to these perceived time savings is consistent with the idea that participants did value such efficiency. That doubling-back aversion still emerged speaks to the power of the effect even when temporal savings made doubling back a (temporally) incentive-compatible solution.

We ran two parallel mediation models (PROCESS Model 4, Version 4.3; Hayes, 2017) to further examine whether the effect of each manipulation on choice was statistically mediated through each candidate mediator: the perceived relative route length of switching and the route construal of switching (perception of starting over). In each model, we alternated which manipulation (deletion or task remaining) was the independent variable and which was a covariate. In both models, we included the interaction between the two manipulations as an additional covariate (to mimic the original model). Note that each candidate mediator in a parallel mediation model serves as a covariate when assessing an indirect effect through the other candidate mediator.

The indirect effect of deletion on choice through route construal of switching was significant, 95% confidence interval (CI) [−0.2484, −0.0438], as was the indirect effect of task remaining on choice through route construal of switching, 95% CI [−0.2784, −0.0635]. In contrast, the indirect effect through estimated time difference was nonsignificant for both the deletion model, 95% CI [−0.2174, 0.0052], and the task-remaining model, 95% CI [−0.2180, 0.0119]. These effects were anticipated by the earlier reported results that our manipulations reliably influenced route construal but less robustly affected perceived relative route length. This provides initial evidence that doubling-back aversion results from shifts in people's subjective understanding of what changing course would mean, independent of perceptions of how objectively daunting each route was.

Alternate exploratory tests. We conducted two additional nonpreregistered exploratory tests. First, we tested whether each manipulated component of doubling back predicted each mediator (perceived relative route length and route construal) while statistically controlling for the other variable. After all, these two measures were correlated, $r(704) = -.14$, $p < .001$. This raises the question of whether the manipulations' effects on each variable emerged independently of the other variable. As described in the Supplemental Material, both the deletion and task-remaining manipulations predicted the route-construal measure while controlling for perceived relative route length. In contrast, neither the deletion nor task-remaining manipulation predicted perceived relative route length when controlling for route construal. These (non)effects were also observed in Study 4.

Second, we considered whether the influence of each doubling-back component on route construal was statistically greater than its effect on perceived relative route length. To conduct this test, it was necessary to make each candidate mediator comparable. We thus standardized each measure and reverse-scored the perceived relative route-length variable so that higher values for both variables would represent an effect on the mediator that could discourage switching tasks. In a repeated-measures ANOVA that allowed us to compare the size of the two effects, we did not find evidence that the manipulations operated more strongly on the route-construal measure than the perceived relative route length. That said, in Study 4, we used an expanded set of route construals that provided more insight into how the deletion and task-remaining manipulations altered people's subjective interpretation of what doubling back would mean. As reported in the Supplemental Material, in that study, both manipulations did operate more strongly on route construals than perceived relative route length.

Study 4

Study 4 builds on Study 3 by assessing whether each component of doubling back contributes to doubling-back aversion because of shifts in how one construes one's past efforts and/or shifts in construals of one's future work. We also disentangle construals stemming from one's actually switching course (and thus potentially doubling back) as opposed to staying the course. This has the potential of allowing us to localize the mediating effects of subjective route construals on doubling-back aversion to perceptions associated with the specific prospect of doubling back (as opposed to the entire choice context when doubling back is a possibility).

Method

Participants and design. CloudResearch-approved Americans (n = 1,198) were recruited from AMT. Participants were randomly assigned to one of four conditions in a 2 (deletion: deletion or no-deletion) × 2 (task remaining: some or all) full-factorial design. Per our preregistered criteria, we excluded 11 participants who were unable to answer a memory-based attention check at the end of the study that asked them what they were asked to do in the study (correct answer: "write words that begin with a certain letter"). This left 1,187 participants in all analyses reported below. The hypotheses, methods, and analysis plan were preregistered (https://aspredicted.org/fjsr-53mk.pdf).

Procedure. The study began in much the way that Study 2 did. After seeing a number of tasks that might be assigned, participants learned they would be listing 40 words that start with the letter "G." After completing 25% of this task (i.e., listing 10 words), participants received a choice of whether to continue under the original instructions or to switch to a task that Study 2 suggested was objectively shorter: to generate 30 words that start with the letter "T." As in Study 3, we decomposed doubling back into two separate components. Depending on participants' deletion condition, they were led to believe that switching would involve throwing out (*deletion*) or preserving (*no-deletion*) the work they had done so far. And depending on participants' task-remaining condition, we framed a decision to switch as meaning they would start over on a new task (*all* remaining) or finish the original task (*some* remaining) under modified instructions.

