

# The Biography of Discovery: How Unintentional Discovery of Resources Influences Choice and Preference

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An archeologist discovers a 1,500-year-old Viking sword at the bottom of a lake. Would people be more drawn to the sword if they knew that the discovery was intentional, or unintentional? The current research examines this previously unexplored type of biographical narrative—the biography of the discovery of historical and natural resources. We propose that unintentionality in the discovery of a resource can shape choice and preference. We focus our investigation on resources because the event of discovery is an inherent component in the biography of all known historical and natural resources, and because these resources are either themselves already objects (like historical artifacts) or are the building blocks of virtually all objects. Eight laboratory studies and one field experiment indicate that the unintentional discovery of resources heightens the choice of and preference for the resources. We find that the unintentional discovery of a resource triggers counterfactual thoughts about how the discovery might not have occurred, increasing perceptions that the discovery was fated, consequently driving choice of and preference for the resource. Further, we identify the level of expertise of the discoverer as a theoretically relevant moderator of this effect, finding that the effect is eliminated in the case of novice discoverers. It arises for resources discovered by experts with the rationale that unintentional discovery by an expert is unexpected, and therefore prompts heightened counterfactual thoughts. However, resources discovered by novices for which discovery is unexpected whether it is intentional or unintentional are preferred at equally high rates.

## Public Significance Statement

These experiments suggest that communicating unintentionality in the discovery of historical or natural resources increases preference for those resources. This effect is driven by unintentional discovery inspiring heightened thought about how the discovery might not have occurred, which subsequently causes people to perceive the discovery as a product of fate to a greater extent. While preference is heightened for resources discovered unintentionally by experts, resources discovered by novices are preferred at equally high rates whether their discovery was intentional or unintentional.

**Keywords:** biography of discovery, unintentional, counterfactual thought, fate, serendipity, expertise

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Biographical elements of objects are frequently shared to generate interest and positively influence preference (Avery et al., 2010; Keller, 2020; Paharia et al., 2011). An object's biography has been conceptualized as intangible information that is not directly related to the functional performance of the object but communicates aspects of the object's history through a curated story (Keller, 2020). The current research advances our understanding of the influence of

biography by examining a previously unexplored biographical narrative—the biography of the discovery of historical and natural resources. We focus our investigation on historical and natural resources because the event of discovery is an inherent component in the biography of all known historical and natural resources. Historical resources are defined as a “publicly or privately owned building, structure, site, object, feature, or open space that is significant

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Data and materials can be found at <https://tinyurl.com/25b6pkem>. Preregistration links are the following: Study 1A: <https://aspredicted.org/blind.php?x=kn4vd8>, Study 1B: <https://aspredicted.org/blind.php?x=h7rq2t>, Study 2: [https://aspredicted.org/HHM\\_2GY](https://aspredicted.org/HHM_2GY), Study 3: [https://aspredicted.org/SZD\\_DT5](https://aspredicted.org/SZD_DT5), Study 4A: <https://aspredicted.org/blind.php?x=66tz9t>, Study 4B: [https://aspredicted.org/5YQ\\_DQC](https://aspredicted.org/5YQ_DQC), Study 5: <https://aspredicted.org/blind.php?x=ib7vf3>.

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Alexander Goldklank Fulmer served as lead for conceptualization and writing—original draft and contributed equally to data curation, investigation, methodology, writing—review and editing, and formal analysis. Taly Reich contributed equally to conceptualization, writing—original draft, data curation, investigation, methodology, writing—review and editing, and formal analysis.

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in the history, architecture, archaeology, engineering, or culture of this state" (Law Insider, 2021), and natural resources are defined as "materials or substances such as minerals, forests, water, and fertile land that occur in nature and can be used for economic gain" (Oxford English Dictionary, 2021). Of note, these resources are either themselves objects (as is the case with historical artifacts displayed in museums or sold at auction), or are the building blocks in the construction of virtually all objects. As a consequence, a broad understanding of how biographical elements of resources influence choice of and preference for those resources or objects resulting from those resources could offer theoretical implications for understanding the psychological inputs to choice and preference as well as offer prescriptive implications for communication of biographical elements.

We examine how the biography of the discovery of resources can have significant influences on choice of and preference for those resources. Specifically, because the discovery of a historical or natural resource can be the objective of a purposeful expedition or a completely unintended occurrence, the present studies investigate the biographical facet of the intentionality behind a resource's discovery. We examine whether the unintentional discovery of resources in object biography influences choice and preference compared to the intentional discovery of otherwise identical resources. For example, imagine a person reading a jewelry company's web page about its history of making jewelry out of gold. Would it make the person more interested in shopping at the jewelry company if the gold mine from which it sources all its material was unintentionally discovered?

We define an unintentional discovery as a discovery which was not a product of an actor's planning or intention (Cameron et al., 2017; Caruso et al., 2010; Mele & Moser, 1994). We propose that a resource which is unintentionally discovered will be preferred to an otherwise identical resource which is intentionally discovered. We posit that unintentional discovery triggers counterfactual thoughts about how the discovery might not have occurred at all, ultimately increasing the perceived fatedness of the discovery. Under this theoretical framework, if the gold mine from which the jewelry company sources its materials in our earlier example had been unintentionally discovered, the person reading about this would be more interested in shopping at the jewelry company than if the gold mine had been intentionally discovered because they would think more about how its discovery might not have occurred, leading them to perceive the discovery as more fated.

We build our prediction on three different lines of research. The first demonstrating that unexpected events trigger counterfactual thoughts (Olson & Roese, 2002; Sanna & Turley, 1996), the second indicating that counterfactual thoughts about an event can increase perceptions that the event was fated (Ersner-Hershfield et al., 2010; Kray et al., 2010), and the third indicating that fate is frequently conceptualized as serendipity (Guindon & Hanna, 2002; Hsu & Hwang, 2016; Mirvahedi & Morrish, 2017; Sethna, 2017), which can heighten preference (Kim et al., 2021). Based on these three lines of research, we propose that because unintentional discovery is typically unexpected, the unintentional discovery of a resource triggers counterfactual thought about how the discovery might not have occurred at all, leading to increased perceptions of the discovery's fatedness, consequently increasing choice of and preference for the resource.

By examining the relationship between the intentionality behind a resource's discovery and preference, the current research makes

several theoretical contributions. First, it offers a novel theory on how unintentionality in a resource's discovery can increase choice of and preference for the resource, adding to the literature on the positive role that unintentionality can play in inferences (Newman & Bloom, 2012; Newman et al., 2014; Reich et al., 2018; Reich & Maglio, 2020). Second, it extends work demonstrating that object biography shapes preference (Argo et al., 2006, 2008; Avery et al., 2010; Cho & Schwarz, 2008; Fuchs et al., 2015; Hong & Wyer, 1989; Keller, 2020; Kruger et al., 2004; Morales, 2005; Newman & Bloom, 2012; Newman & Dhar, 2014; Newman et al., 2014; Paharia et al., 2011; Reich et al., 2018) by showing how the biography of a resource's discovery influences choice and preference. Further, it contributes to research on the conceptualization and consequences of perceptions of fate (Ersner-Hershfield et al., 2010; Guindon & Hanna, 2002; Hsu & Hwang, 2016; Kim et al., 2021; Kray et al., 2010; Mirvahedi & Morrish, 2017; Sethna, 2017). The present work highlights the importance in research of distinguishing between multiple conceptualizations of the same construct, in this case fate, in order to precisely understand how participants are characterizing the causal processes at play in psychological phenomena. Finally, our investigation of fate could have implications for contexts in which surprise plays a role such as gift-giving (Areni et al., 1998; Belk, 1996; Ruffle, 1999; Vanhamme & de Bont, 2008). Our work suggests that the positive effect of surprise in gift-giving might be enhanced to the extent that is perceived as serendipitous.

The remainder of the article is organized as follows: first, we unpack the connection between object biography and preference. Second, we discuss literature on how intentionality enhances value. In contrast, we then propose that the unintentional discovery of a resource will increase choice of and preference for that resource because of novel cognitive processes set in motion by unintentional discovery. Next, we explain the serial mechanism underlying this effect by providing a framework for why unintentional discovery would trigger counterfactual thinking, increasing perceptions that a resource's discovery was fated, consequently driving choice of and preference for the resource. Afterward, we report eight laboratory experiments and one field study testing our conceptual framework, and conclude with theoretical and practical implications and directions for future research.

## Conceptual Development

Psychological research has long demonstrated the importance of elements of object biography in shaping preference (Argo et al., 2006, 2008; Avery et al., 2010; Cho & Schwarz, 2008; Fuchs et al., 2015; Hong & Wyer, 1989; Keller, 2020; Kruger et al., 2004; Newman & Bloom, 2012, 2014; Newman & Dhar, 2014; Newman et al., 2014; Paharia et al., 2011; Reich et al., 2018). Such biographies can lead to increased preference for and evaluations of an object (Argo et al., 2008; Avery et al., 2010; Cho & Schwarz, 2008; Fuchs et al., 2015; Hong & Wyer, 1989; Newman & Bloom, 2012, 2014; Newman & Dhar, 2014; Newman et al., 2011, 2014; Paharia et al., 2011; Reich et al., 2018). For example, handmade products are preferred to otherwise identical machine-made products (Fuchs et al., 2015), and an otherwise identical piece of clothing is preferred when it is manufactured at its brand's original factory compared with when it is manufactured at its brand's newer factories (Newman & Dhar, 2014). Conversely, biography can also decrease preference for and evaluations of an object

(Argo et al., 2006; Hong & Wyer, 1989; Newman & Bloom, 2014; Newman & Dhar, 2014; Newman et al., 2011). For example, the amount of physical contact that objects were believed to have had with a disliked other, such as Bernie Madoff, negatively predicted the final bids for those objects at auction (Newman & Bloom, 2014), and products created in countries holding unfavorable impressions were evaluated more negatively than products created in countries holding favorable impressions (Hong & Wyer, 1989).