After these manipulations, participants registered their choice of whether to stay the course or switch. At that point, participants completed a more nuanced set of subjective construal measures (described below) designed to test how the decision to stay or switch would change their feelings about the work they had already completed as well as the work they had yet to do. Then, as in Study 3, participants made time estimates that allowed us to calculate the *perceived relative route length*: participants' estimates of how long it would take them to complete the remaining work if they were to continue under the original instructions or switch to the new instructions. Finally, participants actually completed their chosen course of action.

Route construals of past efforts. Participants indicated how they would feel about the work they had already completed under two conditions: if they decided to stay the course ("Think about if you continued by generating words that start with 'G'. . .") and if they decided to switch ("Think about if you switched to generating words that start with 'T'. . ."). Under each condition, participants responded to two items preceded by the prompt "I would feel like the work I already did is . . .": "a waste" and "successful progress." Participants responded to each item on a scale from 1 to 5 (1 = *strongly disagree*, 2 = *somewhat disagree*, 3 = *neither agree nor disagree*, 4 = *somewhat agree*, 5 = *strongly agree*). The items were negatively correlated ($r = -.74$, $p < .001$). We reverse-scored the first item and averaged it to the second to create two separate composites: one conditional on staying the course and one conditional on switching. For each, higher *past-effort construal* scores reflect more positive construals of the work already completed.

Route construals of future efforts. These items complemented the perceptions of work already done by asking how participants would feel about the route they still had to traverse, again conditional on making each choice. For both pairs of items, participants responded to two items preceded by the prompt "I would feel like the work I still have to do is . . .": "a lot to do" and "an opportunity to succeed." Participants responded on the same scale as above (1 = *strongly disagree*, 5 = *strongly agree*). These items were also negatively correlated ($r = -.15$, $p < .001$). We again reverse-scored the first item and averaged it with the second item so that higher *future-work construal* scores (one conditional on staying the course and one conditional on switching routes) reflect more positive construals of the route that lies ahead.

Results

Actual and perceived route-length differences.

Actual differences. We began by conducting an exploratory analysis to test whether we would replicate the finding from Study 2 that those who switched were able to complete the second task more quickly than those who stayed the course. As in previous studies, we log-transformed the task-completion times (recorded in seconds) to best reduce skew. Once again, participants who switched to the "T" task finished that task more quickly ($M = 5.11$, $SD = 0.45$, back-transformed $M = 165.18$ s) than participants who stayed the course with the "G" task ($M = 5.36$, $SD = 0.46$, back-transformed $M = 213.74$ s), $t(1185) = 9.42$, $p < .001$, $d = 0.56$. This supports the wisdom of switching.

Perceived differences. We then examined whether participants anticipated that switching would bring with it a time savings. As with Study 3, this was the case. Overall, participants estimated that the second part would take less time if they switched tasks ($M = 4.81$, $SD = 0.99$, back-transformed $M = 123.04$ s) than if they continued on the same task ($M = 4.98$, $SD = 0.98$, back-transformed $M =$ 145.04 s), paired $t(1186) = 10.38$, $p < .001$, $d = 0.17$. Later analyses will examine how the doubling-back manipulations may have affected these perceptions.

Doubling-back aversion. We next tested whether our manipulations that decomposed the two components of doubling back—deletion and task remaining—affected participants' decision to switch. We conducted a logistic regression in which the deletion manipulation (deletion: +0.5; no deletion: −0.5), the task-remaining manipulation (all: +0.5; some: −0.5), as well as their interaction predicted the decision to switch. We observed a main effect of deletion, $z = -11.44$, $p < .001$, $AOR = 0.22$, a main effect of task remaining, $z = -3.22$, $p = .001$, $AOR = 0.66$, but no hint of an interaction, $z = 0.32$, $p = .746$, $AOR = 1.09$. As depicted in Figure 4a, those led to believe that switching would delete the work they had done thus far were less likely to switch (21.6%) than those led to believe that the same switch would lead to their initial work being preserved (54.8%). Similarly, those encouraged to see the switch as requiring the completion of an entirely new task were less likely to switch (33.7%) than those encouraged to see the switch as leaving only some of the task to do (42.6%). These findings replicate—using a new task—that an aversion to undoing one's initial efforts as well as a perception that one has an entire new task ahead of one independently contribute to doubling-back aversion.

Perceived relative route length. We then proceeded to delve more deeply into understanding what contributes to doubling-back aversion. We conducted a two-way ANOVA to evaluate the effects of the two manipulations and their interaction on the time-estimate difference score (estimated time to complete the task under the original instructions minus estimated time to complete the task under the new instructions, with each estimate first log-transformed). We observed a significant effect of deletion, $F(1, 1183) = 27.54$, $p < .001$, $\eta_p^2 = .023$, a marginally significant effect of task remaining, $F(1, 1183) = 3.71$, $p = .054$, $\eta_p^2 = .003$, but no interaction, $F(1, 1183) = 1.62$, $p = .203$, $\eta_p^2 = .001$ (see Fig. 4b). The direction of these main effects reflected that staying the course (vs. switching) seemed like it would take relatively less time to finish when a switch would involve deletion (vs. the preservation) of one's work and (marginally) less when a decision to switch was framed as requiring the completion of the entire task (vs. the 75% that remained). In combination, this provides middling (but stronger than Study 3) evidence that shifts in perceptions of the objective time-and-effort costs of traversing each route could contribute to at least one component of doubling-back aversion.

Route construals. We now turn to our route-construal measures. We first created a single composite that reflected

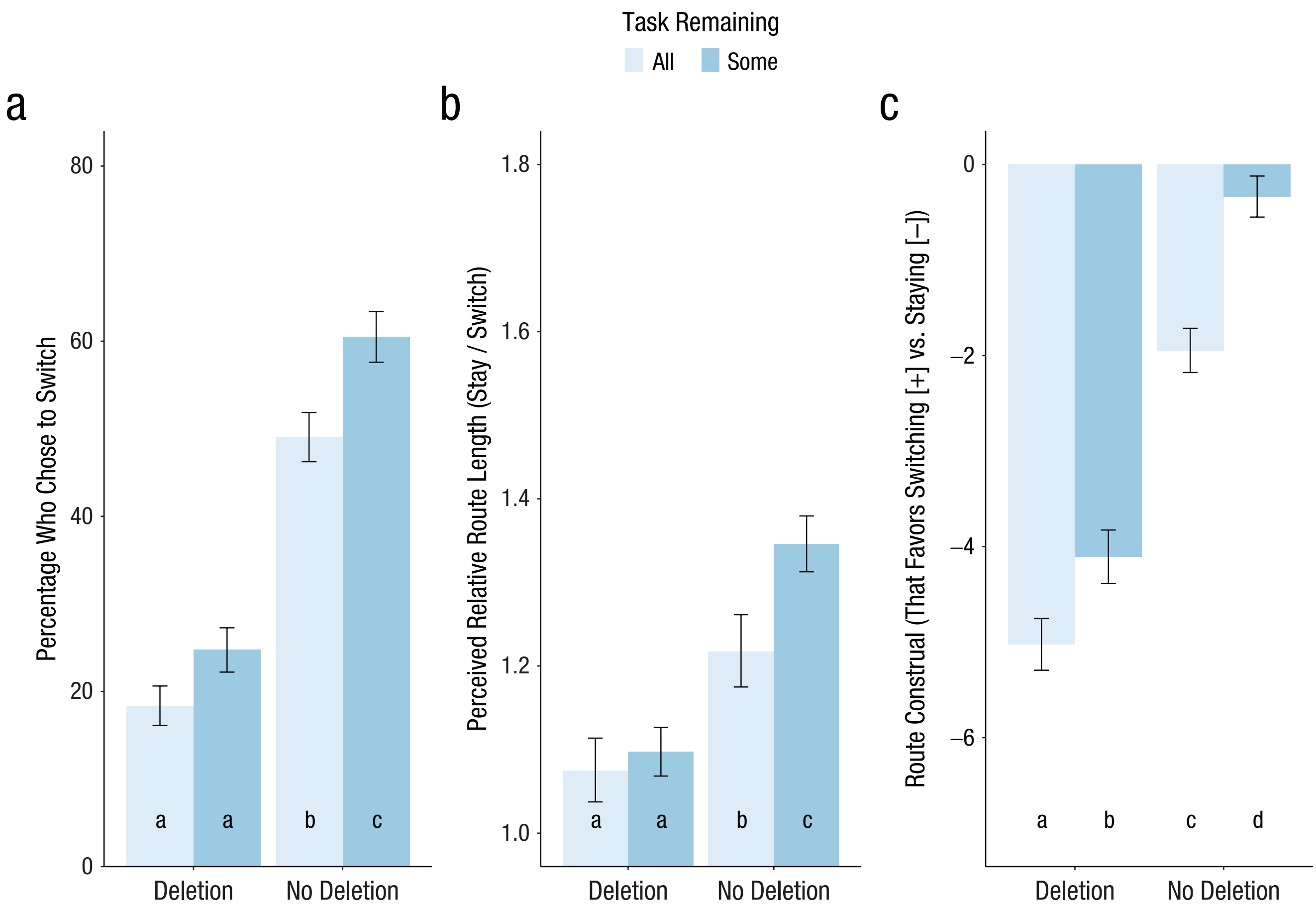

Fig. 4. Choice, perceived relative route length, and route construal by condition (Study 4). The two depicted main effects for (a) choice suggest that each component of doubling back contributes to doubling-back aversion. The plotted values for (b) perceived relative route length are the back-transformed means of the difference score of the two log-transformed estimates; this can be interpreted as the ratio of the two estimates. The (c) route construal is the perceived positivity of switching minus the perceived positivity of staying. Error bars reflect ± 1 *SE* of the mean. Bars that do not share the same letter are significantly different at the $p < .05$ level.

the *perceived positivity of switching* by summing the past and future composites under the assumption one switched. We created an analogous *perceived positivity of staying* composite. We created a *relative positivity of switching* composite by creating a simple difference score: the perceived positivity of switching minus the perceived positivity of staying. Although this combination blurs across positively and negatively tinged construals that possess differences in content, the construals were all correlated and, perhaps most important, were affected by the doubling-back manipulations in similar ways.