The present research examines the counterintuitive possibility that unintentionality in a resource's discovery can increase preference more so than intentional discovery. Prior work suggests that an intentionally discovered resource would be preferred because intentionality has been shown to enhance value. Specifically, perceptions of intentionality have been found to increase perceptions of effort (Caruso et al., 2010; Malle, 2010; Malle & Knobe, 1997), and multiple lines of research have shown that objects that were believed to have taken more effort to create were valued more (Cho & Schwarz, 2008; Kruger et al., 2004; Morales, 2005). For example, Kruger et al. (2004) demonstrate that poems and paintings were valued more when people perceived their creation as involving more effort. Further, research has shown the powerful benefits of intentionality in shaping experience such as reducing the pain and heightening the pleasure of otherwise identical experiences (Gray, 2012). Specifically, benevolently intended electric shocks (benevolent in that they were believed to heighten the chance that the recipient would receive a \$50 reward) caused the recipient less pain, benevolently intended massages felt more pleasurable, and benevolently intended candy tasted better than otherwise identical unintended experiences that were randomly assigned to occur (Gray, 2012). Additionally, people believe that agents hold more skill if their actions are intentional (Caruso et al., 2010; Malle, 2010; Malle & Knobe, 1997). These findings imply that intentionally discovered resources would be preferred to unintentionally discovered resources as the skill and effort implicitly perceived in intentional discovery and appreciation of intentional actions may spillover into a preference for the resource. However, despite intentionality often enhancing value, we propose that the unintentional discovery of a resource can actually increase preference for the resource because of novel cognitive processes triggered by unintentional discovery.

We propose that the unintentional discovery of a resource will trigger counterfactual thinking. Specifically, the current research predicts that the unintentional discovery of a resource will trigger counterfactual thoughts about the occurrence of the discovery. Research on the generation of counterfactual thoughts illustrates that counterfactual thinking is spontaneously triggered by unexpected outcomes (Olson & Roese, 2002; Sanna & Turley, 1996). Because the unintentional discovery of a resource is, by its nature, unexpected, we propose that the unintentional discovery of a resource will inspire increased counterfactual thought compared with the intentional discovery of an otherwise identical resource. Further, previous work has indicated that counterfactual thinking can promote perceptions of fate (Ersner-Hersfield et al., 2010; Kray et al., 2010). For example, Kray et al. (2010) showed that when participants were asked to ponder counterfactual thoughts about how their life would be different had a pivotal moment in it *not* occurred, they subsequently perceived that moment to be the product of fate to a greater extent compared with participants who did not consider counterfactual thoughts about such a moment. Because of this connection between counterfactual thoughts about an event and heightened perceptions of fate, we propose that the

heightened counterfactual thoughts about how an unintentional discovery might never have occurred increase perceptions of fate in the discovery.

The construct of fate has been conceptualized in academic research in multiple ways. Some literature defines fate as the perceived predetermination and inevitability of an outcome (Kray et al., 2010; Norenzayan & Lee, 2010). However, fate is also frequently conceptualized as serendipity (Guindon & Hanna, 2002; Hsu & Hwang, 2016; Mirvahedi & Morrish, 2017; Sethna, 2017), which is the "phenomenon of finding valuable or agreeable things not sought for" (Merriam Webster, 2022). We propose that the influence of unintentional discovery on preference demonstrated by the present research operates through this latter conceptualization of fate as serendipity rather than inevitability. Specifically, we propose perceptions of serendipity in a resource's discovery increase choice of and preference for this resource. Given that perceptions of a fated discovery in our theoretical framework are driven by thoughts about how the discovery might never have occurred, the latter characterization of fate as serendipity would be more likely than the former characterization of fate as inevitability from the perspective of our participants. We posit that perceptions that another person's unintentional discovery of a resource was serendipitous should increase appreciation for the resource itself, manifesting as heightened choice of and preference for the resource. We test our prediction that perceptions of fate, specifically characterized as serendipity, can increase preference by having people read information stating that the discovery of a dinosaur skull fossil was or was not intentional before asking them how interested they would be in seeing this skull fossil in a museum exhibit (Study 4A-B). By measuring counterfactual thoughts about how the discovery might not have occurred (Study 4A-B), perceptions that the discovery was a product of fate (Study 4A), and perceived serendipity of the discovery (Study 4B), these studies provide combined support for the ability of unintentional discovery to increase counterfactual thoughts, which increase perceived fatedness of the discovery, and show that this ability drives unintentional discovery's effect on preference.

Notably, this framework predicts that people do not always choose or prefer resources which were unintentionally discovered over otherwise identical resources which were intentionally discovered, implying the expertise of the discoverer as an important boundary condition to our effect. We predict that when the discoverer was a novice, people will prefer a resource at equally high rates whether it was discovered intentionally or unintentionally. Specifically, when the discoverer was a novice, both intentional and unintentional discovery of the resource would be unexpected, triggering counterfactual thoughts and driving the causal chain to heightened preference which our framework proposes. However, only unintentional discovery by an expert is unexpected, and therefore the causal chain that we propose heightens preference for resources is only set in motion for experts in the case of unintentional discovery (but not intentional discovery). Consequently, we predict that people will exhibit greater choice of and preference for resources discovered unintentionally when the discoverer was an expert, but will exhibit equally high preference for resources discovered intentionally or unintentionally when the discoverer was a novice. As a corollary of this prediction, we investigated the influence of the unintentional discovery of a resource in contexts in which the discoverer was an expert in the appropriate field such as an archeologist (Studies 1B and 7), a paleontologist (Studies 2–4B), and a geologist (Studies

1A and 6). Further, our test to determine if the expertise of the discoverer moderated the relationship between intentionality behind the discovery of a resource and choice of the resource (Study 5) compared the unintentional discovery of a resource to the intentional discovery of an otherwise identical resource with both an expert discoverer and a novice discoverer.

We formally predict the following:

*H1:* People prefer resources that were unintentionally discovered by an expert (vs. resources that were intentionally discovered by an expert).

*H2a:* People exhibit increased counterfactual thoughts about how resources might never have been discovered at all when they were unintentionally discovered by an expert (vs. resources that were intentionally discovered by an expert).

*H2b:* People will perceive the discovery of resources to be the product of fate to a greater extent when they were unintentionally discovered by an expert (vs. resources that were intentionally discovered by an expert).

*H2c:* Increased counterfactual thoughts about how resources might never have been discovered at all and perceptions that their discovery was a product of fate will serially mediate the relationship between the unintentional discovery of a resource by an expert and preference.

*H3:* People prefer resources that were unintentionally discovered by experts (vs. resources that were intentionally discovered by experts), but exhibit equally high preference for resources unintentionally discovered by novices (vs. resources that were intentionally discovered by novices).

## Overview of Studies

Eight laboratory studies and one field experiment examined people's choice of and preference for either intentionally or unintentionally discovered resources. Study 1A provided initial evidence for our core prediction by demonstrating that people show greater interest in shopping at a jewelry company when the gold mine it sources all of its materials from was unintentionally discovered by a geologist compared with when it was intentionally discovered, and compared with a Control condition. Study 1A also provided evidence inconsistent with the potential alternative explanation that intentional discovery lowers preference due to a perception that communication of intentional discovery is exploitative. Study 1B demonstrated the robustness of our effect by conceptually replicating the result with a historical resource; reading that a Viking sword was unintentionally discovered by an archeologist increased people's interest in seeing the sword in a museum exhibit compared to when they read that it was intentionally discovered. Using mediation, Study 2 demonstrated our proposed mechanism, showing that people exhibited heightened counterfactual thinking about how the discovery of a resource might never have occurred when the resource was unintentionally discovered. Further, Study 2 provided evidence inconsistent with an alternative explanation that people prefer resources discovered unintentionally because they perceive the resources as more unique. Study 3 provided converging evidence for our proposed mechanism using a new measure

capturing spontaneous counterfactual thought. Further, Study 3 provided evidence inconsistent with alternative explanations that people prefer unintentionally discovered resources because they perceive unintentional discoverers as more skilled, they perceive such resources as more authentic, or because they experience greater positive affect when they learn about the unintentional discovery of a resource. Study 4A documented the serial mediation of counterfactual thought about how a resource might never have been discovered at all leading to perceptions that the discovery was a product of fate, consequently increasing preference for unintentionally discovered resources. Study 4B more completely illuminated the serial process underlying the preference for unintentionally discovered resources, directly measuring serendipity as the conceptualization of fate. Further, Study 4B provided evidence inconsistent with the potential alternative explanation that people prefer unintentionally discovered resources because they perceive their discoveries as more unique finds. In an incentive-compatible design, Study 5 examined a theoretically relevant moderator of the effect and demonstrated that choice of unintentionally discovered resources depends on the expertise of the discoverer. It arises for resources discovered by experts with the rationale that unintentional discovery by an expert is unexpected, and therefore prompts heightened counterfactual thoughts. However, resources discovered by novices are preferred at equally high rates whether their discovery is intentional or unintentional. This is because the discovery of a resource by a novice is unexpected whether it is intentional or unintentional, eliciting counterfactual thoughts in both cases and setting in motion the causal chain to preference that our framework proposes. Further, Study 5 provided evidence inconsistent with the alternative explanation that an underdog biography (Paharia et al., 2011) is driving the preference that we demonstrate for unintentionally discovered resources. Study 6 examined this effect in consequential choice, showing that people preferred to receive commonplace products when their biography included unintentional discovery. Specifically, Study 6 investigated consequential choice between two brands of bottled water, demonstrating that people chose a target brand at higher rates when the spring water used by the brand was discovered by a geologist unintentionally compared to when it was intentionally discovered. Study 7 provided initial evidence for this phenomenon's ecological validity in a noisy real-world environment, showing that Facebook users clicked on an advertisement to visit a real museum exhibit featuring an ancient Mesopotamian tablet engraved with cooking recipes from its time period at marginally significantly higher rates when they read that the tablet had been discovered by an archeologist unintentionally rather than intentionally.

For all studies, we report all measures, conditions, and pre-registered analyses, and have no data exclusions. Target sample sizes for Experiments 1A–5 were determined in advance of data collection based on the principle that researchers should collect well-powered samples large enough to detect even small effects (100 participants per cell; Simmons et al., 2018). Because experiment 6 examined consequential choice, the target sample size for this study was in part determined by the cost of compensating each participant with a case of bottled water, but still made large enough to adhere to the principle that researchers should collect at least 50 participants per cell (Simmons et al., 2013). Data collection did not continue after data analysis for any studies.

We attempted to recruit participants from a variety of populations in order to provide evidence for a generally robust effect. Our samples for Studies 1A and 1B, and 4A, 5, and 6 came from Amazon's



Mechanical Turk which recruits from geographically and demographically diverse populations across the United States. Studies 2, 3, and 4B recruited CloudResearch Approved Participants, which allowed us to include only high-quality participants who had been vetted based on their previous engagement in online studies. Finally, Study 7 offered an ecologically valid test of our effect in a noisy real-world environment by using Facebook's split test function to test two versions of an advertisement for an artifact featured in a museum exhibit.

### Study 1A: Unintentional Discovery in Object Biography Increases Preference: Jewelry

Study 1A provides initial evidence that people prefer unintentionally discovered resources to otherwise identical intentionally discovered ones, and further demonstrates that people prefer unintentionally discovered resources to otherwise identical resources in a Control condition. Study 1A demonstrates the phenomenon we propose in a shopping context using the communication of object biography by a company. Participants in Study 1A read an excerpt from a jewelry company's web page and learned that the gold mine which the company sourced all its materials from had been discovered by a geologist either intentionally or unintentionally, or were assigned to a Control condition. We predicted that people would show the greatest interest in shopping at the jewelry company when they read that the material for the jewelry had been discovered unintentionally. This study was pre-registered on AsPredicted.org (<https://aspredicted.org/blind.php?x=kn4vd8>).

## Method

### Participants

Three hundred participants ( $M_{\text{age}} = 38.79$ ,  $SD = 11.75$ ; 53.7% female, 45.7% male, 0.7% not reported) from Amazon Mechanical Turk participated in exchange for monetary payment. Data and materials of this study and all subsequent studies can be found at [https://researchbox.org/514&PEER\\_REVIEW\\_passcode=KPPUE](https://researchbox.org/514&PEER_REVIEW_passcode=KPPUE).

### Procedure

Participants were randomly assigned to one of three Biography of Discovery conditions: Intentional, Unintentional, or Control. In both the Intentional Discovery condition and the Unintentional Discovery condition, participants read: "A jewelry company, which manufactures its jewelry entirely out of gold, shares its brand's biography on its website by communicating how its founder, a geologist, discovered the gold mine from which it sources all of its material." Participants in the Control condition read: "A jewelry company, which manufactures its jewelry entirely out of gold, shares its brand's biography on its website." All participants then read "Below is an excerpt from the company's brand biography webpage." Participants in the Intentional Discovery condition read an excerpt about the history of the company including the detail that the founder had intentionally discovered the gold mine from which all the company's material was sourced (see "Intentional," Figure 1). Participants in the Unintentional Discovery condition read the same excerpt about the history of the company, except they read that the founder had unintentionally discovered the gold mine from which all the company's material was sourced (see "Unintentional,"

**Figure 1**

*Intentional Versus Unintentional Versus Control Object Biographies for Study 1A*

<p><i>Our Story...</i></p> <p>For decades, we have crafted high quality gold jewelry, all sourced from the same mine. It all began when our founder was exploring the area with the intention of discovering a gold mine.</p>	<p><i>Our Story...</i></p> <p>For decades, we have crafted high quality gold jewelry, all sourced from the same mine. It all began when our founder was hiking in the area and discovered a gold mine unintentionally.</p>	<p><i>Our Story...</i></p> <p>For decades, we have crafted high quality gold jewelry, all sourced from the same mine.</p>
Intentional	Unintentional	Control

Figure 1). Participants in the Control condition read the same excerpt about the history of the company but with no additional detail about the mine's discovery (see "Control," Figure 1).

All participants then answered "How interested would you be in shopping at this jewelry company?" (1 = *not at all interested*, 9 = *extremely interested*). Participants then reported demographics. Specifically, participants were asked to report their gender and chose among three options (Male, Female, and Other) but were not required to respond to this question. Finally, participants were asked to report their age and given a free-response box but were not required to respond to this question.

## Results and Discussion

### Preference

A one-way analysis of variance revealed a significant effect of Biography of Discovery on interest in shopping at the jewelry company,  $F(2, 297) = 4.87$ ,  $p = .008$ ,  $\eta^2 = 0.03$ . As predicted, participants in the Unintentional Discovery condition reported higher interest in shopping at the jewelry company ( $M = 6.08$ ,  $SD = 1.79$ ) compared with participants in both the Intentional Discovery condition ( $M = 5.43$ ,  $SD = 1.83$ ; Fisher's LSD:  $p = .012$ ;  $\eta^2 = 0.03$ , 95% CI for the mean difference = [0.14, 1.17]) and the Control condition ( $M = 5.33$ ,  $SD = 1.91$ ; Fisher's LSD:  $p = .005$ ;  $\eta^2 = 0.04$ , 95% CI for the mean difference [0.23, 1.26]), which did not differ from each other (Fisher's LSD:  $p = .723$ ,  $\eta^2 < .01$ , [-0.42, 0.61]).

Study 1A provides converging evidence for the proposal that people prefer unintentionally discovered resources to otherwise identical intentionally discovered resources. People were more interested in shopping at the jewelry company when the gold mine from which all the material was sourced had been unintentionally discovered than when it had been intentionally discovered or in a Control condition. Further, that interest in shopping at the jewelry company did not differ between the Intentional Discovery and Control conditions indicates that unintentional discovery of a resource heightens preference for the resource and that intentional discovery of a resource is not lowering preference for the resource. Additionally, this result provides evidence inconsistent with the potential alternative explanation that intentional discovery is lowering preference for resources because the communication of intentional discovery is perceived as exploitative and for commercial gain. Specifically, if people found intentional discovery to be exploitative for the purpose of commercial gain, this perception should be most salient in the context Study 1A investigates. Study 1A participants read an excerpt from a jewelry company's brand biography web page, and then indicated their interest in engaging in the commercial experience of shopping at the jewelry company. In such a consumption context, prospective consumers would be most sensitive to persuasion attempts. That there is no difference between the Intentional

condition and the Control condition in this highly commercial context provides evidence inconsistent with the alternative explanation that intentional discovery lowers preference due to a perception that communication of intentional discovery is exploitative.

### Study 1B: Conceptual Replication: Viking Sword

Study 1B demonstrates the robustness of the preference for unintentionally discovered resources to otherwise identical intentionally discovered ones by conceptually replicating the effect with a historical resource. Specifically, participants in Study 1B read about a Viking sword that had been discovered by an archeologist either intentionally or unintentionally before reporting how interested they would be in seeing the sword in a museum exhibit. We predicted that people would be more interested in seeing the sword in a museum exhibit when it had been unintentionally discovered. This study was pre-registered on AsPredicted.org (<https://aspredicted.org/blind.php?x=h7rq2t>).

### Method

#### Participants

Two hundred participants recruited via Amazon's Mechanical Turk ( $M_{\text{age}} = 38.03$ ,  $SD = 11.79$ ; 45.5% female, 54.0% male, 0.5% other) participated in exchange for monetary payment.

#### Procedure

Participants were randomly assigned to one of two Biography of Discovery conditions: Intentional or Unintentional. In the Intentional Discovery condition, participants read: "An archaeologist found a 1,500 year old Viking sword at the bottom of a lake. When interviewed about the find, the archaeologist stated: 'When I was at the lake, I was leading an expedition in order to find artifacts like this sword.'" In the Unintentional Discovery condition, participants read: "An archaeologist found a 1,500 year old Viking sword at the bottom of a lake. When interviewed about the find, the archaeologist stated: 'When I was at the lake, I had not been leading an expedition. I did not intend to find artifacts like this sword.'"

All participants then answered, "How interested would you be in seeing this sword in a museum exhibit?" (1 = *not at all interested*, 9 = *extremely interested*). Participants then reported demographics. Specifically, participants were asked to report their gender and chose among three options (Male, Female, and Other) but were not required to respond to this question. Finally, participants were asked to report their age and given a free-response box but were not required to respond to this question.