Following our preregistration, we first conducted a two-way ANOVA to evaluate the effects of the two manipulations and their interaction on the relative positivity of switching (vs. staying). We observed a main effect of deletion, $F(1, 1183) = 186.73$, $p < .001$, $\eta_p^2 = .136$, a main effect of task remaining, $F(1, 1183) = 25.44$, $p < .001$, $\eta_p^2 = .021$, but no interaction, $F(1, 1183) = 1.91$, $p = .167$, $\eta_p^2 = .002$. This suggested that both components of doubling back independently soured participants on their perceptions of switching compared to staying.

Note that the overall composite does not allow us to see to what extent the manipulations changed how participants would construe their efforts (past and future) as a function of each route (i.e., if they stayed the course as opposed to if they switched). We thus used the same two-way ANOVA model but this time predicted the switching and staying composites separately (instead of their difference score). Positive construals of switching were eroded by the deletion manipulation, $F(1, 1183) = 271.53$, $p < .001$, $\eta_p^2 = .187$, as well as the task-remaining manipulation, $F(1, 1183) = 33.40$, $p < .001$, $\eta_p^2 = .027$. The interaction was not significant, $F(1, 1183) = 1.33$, $p = .249$, $\eta_p^2 = .001$. Crucially, it was only these construals regarding switching that produced the effects on the overall composite. That is, construals about staying the course were not affected

Table 1. Effects of Doubling-Back Manipulations on Route-Construal Composites

Predictor variables	Overall (switching – staying)	Switching (positive) construal			Staying (positive) construal		
		Past + future	Past	Future	Past + future	Past	Future
Deletion	−0.37***	−0.43***	−0.46***	−0.25***	0.02	0.03	0.01
Task remaining	−0.14***	−0.15***	−0.14***	−0.12***	0.02	0.02	0.01
Deletion × Task Remaining	0.04	0.03	0.05*	−0.01	−0.02	−0.01	−0.03

Note: Each cell includes the standardized beta of the row variable predicting the column outcome variable from a multiple-regression model that includes deletion (deletion: +0.5; no deletion: −0.5), task remaining (all: +0.5; some: −0.5), and their interaction.
*$p < .05$. ***$p < .001$.