### Results and Discussion

#### Preference

As predicted, participants reported higher interest in seeing the sword in an exhibit when it was unintentionally discovered ( $M = 7.09$ ,  $SD = 1.71$ ) than when it was intentionally discovered ( $M = 6.47$ ,  $SD = 2.09$ ),  $t(198) = 2.28$ ,  $p = .024$ ,  $d = .33$ , 95% CI for the mean difference = [0.08, 1.15].

Study 1B conceptually replicated the core effect of unintentional discovery on preference with a historical resource. People were more interested in seeing a Viking sword in a museum exhibit when it had

been unintentionally discovered than when it had been intentionally discovered.

### Study 2: The Underlying Role of Counterfactual Thoughts: Dinosaur Skull Fossil

Study 2 tested the mediating role of counterfactual thinking in driving preference for unintentionally discovered resources. Research on the generation of counterfactual thoughts illustrates that counterfactual thinking is spontaneously triggered by unexpected outcomes (Olson & Roese, 2002; Sanna & Turley, 1996). Based on this research, we posit that because the unintentional discovery of a resource by an expert is unexpected, such discovery would trigger more counterfactual thought than the intentional discovery of a resource. Specifically, we propose that the unintentional discovery of a resource will lead people to think more about the counterfactual that this resource might not have been discovered at all. Further, we predict that this increased thought about how a resource might not have been discovered at all increases preference for this resource. Participants in Study 2 read about a dinosaur skull fossil that had been either intentionally or unintentionally discovered by a paleontologist. Next, participants reported how interested they would be in seeing the dinosaur skull fossil in a museum exhibit as well as to what extent they thought about how the discovery might not have occurred. Additionally, participants reported their perceptions of the uniqueness of the dinosaur skull fossil to provide evidence inconsistent with an alternative explanation that unintentionally discovered resources are preferred because they are perceived as more unique. Reich et al. (2018) found that consumers preferred hedonic products when a mistake occurred during the product's creation process more than when the same action was intentional because the mistake made consumers perceive the product as more unique. However, we propose that unintentional discovery will not affect perceptions of uniqueness because (a) we examine unintentionality in the process of discovery of a resource rather than the creation process of the resource (b) we examine unintentionality rather than mistakes, and (c) we look at utilitarian as well as hedonic objects. We predicted that when the discovery was unintentional, people would think more about the counterfactual of it never having occurred, and these thoughts would subsequently drive heightened interest in seeing the skull fossil in a museum exhibit. This study was pre-registered on AsPredicted.org ([https://aspredicted.org/HHM\\_2GY](https://aspredicted.org/HHM_2GY)).

### Method

#### Participants

Two hundred ( $M_{\text{age}} = 39.35$ ,  $SD = 11.55$ ; 48.0% female, 51.5% male, 0.5% other) CloudResearch Approved participants participated in exchange for monetary payment. Utilizing CloudResearch Approved participants allowed us to include only high-quality participants who had been vetted based on their previous engagement in online studies.

#### Procedure

Participants were randomly assigned to one of two Biography of Discovery conditions: Intentional or Unintentional. In the Intentional Discovery condition, participants read: "A paleontologist found a skull fossil of a dinosaur from the cretaceous era embedded in the side of a mountain. When interviewed about

the find, the paleontologist stated: ‘When I was at the mountain, I was leading an expedition in order to find dinosaur fossils and I am happy that I did.’” In the Unintentional Discovery condition, participants read: “A paleontologist found a skull fossil of a dinosaur from the cretaceous era embedded in the side of a mountain. When interviewed about the find, the paleontologist stated: ‘When I was at the mountain, I had not been leading an expedition. I did not intend to find dinosaur fossils and I am happy that I did.’”

All participants then answered, “How interested would you be in seeing this dinosaur skull fossil in a museum exhibit?” (1 = *not at all interested*, 9 = *extremely interested*). Participants also indicated “How much did you think about how this discovery might not have occurred?” (1 = *not at all*, 9 = *very much*).

We used the same three-item uniqueness measure as in Reich et al. (2018). Specifically, participants indicated “How original do you think this dinosaur skull fossil is?” (1 = *not original*, 9 = *original*), “How regular do you think this dinosaur skull fossil is?” (1 = *irregular*, 9 = *regular*), and “How common do you think this dinosaur skull fossil is?” (1 = *uncommon*, 9 = *common*). The order in which participants completed these measures was randomized. Participants’ answers to the latter two questions were reverse coded, and participants’ answers to these three questions were averaged together to create a single index of uniqueness ( $\alpha = .68$ ). Participants then reported demographics. Specifically, participants were asked to report their gender and chose among three options (Male, Female, and Other) but were not required to respond to this question. Finally, participants were asked to report their age and given a free-response box but were not required to respond to this question.

## Results and Discussion

### Preference

As predicted, participants reported higher interest in seeing the skull fossil in an exhibit when it was unintentionally discovered ( $M = 7.03$ ,  $SD = 1.58$ ) than when it was intentionally discovered ( $M = 6.50$ ,  $SD = 1.68$ ),  $t(198) = 2.30$ ,  $p = .023$ ,  $d = 0.33$ , 95% CI for the mean difference = [0.08, 0.99].

### Counterfactual Thoughts

Also as predicted, participants reported more counterfactual thoughts about how the discovery might not have occurred when it was unintentional ( $M = 5.47$ ,  $SD = 2.17$ ) than when it was intentional,  $M = 3.60$ ,  $SD = 2.28$ ;  $t(198) = 5.94$ ,  $p < .001$ ,  $d = 0.84$ , 95% CI for the mean difference = [1.25, 2.49].

### Uniqueness

Also as predicted, participants perceived the skull fossil as equally unique when its discovery was unintentional ( $M = 6.35$ ,  $SD = 1.54$ ) as when it was intentional ( $M = 6.45$ ,  $SD = 1.62$ ),  $t(198) = -0.45$ ,  $p = .653$ ,  $d = -0.06$ , 95% CI for the mean difference = [-0.54, 0.34].

## Mediation Analysis

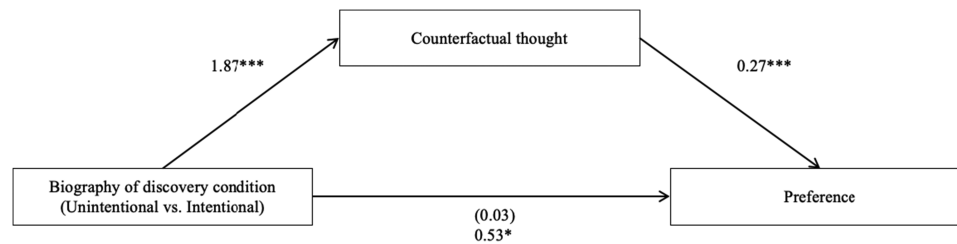
To test if participants preferred an unintentionally discovered resource because they thought more about how the discovery might not have occurred, we conducted a bootstrap analysis with 5,000 samples (Hayes, 2013) using Biography of Discovery as the independent variable, counterfactual thoughts as the mediator, and interest in seeing the skull fossil in a museum exhibit as the dependent variable. Consistent with our theorizing, the analysis revealed that participants in the Unintentional Discovery condition thought more about how the discovery of the fossil might not have occurred, resulting in greater preference for the fossil (95% CI for the indirect effect: [0.2685, 0.7771]); see Figure 2.

These results support the proposed mechanism underlying the effect of unintentional discovery on preference—that increased preference for an unintentionally discovered resource is driven by heightened counterfactual thought about how the discovery might not have occurred. People were more interested in seeing the dinosaur skull fossil in a museum exhibit when it was unintentionally discovered, and heightened counterfactual thoughts about how the unintentional discovery might not have occurred mediated this preference. Because unintentional discovery is unexpected, this finding builds upon research indicating that counterfactual thinking is spontaneously triggered by unexpected outcomes (Olson & Roese, 2002; Sanna & Turley, 1996). Further, these results provide evidence inconsistent with an alternative explanation that people prefer unintentionally discovered resources because they perceive them as more unique. People perceived the dinosaur skull fossil as equally unique whether it was discovered intentionally or unintentionally.

## Study 3: Spontaneous Measure of Counterfactual Thought: Dinosaur Skull Fossil

Study 3 provided converging evidence for the mediating role of counterfactual thinking in driving preference for unintentionally discovered resources using a new measure capturing spontaneous counterfactual thoughts. Participants in Study 3 read about a dinosaur skull fossil that had been either intentionally or unintentionally discovered by a paleontologist. Next, participants reported how interested they would be in seeing the dinosaur skull fossil in a museum exhibit. Participants then listed thoughts that came to their minds as they were reading about the discovery of the dinosaur skull fossil. Additionally, participants reported their perceptions of the discoverer’s skill, perceptions of the dinosaur skull fossil’s authenticity, and feelings of positive affect in order to provide evidence against alternative explanations underlying the preference for unintentionally discovered resources. For example, previous research has indicated that expectancy disconfirmation and uncertainty can amplify positive affect (Shepperd & McNulty, 2002; Wilson et al., 2005; Wilson & Gilbert, 2008). Consequently, it is possible that because the unintentional discovery of a resource by an expert is unexpected, and may be perceived as having involved more uncertainty than intentional discovery, learning about such discovery enhances people’s feelings of positive affect, and this enhanced affect leads them to prefer the resource. After reporting measures of skill, authenticity, and positive affect, participants were shown the thoughts that they had listed earlier one by one and categorized each thought either as related to how the discovery might not have occurred at all, or not. We predict that spontaneously

**Figure 2**  
Mediation Model in Study 2



*Note.* The path coefficients are unstandardized betas. Values in parentheses indicate the effect of the Biography of Discovery condition on the dependent variable after controlling for the mediator.

\**p* < .05. \*\*\**p* < .001.

generated counterfactual thoughts about how the dinosaur skull fossil might not have been discovered will mediate the relationship between intentionality behind the discovery of the skull fossil and preference for the skull fossil. Further, we predict that perceptions of the discoverer's skill, perceptions of the dinosaur skull fossil's authenticity, and the experience of positive affect will not underlie the preference for the unintentionally discovered skull fossil. This study was pre-registered on AsPredicted.org ([https://aspredicted.org/SZD\\_DT5](https://aspredicted.org/SZD_DT5)).

## Method

### Participants

Two hundred one ( $M_{\text{age}} = 42.25$ ,  $SD = 13.34$ ; 44.3% female, 55.7% male) CloudResearch Approved participants participated in exchange for monetary payment. Utilizing CloudResearch Approved participants allowed us to include only high-quality participants who had been vetted based on their previous engagement in online studies.

### Procedure

Participants were randomly assigned to one of two Biography of Discovery conditions: Intentional or Unintentional. Participants read scenarios identical to those described in Study 2.

All participants then answered, "How interested would you be in seeing this dinosaur skull fossil in a museum exhibit?" (1 = *not at all interested*, 9 = *extremely interested*). Participants then read "We are interested in *all of the thoughts* that came to your mind as you were reading about the discovery of the dinosaur skull. We ask you to list each individual thought in its own response box, starting with the one provided below. After listing a thought here, choose one of the subsequent options to either enter another thought on the next screen, or finish when you have no other thoughts to list." After participants finished listing thoughts, they indicated "How talented do you think the paleontologist is?" (1 = *not talented at all*, 9 = *extremely talented*) and "How competent do you think the paleontologist is?" (1 = *not competent at all*, 9 = *extremely competent*). These responses were then averaged together to create a single index of skill ( $r = .81$ ,  $p < .001$ ). Participants then reported their perceptions of the dinosaur skull fossil's authenticity. We used the same two-item authenticity measure as in Newman and Dhar (2014). Specifically, participants reported to what extent they agree with the following statements regarding the skull fossil: "This skull fossil authentic." and "This skull fossil is genuine."

(1 = *not at all*, 9 = *extremely*). These responses were then averaged together to create a single index of authenticity ( $r = .88$ ,  $p < .001$ ). Participants then reported their feelings of positive affect. We used the same five-item positive affect subscale of the PANAS as in Thompson (2007). Specifically, participants reported to what extent they currently feel: "alert," "inspired," "determined," "attentive," and "active" (1 = *not at all*, 5 = *a great deal*). These responses were then averaged together to create a single index of positive affect ( $\alpha = .85$ ). Participants then read: "We will now present to you each of the THOUGHTS you listed earlier, after reading about the discovery of the dinosaur skull. Please categorize each thought as either—Related to how the discovery might not have occurred at all.—Not related to how the discovery might not have occurred at all." Participants were then shown each of the thoughts that they had listed previously, one at a time, and categorized each of them in a binary choice (*Related to how the discovery might not have occurred at all./Not related to how the discovery might not have occurred at all.*). Participants then reported demographics. Specifically, participants were asked to report their gender and chose among three options (Male, Female, and Other) but were not required to respond to this question. Finally, participants were asked to report their age and given a free-response box but were not required to respond to this question.

Because participants coded their own counterfactual thoughts after they were exposed to our experimental manipulation, the interpretability of our results based on this analysis alone is limited because this procedure may leave the results vulnerable to experimental demand effects (Rosenthal & Rubin, 1978). Specifically, participants who had been exposed to our unintentional manipulation may have felt to a greater extent as though they were expected to categorize the thoughts they spontaneously generated as relating to how the discovery might not have occurred at all. Consequently, in addition to having participants code their own thoughts, two research assistants, blind to the hypotheses and to which Biography of Discovery condition each participant was assigned, coded each thought offered by each participant. Inter-coder reliability was moderately strong ( $\kappa = 0.41$ ,  $p < .001$ ; 79.6% agreement between coders).

## Results and Discussion

### Preference

As predicted, participants reported higher interest in seeing the skull fossil in an exhibit when it was unintentionally discovered



( $M = 7.02$ ,  $SD = 1.70$ ) than when it was intentionally discovered ( $M = 6.28$ ,  $SD = 2.40$ ),  $t(186.01) = 2.54$ ,  $p = .012$ ,  $d = .36$ , and Levene's test was significant,  $F(1, 199) = 11.23$ ,  $p < .001$ ; thus, equal variances were not assumed, 95% CI for the mean difference = [0.17, 1.32].

### Counterfactual Thoughts

Also as predicted, participants reported more counterfactual thoughts about how the discovery might not have occurred when it was unintentional ( $M = 0.90$ ,  $SD = 0.74$ ) than when it was intentional ( $M = 0.56$ ,  $SD = 0.79$ ),  $t(199) = 3.14$ ,  $p = .002$ ,  $d = .44$ , 95% CI for the mean difference [0.13, 0.55].

### Skill

Participants perceived the discoverer as more skilled when the skull's discovery was intentional ( $M = 7.37$ ,  $SD = 1.39$ ) than when it was unintentional ( $M = 6.97$ ,  $SD = 1.28$ ),  $t(199) = 2.12$ ,  $p = .035$ ,  $d = 0.30$ , 95% CI for the mean difference [0.03, 0.77].

### Authenticity

Participants perceived the skull fossil as equally authentic when its discovery was unintentional ( $M = 7.55$ ,  $SD = 1.55$ ) as when it was intentional ( $M = 7.87$ ,  $SD = 1.47$ ),  $t(199) = -1.49$ ,  $p = .137$ ,  $d = -0.21$ , 95% CI for the mean difference [-0.74, 0.10].

### Positive Affect

Participants' feelings of positive affect were no different when the skull's discovery was unintentional ( $M = 3.51$ ,  $SD = 0.81$ ) than when it was intentional ( $M = 3.69$ ,  $SD = 0.92$ ),  $t(199) = -1.50$ ,  $p = .136$ ,  $d = -0.21$ , 95% CI for the mean difference [-0.43, 0.06].

### Mediation Analysis

To test if participants preferred an unintentionally discovered resource because they thought more about how the discovery might not have occurred, we conducted a bootstrap analysis with 5,000 samples (Hayes, 2013) using Biography of Discovery as the independent variable, counterfactual thoughts as the mediator, and interest in seeing the skull fossil in a museum exhibit as the dependent variable. Consistent with our theorizing, the analysis revealed that participants in the Unintentional Discovery condition thought more about how the discovery of the fossil might not have occurred, resulting in greater preference for the skull fossil (95% CI for the indirect effect: [0.0285, 0.3044]); see Figure 3.

### Supplemental Analyses

Concordant with the primary analysis, based on the counterfactual thoughts coding done by research assistants, participants reported more counterfactual thoughts about how the discovery might not have occurred when it was unintentional ( $M = 0.46$ ,  $SD = 0.62$ ) than when it was intentional ( $M = 0.10$ ,  $SD = 0.29$ ),  $t(133.53) = 5.26$ ,  $p < .001$ ,  $d = 0.76$ , and Levene's test was significant,  $F(1, 199) = 54.72$ ,  $p < .001$ ; thus, equal variances were not assumed, 95% CI for the mean difference [0.23, 0.50]. Further, we conducted a bootstrap analysis with 5,000 samples (Hayes, 2013) using Biography of Discovery as the independent variable, counterfactual

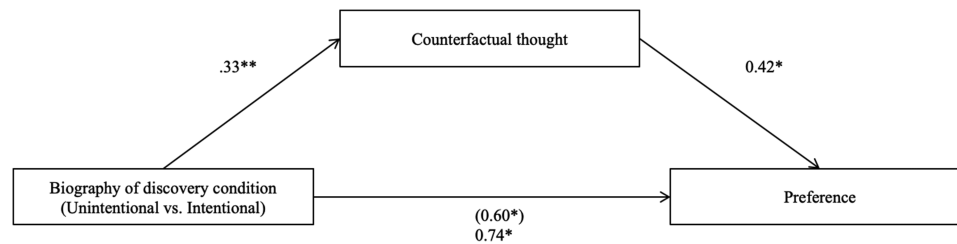
thoughts as the mediator, and interest in seeing the skull fossil in a museum exhibit as the dependent variable. Consistent with our theorizing, the analysis revealed that participants in the Unintentional Discovery condition thought more about how the discovery of the fossil might not have occurred, resulting in greater preference for the skull fossil (95% CI for the indirect effect: [0.0344, 0.3300]).