by the deletion manipulation, $F(1, 1183) = 0.59$, $p = .442$, $\eta_p^2 = .001$, the task-remaining manipulation, $F(1, 1183) = 0.47$, $p = .494$, $\eta_p^2 < .001$, or the interaction, $F(1, 1183) = 0.58$, $p = .448$, $\eta_p^2 < .001$. Table 1 shows the results of substantively equivalent (multiple regression) analyses in which we regressed different combinations of route-construal measures on deletion (deletion: +0.5; no deletion: −0.5), task remaining (all: +0.5; some: −0.5), and their interaction in linear regression models. These models match the Type III two-way ANOVAs used in our earlier analyses. We present the results in this way because such models yield standardized betas that easily capture the direction and magnitude of the effects in a way that can be compared across models. As can be seen in Table 1, the manipulations' effects on route construals of switching emerged similarly for perceptions of one's efforts already completed (past-effort construal) and the work one has yet to complete (future-effort construal). In other words, being led to see switching as undoing one's work and having to complete an entirely new task made people feel that switching would contaminate the work that they had already done *and* feel down about the work they had left to do. Furthermore, and as reported in the Supplemental Material, the deletion manipulation significantly affected all four construal measures (ps < .001). The task-remaining manipulations significantly altered three of the four construal measures (ps < .001) and marginally ($p = .098$) affected the fourth.

Statistical mediation

Next, we examined whether the manipulations' effects on the choice to switch (i.e., doubling-back aversion) could be statistically explained by the potential mediators. We added three terms to our original logistic regression model predicting the decision to switch: the perceived relative route length (estimated time difference score), the switching (positive) construal composite, and the staying (positive) construal composite. Participants were more likely to switch when they saw staying as taking relatively more time, $z = 3.07$, $p = .002$, $AOR = 1.30$, when they had a more positive construal of their work if they switched, $z = 13.78$, $p < .001$, $AOR = 6.72$, and if they had a more negative construal of their work if they stayed the course, $z = -11.32$, $p < .001$, $AOR = 0.31$. With these potential mediators included, the effect of the deletion manipulation was reduced, $z = -4.68$, $p < .001$, $AOR = 0.46$, and the effect of the task-remaining manipulation was eliminated, $z = 0.01$, $p = .992$, $AOR = 1.00$.

We then ran two separate parallel mediation models (PROCESS Model 4, Version 4.3), alternating whether the deletion or task-remaining manipulation was the independent variable or a covariate, to examine whether the effects of our manipulations on choice were statistically mediated by the two mediators that remained plausible: perceived relative route length or the switching (positive) construal composite. Although it was not affected by our manipulations, we included the staying (positive) construal composite as a covariate; the interaction term that included the two manipulations was included as well. The models showed that one's positive subjective construal of switching statistically mediated the effects of the deletion manipulation, 95% CI [−2.0000, −1.3434], and the task-remaining manipulation, 95% CI [−0.7988, −0.3788], on the decision to stay the course and thus display doubling-back aversion. The independent indirect effect through the perceived relative route length (i.e., the time difference score) was significant for the deletion model, 95% CI [−0.1789, −0.0194], but not the task-remaining model, 95% CI [−0.0844, 0.0019]. Combining across Studies 3 and 4, although route construals consistently explained doubling-back aversion, perceived route length did in only one of four relevant tests.

For exploratory purposes, we repeated the indirect-effects tests but separated the two components of the route construals if one switched: past and future. The models showed that one's positive subjective construal of past work after switching statistically mediated the effects of the deletion manipulation, 95% CI [−1.7249,

−1.1482], and the task-remaining manipulation, 95% CI [−0.6066, −0.2709], on the choice to switch. Similarly, one's positive subjective construal of future work after switching also statistically mediated the effects of both the deletion manipulation, 95% CI [−0.4341, −0.1769], and the task-remaining manipulation, 95% CI [−0.2308, −0.0713], on the choice to switch. In summary, this supports the idea that doubling-back aversion is robustly explained by shifts in route construals—whether of one's previous or future efforts—when one considers switching course (and potentially doubling back) but not when one considers staying the course. This asymmetry supports the idea that it is special subjective fears associated with the choice to double back that discourage uptake of this more efficient means to the end.