These results provided converging evidence for our proposed mechanism underlying the effect of unintentional discovery on preference using a measure capturing spontaneous counterfactual thoughts. People were more interested in seeing the dinosaur skull fossil in a museum exhibit when it was unintentionally discovered, and heightened counterfactual thoughts about how the unintentional discovery might not have occurred mediated this preference. Further, these results provide evidence inconsistent with several alternative explanations. In line with findings connecting intentionality to perceptions of skill (Caruso et al., 2010; Malle, 2010; Malle & Knobe, 1997), people perceived the discoverer as more skilled when the dinosaur skull fossil was discovered intentionally, indicating that perceptions of the unintentional discoverer's skill are unlikely to be driving the preference for unintentionally discovered resources. Additionally, people perceived the dinosaur skull fossil as equally authentic whether it was discovered intentionally or unintentionally, indicating that perceptions of an unintentionally discovered resource's authenticity are unlikely to be driving the preference for unintentionally discovered resources. Further, people felt equivalent positive affect whether the dinosaur skull fossil was discovered intentionally or unintentionally, indicating that the ability of expectancy disconfirmation or uncertainty to heighten positive affect (Shepperd & McNulty, 2002; Wilson et al., 2005; Wilson & Gilbert, 2008) is unlikely to be driving the preference for unintentionally discovered resources. Finally, the supplemental analyses based on counterfactual thoughts coded by research assistants blind to the hypotheses and conditions provided converging evidence for our proposed mechanism while simultaneously providing evidence inconsistent with an alternative explanation of experimental demand leading to the apparent role of counterfactual thoughts. While Studies 2 and 3 offer converging evidence for our proposal that counterfactual thoughts about how a discovery might not have occurred at all underlie preference for unintentionally discovered resources, Study 4A offers an initial examination of the full causal chain.

### Study 4A: Full Mechanism: Dinosaur Skull Fossil

Research on counterfactual thinking has shown that counterfactual thoughts about events inspire heightened perceptions that such events were a product of fate (Ersner-Hersfield et al., 2010; Kray et al., 2010). Study 4A examined whether heightened counterfactual thoughts about how an unintentional discovery might not have occurred increased perceptions that the discovery was fated, and showed that these influences work together sequentially to enhance preference for the discovered resource. As in Studies 2 and 3, participants read about a dinosaur skull fossil that had been either intentionally or unintentionally discovered by a paleontologist and reported measures of preference and counterfactual thinking. Participants in Study 4A also indicated to what extent they perceived that the discovery of the dinosaur skull fossil was a product of fate. We predicted that when the dinosaur skull fossil was unintentionally

**Figure 3**  
*Mediation Model in Study 3*



*Note.* The path coefficients are unstandardized betas. Values in parentheses indicate the effect of the Biography of Discovery condition on the dependent variable after controlling for the mediator.

\* $p < .05$ . \*\* $p < .01$ .

discovered, people would think more about the counterfactual that the skull fossil might not have been discovered at all, and that these thoughts would drive increased perceptions that the discovery of the skull fossil was a product of fate, consequently increasing interest in seeing the skull fossil in a museum exhibit. This study was pre-registered on AsPredicted.org (<https://aspredicted.org/blind.php?x=66tz9t>).

## Method

### Participants

Two hundred one participants ( $M_{\text{age}} = 38.30$ ,  $SD = 11.13$ ; 45.3% female, 53.7% male, 1.0% other) from Amazon Mechanical Turk participated in exchange for monetary payment.

### Procedure

Participants were randomly assigned to one of two Biography of Discovery conditions: Intentional or Unintentional. Participants read scenarios similar to those in Studies 2 and 3.

All participants then answered, "How interested would you be in seeing this dinosaur skull fossil in a museum exhibit?" (1 = *not at all interested*, 9 = *extremely interested*). Participants then indicated in random order "How much did you think about how this discovery might not have occurred?" (1 = *not at all*, 9 = *very much*) and "To what extent was the discovery of this dinosaur skull fossil a product of fate?" (1 = *not at all*, 9 = *extremely*; a measure of fate perceptions adapted from Kray et al., 2010). Participants then reported demographics. Specifically, participants were asked to report their gender and chose among three options (Male, Female, and Other) but were not required to respond to this question. Finally, participants were asked to report their age and given a free-response box but were not required to respond to this question.

## Results and Discussion

### Preference

As predicted, participants reported higher interest in seeing the skull fossil in an exhibit when it was unintentionally discovered ( $M = 7.12$ ,  $SD = 1.92$ ) than when it was intentionally discovered ( $M = 6.48$ ,  $SD = 2.00$ ),  $t(199) = 2.31$ ,  $p = .022$ ,  $d = 0.33$ , 95% CI for the mean difference [0.09, 1.18].

### Counterfactual Thoughts

As predicted, participants reported more counterfactual thoughts about how the discovery might not have occurred when it was unintentional ( $M = 5.59$ ,  $SD = 2.27$ ) than when it was intentional ( $M = 4.04$ ,  $SD = 2.20$ ),  $t(199) = 4.93$ ,  $p < .001$ ,  $d = 0.69$ , 95% CI for the mean difference [0.93, 2.18].

### Perceptions of Fate

As predicted, participants reported higher perceptions that the discovery was a product of fate when it was unintentional ( $M = 6.54$ ,  $SD = 2.38$ ) than when it was intentional ( $M = 5.09$ ,  $SD = 2.20$ ),  $t(199) = 4.50$ ,  $p < .001$ ,  $d = 0.63$ , 95% CI for the mean difference [0.82, 2.09].

### Mediation Analysis

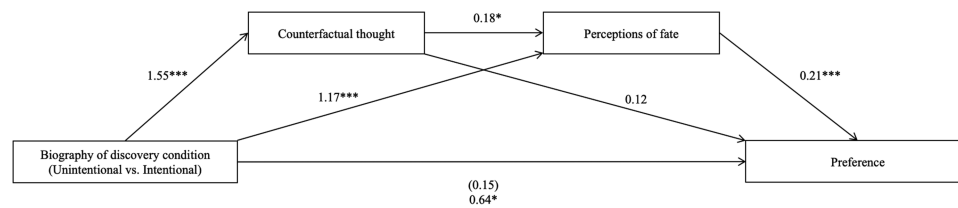
To test our proposed process, we conducted a bootstrap analysis with 5,000 samples (Hayes, 2013) using Biography of Discovery condition as the independent variable, counterfactual thoughts and perceptions of fate as sequential mediators, and interest in seeing the skull fossil in a museum exhibit as the dependent variable. Consistent with our theorizing, the analysis revealed that participants in the Unintentional Discovery condition thought more about how the discovery of the fossil might not have occurred, which increased perceptions of the discovery as a product of fate, resulting in greater preference for the skull fossil (95% CI for the indirect effect: [0.0012, 0.1515]; see Figure 4).

Study 4A provided an initial exploration of the full mechanistic model underlying preference for unintentionally discovered resources. Specifically, the unintentional discovery of a resource triggered heightened counterfactual thoughts about how the discovery might not have occurred at all, which led people to perceive that the discovery was a product of fate to a greater extent, and these perceptions of fate resulted in a higher preference for the resource.

### Study 4B: Fate as Serendipity: Dinosaur Skull Fossil

While Study 4A demonstrated that unintentionally discovered resources are preferred because their discoveries are perceived as a product of fate to a greater extent, this result does not make it entirely clear how our participants are conceptualizing the construct of fate. While some literature defines fate as the predetermination and inevitability of an outcome (Kray et al., 2010; Norenzayan & Lee, 2010),

**Figure 4**  
Mediation Model in Study 4A



Note. The path coefficients are unstandardized betas. Values in parentheses indicate the effect of the Biography of Discovery condition on the dependent variable after controlling for the mediators.

\* $p < .05$ . \*\*\* $p < .001$ .

fate is also frequently conceptualized as serendipity (Guindon & Hanna, 2002; Hsu & Hwang, 2016; Mirvahedi & Morrish, 2017; Sethna, 2017). Given that perceptions of a fated discovery in our theoretical framework are driven by thoughts about how the discovery might never have occurred, the latter characterization of fate as serendipity would be more likely than the former characterization of fate as inevitability from the perspective of our participants. Study 4B illuminates that the role of fate is conceptualized in the phenomenon of unintentional discovery as serendipity, and that counterfactual thoughts about how a discovery might not have occurred and perceptions of the serendipity of the discovery work together sequentially to enhance preference for the discovered resource. As in Studies 2–4A, participants read about a dinosaur skull fossil that had been either intentionally or unintentionally discovered by a paleontologist and reported measures of preference and counterfactual thinking. Participants in Study 4B also indicated to what extent they perceived serendipity in the discovery of the dinosaur skull fossil. We predicted that when the dinosaur skull fossil was unintentionally discovered, people would think more about the counterfactual that the skull fossil might not have been discovered at all, and that these thoughts would increase perceptions of the serendipity of the discovery, consequently increasing interest in seeing the skull fossil in a museum exhibit. Additionally, participants reported their perceptions of the uniqueness of the find of the dinosaur skull fossil to provide evidence inconsistent with an alternative explanation that unintentionally discovered resources are preferred because their discoveries are perceived as more unique finds. This study was pre-registered on AsPredicted.org ([https://aspredicted.org/5YQ\\_DQC](https://aspredicted.org/5YQ_DQC)).

## Method

### Participants

Two hundred ( $M_{\text{age}} = 39.16$ ,  $SD = 11.61$ ; 52.0% female, 47.5% male, 0.5% other) CloudResearch Approved participants participated in exchange for monetary payment. Utilizing CloudResearch Approved participants allowed us to include only high-quality participants who had been vetted based on their previous engagement in online studies.

### Procedure

Participants were randomly assigned to one of two Biography of Discovery conditions: Intentional or Unintentional. Participants read scenarios identical to those in Studies 2 and 3.

All participants then answered, “How interested would you be in seeing this dinosaur skull fossil in a museum exhibit?” (1 = *not at all interested*, 9 = *extremely interested*). Participants then indicated “How much did you think about how this discovery might not have occurred?” (1 = *not at all*, 9 = *very much*).

We adapted the four-item index of perceptions of serendipity used by Kim et al. (2021). Specifically, participants indicated the extent to which they agreed with the following statements: “The skull fossil the paleontologist discovered was a good surprise..,” “It was lucky that the skull fossil was discovered..,” “This was an unexpected discovery..,” “There was some element of chance involved in having discovered this exact fossil.” (1 = *strongly disagree*, 7 = *strongly agree*). Participants’ answers to these four questions were averaged together to create a single index of perceptions of serendipity ( $\alpha = .91$ ).

Participants then answered “How unique was this find?” (1 = *not at all*, 9 = *extremely*). Participants then reported demographics. Specifically, participants were asked to report their gender and chose among three options (Male, Female, and Other) but were not required to respond to this question. Finally, participants were asked to report their age and given a free-response box but were not required to respond to this question.

## Results and Discussion

### Preference

As predicted, participants reported higher interest in seeing the skull fossil in an exhibit when it was unintentionally discovered ( $M = 7.50$ ,  $SD = 1.51$ ) than when it was intentionally discovered ( $M = 6.99$ ,  $SD = 1.83$ ),  $t(198) = 2.15$ ,  $p = .033$ ,  $d = 0.30$ , 95% CI for the mean difference [0.04, 0.98].

### Counterfactual Thoughts

As predicted, participants reported more counterfactual thoughts about how the discovery might not have occurred when it was unintentional ( $M = 5.63$ ,  $SD = 2.23$ ) than when it was intentional ( $M = 4.62$ ,  $SD = 2.47$ ),  $t(198) = 3.02$ ,  $p = .003$ ,  $d = 0.43$ , 95% CI for the mean difference [0.35, 1.66].

### Perceptions of Serendipity

As predicted, participants perceived serendipity in the discovery to a greater extent when it was unintentional ( $M = 6.16$ ,  $SD = 0.98$ ) than when it was intentional ( $M = 5.00$ ,  $SD = 1.45$ ),

$t(169.88) = 6.58, p < .001, d = 0.94$ , and Levene's test was significant,  $F(1, 198) = 9.45, p = .002$ ; thus, equal variances were not assumed, 95% CI for the mean difference [0.81, 1.50].

### Uniqueness of the Find

Participants perceived the discovery as an equally unique find when it was unintentional ( $M = 6.86, SD = 2.06$ ) as they did when it was intentional ( $M = 6.81, SD = 2.33$ ),  $t(198) = 0.18, p = .856, d = 0.03$ , 95% CI for the mean difference [-0.56, 0.70].

### Mediation Analysis

To test our proposed process, we conducted a bootstrap analysis with 5,000 samples (Hayes, 2013) using the Biography of Discovery condition as the independent variable, counterfactual thoughts and perceptions of serendipity as sequential mediators, and interest in seeing the skull fossil in a museum exhibit as the dependent variable. Consistent with our theorizing, the analysis revealed that participants in the Unintentional Discovery condition thought more about how the discovery of the fossil might not have occurred, which increased perceptions of the serendipity of the discovery, resulting in greater preference for the skull fossil (95% CI for the indirect effect: 0.0446, 0.2537; see Figure 5).

Study 4B further illuminated the mechanistic model underlying the preference for unintentionally discovered resources. Specifically, the unintentional discovery of a resource triggered heightened counterfactual thoughts about how the discovery might not have occurred at all, which led people to perceive greater serendipity in the discovery, and these perceptions of serendipity resulted in a higher preference for the resource. In so doing, Study 4B helps to clarify that the role of fate is conceptualized as serendipity in the phenomenon we investigate rather than as inevitability. While this established index measuring perceptions of serendipity includes one item assessing participants' perceptions of the unexpectedness of the discovery, serendipity itself is not merely the sense of unexpectedness. Rather, the majority of items included in this index speak to the nature of serendipity as a magical belief holding a positive valence and not exclusively a sense of unexpectedness.

Further, these results provided evidence inconsistent with an alternative explanation that people prefer unintentionally discovered resources because they perceive their discoveries as more unique finds. People perceived the discovery of the dinosaur skull fossil as an equally unique find whether it was discovered intentionally or unintentionally.

### Study 5: Expert Versus Novice Discoverers: Prehistoric Cave Painting

Study 4A-B unpacked the full mediating path driving the influence of the unintentional discovery of a resource on preference. It did so by providing evidence that the unintentional discovery of a resource enhanced preference by triggering counterfactual thinking about how the discovery might not have occurred, which in turn increased perceptions of the discovery's fatedness. Importantly, we propose that this causal chain is set in motion because the unintentional discovery of a resource is inherently unexpected, and unexpected events inspire counterfactual thought (Olson & Roese, 2002; Sanna & Turley, 1996). Consequently, one moderator of the effect of unintentional discovery on the preference that this theoretical

framework suggests is the discovery of a resource by a novice discoverer, because people would find both intentional and unintentional discovery by a novice to be unexpected. Therefore, with a novice discoverer, counterfactual thoughts about how the discovery might not have occurred at all would be triggered in both cases. Notably, the previous studies examined the preference for resources described as unintentionally discovered by a geologist (Study 1A), an archeologist (Study 1B), or by paleontologists (Studies 2–4B); discoverers who are experts in their respective fields. Thus, when people are informed that a resource was unintentionally discovered by an expert in the appropriate field, the discovery is unexpected and therefore triggers counterfactual thoughts about how it might not have occurred (Olson & Roese, 2002; Sanna & Turley, 1996). In contrast, for novice discoverers, the discovery of the resource would be unexpected whether it is intentional or unintentional. Therefore, intentional discovery as well as unintentional discovery of the resource by a novice would trigger counterfactual thoughts about how the discovery might not have occurred (Olson & Roese, 2002; Sanna & Turley, 1996), driving the causal chain to preference and making the discovered resource preferred at equally high rates regardless of the intentionality behind its discovery. However, only unintentional discovery by an expert is unexpected, and therefore the causal chain that we propose heightens preference for resources is only set in motion for experts in the case of unintentional discovery (but not intentional discovery).

To test this theory, in an incentive-compatible choice, participants in Study 5 indicated their preference for a resource that was either discovered by an expert or by a novice. Consistent with our findings that counterfactual thoughts about how a resource might not have been discovered at all play a critical role in the mechanism underlying preference, we predicted that a resource discovered by a novice would be chosen at equally high rates regardless of the intentionality behind the discovery. We predicted that the greater choice of unintentionally discovered resources compared with otherwise identical intentionally discovered resources would only emerge for resources discovered by experts. By testing this theoretically relevant moderator, the design of Study 5 provided converging evidence for our proposed mechanism underlying a preference for unintentionally discovered resources. This study was pre-registered on AsPredicted.org (<https://aspredicted.org/blind.php?x=ib7vf3>).

## Method

### Participants

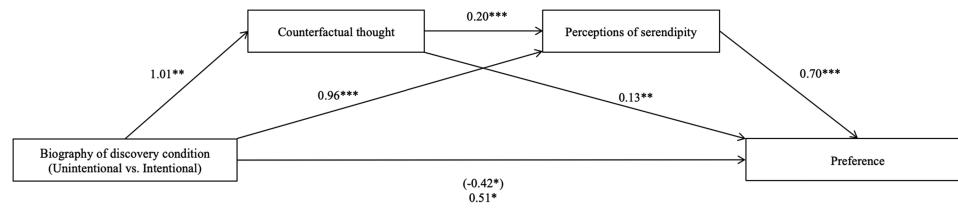
Four hundred three participants ( $M_{\text{age}} = 39.32, SD = 11.79$ ; 47.9% female, 50.1% male, 1.5% other, 0.5% not reported) from Amazon Mechanical Turk participated in exchange for monetary payment. Participants were randomly assigned to one condition in a 2 (Biography of Discovery: Unintentional vs. Intentional)  $\times$  2 (Expertise: Expert vs. Novice) between-subjects design.

### Procedure

All participants first read "We are working with a museum to survey potential visitors. We will first share one of the discoveries that is displayed in the museum." Then, all participants read about a discoverer who had discovered a prehistoric painting depicting animals and outlines of human hands on the wall of a cave. In the Expert conditions, participants read that the discoverer was an archeologist,



**Figure 5**  
Mediation Model in Study 4B



Note. The path coefficients are unstandardized betas. Values in parentheses indicate the effect of the Biography of Discovery condition on the dependent variable after controlling for the mediators.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

whereas, in the Novice conditions, participants read that the discoverer was a 12-year-old boy. In the Unintentional Discovery conditions, participants read that when interviewed about the find, the discoverer stated, “When I was exploring the cave, I was not looking for prehistoric paintings but I am happy I found one.” In the Intentional Discovery conditions, participants read that when interviewed about the find, the discoverer stated “When I was exploring the cave, I was looking for prehistoric paintings and I am happy I found one.”

All participants then answered two filler questions about museums (see [Supplemental Material](#)) to make the cover story believable. All participants were then asked “As a token of our appreciation we would like to offer you a choice of receiving an extra 5 cent compensation for the study or a print of the prehistoric painting that you learned about in the study. Which would you prefer?” (*Extra 5 cents/A print of the prehistoric painting*). The choice between receiving additional compensation (5 cents) and the discovered resource (cave painting print) was our primary dependent variable of interest. After making their choice, participants were debriefed and informed that upon the culmination of the study, all participants would be awarded an extra 5 cents rather than receive the print. Participants then reported demographics. Specifically, participants were asked to report their gender and chose among three options (Male, Female, and Other) but were not required to respond to this question. Finally, participants were asked to report their age and given a free-response box but were not required to respond to this question.