In light of the statistical mediation results, it may be that the most straightforward way to discourage doubling-back aversion is to encourage people to reconstrue the consequences of doubling back. For example, undoing one's efforts to start over may make one's past efforts seem like a waste, but it actually guarantees that one's future time is spent wastefully. Not only might a more forward-looking perspective discourage doubling-back aversion, but making one's future feel constricted may also encourage people to take time-saving measures that involve doubling back. Much as constricted future time horizons can reduce the sunk-cost fallacy by highlighting the futility of trying to recover one's losses (Strough et al., 2014), they may also increase one's interest in using one's time more objectively efficiently despite subjective costs.

General Discussion

Across various contexts, we consistently observed doubling-back aversion: a reluctance to choose more efficient means to an end if they entail undoing one's progress and thus essentially starting over. Each separable component of doubling back—undoing one's work and adding to the proportion of a task remaining—independently contributed to these effects. Doubling-back aversion was little explained by a perception that such routes to the end state would take longer to traverse but instead through subjective construals specifically associated with doubling back, not staying the course—perceptions of starting over that contaminate construals of one's past and future efforts.

Doubling-back aversion reinforces the theme that people do not wish to perceive their efforts as having been a waste (Frisch, 1993). For example, people value their work to the extent it can be construed in an abstract, meaningful sense instead of as meaningless drudgery (Hamilton et al., 2019; Martela & Pessi, 2018). Doubling back is one reason past efforts may be subjectively devalued. The irony is that doubling-back aversion can encourage people to waste more time just so as not to have to double back and view one's previous efforts as pointless.

This newly documented phenomenon has similarities with and differences from the sunk-cost fallacy; we see them as part of the same family of effects. In one instantiation, the sunk-cost fallacy can dissuade people from completing a goal (e.g., attending a show) if their initial investment failed to yield a return (e.g., a purchased ticket was lost; Kahneman & Tversky, 1982). With doubling-back aversion, the question is not whether people complete a goal but rather what may discourage them from doing so efficiently. In another example, people display unwarranted escalations of commitment—irrationally persevering on a goal—in the hopes of delaying (and possibly escaping) an admission that their initial investments were actually misguided (Bobocel & Meyer, 1994; Staw, 1976; Whyte, 1993). Losses simply pile up as a result (Dijkstra & Hong, 2019). Doubling-back aversion discourages people from issuing a course correction even when doing so would not require them to accept responsibility for choosing that longer course in the first place. After all, our participants had to travel down a pathway to even see that there was another route available (Study 1) or were first *assigned* to complete a task in a particular way (Studies 2–4) before they were offered an alternative. That said, both phenomena emphasize that people do not want to take actions that would force themselves to view their previous efforts as a waste, although with doubling-back aversion it was not a waste that they could have avoided.

By testing whether doubling-back aversion is explained by route construals—independent of perceived relative route length—we were able to learn that doubling-back aversion does not simply (or even consistently) stem from a perception that doubling back will simply take longer. This is particularly important in differentiating doubling-back aversion from the goal-gradient hypothesis, the notion that people are more motivated to pursue a goal when they are closer to the end state (Hull, 1932; Schmid, 2020). That is, some might have suspected that people avoid doubling back when it seemingly entails completing 100% (vs. 75%) of the remaining task simply because the former leads people to think they are further from the goal. Not only did this manipulation not robustly change how much time participants thought each route would take to complete, but doubling-back aversion also held even when controlling for such perceptions.

Finally, we have been careful to avoid claiming that *route construal* is a singular psychological construct. In part, this is because we suspect that which construals doubling back contaminates vary depending on the details of the goal context. Although doubling back may always entail more of a perception that one's previous efforts were a waste or that one is reintroducing a whole slog to still complete, only in achievement contexts (like Study 4) should doubling back interfere with a sense of success. For example, we doubt Study 1 participants felt that navigating along pathways in a virtual world truly offered an opportunity to succeed. This initial work reinforces the importance of route construals, independent of perceived route length, in producing doubling-back aversion, but future research will be necessary to identify which construal-contamination effects are more universal versus context-specific.

Transparency

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Supplemental Material

Additional supporting information can be found at http://journals.sagepub.com/doi/suppl/10.1177/09567976251331053

Note

1. Although this step was not preregistered in Study 1, we preregistered a rule in Study 2, which we applied here, that we would choose among three approaches to potentially transforming data—applying a log transformation, a square-root transformation, or no transformation—depending on which approach minimized skewness. For more information on how both transformations affected skew, as well as robustness checks (for all four studies) that used different transformation approaches, see the Supplemental Material.

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