## Results and Discussion

### Preference

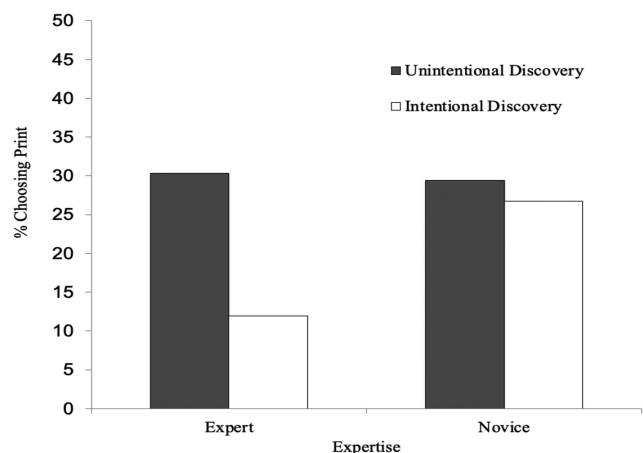
We analyzed the compensation choice data using a binary logistic regression analysis with the Biography of Discovery condition (coded as 1 = *intentional discovery* and 2 = *unintentional discovery*), Expertise condition (coded as 1 = *expert discoverer* and 2 = *novice discoverer*), and the interaction term as parameters. There was a main effect of Biography of Discovery ( $b = 2.21$ ,  $SE = 0.82$ ,  $p = .007$ ,  $OR = 9.11$ , 95% CI [1.84, 45.15]) and a main effect of Expertise ( $b = 2.03$ ,  $SE = 0.82$ ,  $p = .013$ ,  $OR = 7.64$ , [1.53, 38.26]). Most relevant to the current theorizing, the predicted interaction was significant ( $b = -1.04$ ,  $SE = 0.49$ ,  $p = .034$ ,  $OR = 0.35$ , [0.14, 0.93]; see [Figure 6](#)). In the Expert discoverer conditions, participants were more likely to choose to receive a print of the cave painting when it had been unintentionally discovered (30.3%)

compared to when it had been intentionally discovered (11.9%;  $b = 1.17$ ,  $SE = 0.38$ ,  $p = .002$ ,  $OR = 3.23$ , [1.54, 6.76]). In contrast, in the Novice discoverer conditions, participants chose to receive a print of the cave painting with the same likelihood when it had been unintentionally discovered (29.4%) compared to when it had been intentionally discovered (26.7%;  $b = 0.13$ ,  $SE = 0.31$ ,  $p = .671$ ,  $OR = 1.14$ , [0.62, 2.11]).

Decomposed differently, in the Intentional Discovery conditions, participants were less likely to choose to receive a print of the cave painting when the discoverer was an expert (11.9%) compared to when the discoverer was a novice (26.7%;  $b = -1.00$ ,  $SE = 0.38$ ,  $p = .009$ ,  $OR = 0.37$ , 95% CI [0.18, 0.78]). However, in the Unintentional Discovery conditions, participants chose to receive a print of the cave painting with the same likelihood when the discoverer was an expert (30.3%) compared to when the discoverer was a novice (29.4%;  $b = -0.04$ ,  $SE = 0.31$ ,  $p = .890$ ,  $OR = 0.96$ , 95% CI [0.52, 1.75]).

These results illustrated a theoretically relevant moderator of the influence of the unintentional discovery of a resource on preference—the level of expertise of the discoverer. Only when the discoverer was an expert did people choose an unintentionally discovered resource over an intentionally discovered resource. When the discoverer was a novice and the discovery was unexpected whether it was intentional or unintentional, intentionally and unintentionally

**Figure 6**  
Choice of Cave Painting Print as a Function of Biography of Discovery and Expertise for Study 5



discovered resources were chosen at equal rates. Further, decomposing the interaction differently allows us to see that when people learned that the discovery was intentional, they chose the resource at a higher rate when it was discovered by a novice than by an expert. This difference indicates that when the discoverer is a novice, they may spontaneously generate counterfactual thoughts about how the discovery of a resource might not have occurred even when the discovery was intentional, driving choice. That choice of the resource does not differ based on the expertise of the discoverer when the discovery was unintentional, and also does not differ from choice of the resource intentionally discovered by a novice discoverer, supports the idea that counterfactual thoughts increasing choice of the resource are spontaneously generated in the case of unintentional discovery by an expert. In this way, the results of Study 5 provided additional support for our proposed mechanism underlying the preference for unintentionally discovered resources.

Further, Study 5 provided additional evidence inconsistent with the alternative explanations examined in Studies 2, 3, and 4B. Specifically, if people preferred unintentionally discovered resources because either the resources or the discoveries were perceived as more unique, more authentic, elicited heightened perceptions of the discoverer's skill, or elicited greater feelings of positive affect, we would not expect preference for the cave print discovered intentionally by a novice discoverer in Study 5 to rise to levels of preference for the cave print discovered unintentionally by a novice discoverer.

Finally, Study 5 provides evidence inconsistent with the potential alternative explanation that the preference for unintentionally discovered resources is driven by an underdog biography (Paharia et al., 2011). Indeed, the seminal work on the underdog effect identifies "two essential dimensions of an underdog biography: external disadvantage, and passion and determination" (Paharia et al., 2011, p. 775). While it is arguable that any novice discoverer holds an external disadvantage, it is unlikely that the unintentional novice discoverer depicted in Study 5 holds passion and determination for the discovery of pre-historic cave paintings given that he was not looking for such paintings. Only when this novice discoverer intentionally discovers a resource is it arguable that he held passion and determination for discovering it. Therefore, if the underdog effect were primarily driving the preference we show for unintentionally discovered resources, we would expect the pattern of results to reverse for novice discoverers such that resources discovered by intentional novice discoverers would be preferred to otherwise identical resources discovered by unintentional novice discoverers. That the results of Study 5 show that the effect of unintentional discovery is eliminated in the case of novice discoverers rather than is reversed provides evidence inconsistent with the alternative explanation that an underdog biography is driving the preference that we demonstrate.

### Study 6: Consequential Choice Between Commonplace Products: Bottled Water

Study 6 examined the preference for unintentionally discovered resources in a consequential choice between two products. Specifically, participants in Study 6 were given a choice to receive a case of either Fiji water or Proud Source water. Some participants read that the spring water for Proud Source had been unintentionally discovered, and others read that the spring water for Proud Source

had been intentionally discovered. We predicted that people would choose to receive a case of Proud Source water at higher rates when they learned that it had been unintentionally discovered by an expert than when they learned that this spring water was intentionally discovered by an expert.

## Method

### Participants

One hundred participants recruited via Amazon's Mechanical Turk ( $M_{age} = 30.42$ ,  $SD = 5.80$ ; 53.0% female, 46.0% male, 1.0% other) participated in exchange for monetary payment.

### Procedure

Participants were randomly assigned to one of two Biography of Discovery conditions: Intentional or Unintentional. In the Intentional Discovery condition, participants read: "Proud Source, a bottled water company, is selling water which a geologist found in a spring at a base of Mount McCaleb in Idaho. The geologist gave the following statement about the find: 'When I was on Mount McCaleb, I was leading an expedition in order to find spring water.'" In the Unintentional Discovery condition, participants read: "Proud Source, a bottled water company, is selling water which a geologist found in a spring at a base of Mount McCaleb in Idaho. The geologist gave the following statement about the find: 'When I was on Mount McCaleb, I had not been leading an expedition. I did not intend to find spring water.'" All participants completed two filler questions (see [Supplemental Material](#)) and were told "Thank you for participating! As a token of our appreciation you will be sent a case of 12 bottles of water of your choosing. Would you like a case of the Proud Source spring water mentioned earlier or a case of Fiji water?" (*Proud Source/Fiji*) and shown images of both Proud Source water and Fiji water. Our dependent variable of interest was the participants' rate of choice to receive the case of Proud Source water. Participants then reported demographics. Specifically, participants were asked to report their gender and chose among three options (Male, Female, and Other) but were not required to respond to this question. Finally, participants were asked to report their age and given a free-response box but were not required to respond to this question. Upon the culmination of the study, each participant was shipped a case of their preferred water.

## Results and Discussion

### Preference

As predicted, a chi-square analysis revealed that participants were significantly more likely to choose to receive a case of the Proud Source water when that spring water had been unintentionally discovered (76.9%) than when that spring water was intentionally discovered (55.7%),  $\chi^2(1, N = 100) = 4.63$ ,  $p = .031$ ;  $OR = 2.65$ , 95% CI [1.08, 6.51].

These results support the ecological validity of this phenomenon by demonstrating in a study design involving consequential choice that people chose a commonplace product at a higher rate when its biography included its unintentional discovery. More people opted

to receive the Proud Source water when they learned that this resource had been unintentionally discovered.

### Study 7: Facebook Field Experiment: Mesopotamian Tablet in an Online Museum Exhibit

In a field experiment conducted on Facebook, we provided initial support for the ecological validity of the effect of the unintentional discovery of a resource on preference for that resource in a noisy real-world environment. In this field study, we tested preference for an artifact featured in a museum's online exhibit. Specifically, Facebook's split test function allowed us to test two versions of an advertisement for a Mesopotamian tablet on which was carved 4,000-year-old recipes. Facebook users who saw one of the versions of the advertisement read either that the tablet had been discovered intentionally or unintentionally by an archeologist. Facebook's functionality allowed us to capture the number of times each version of the advertisement was clicked as well as the number of times each advertisement was shown to a unique Facebook user (defined as "reach"). In line with research utilizing Facebook's split test function, we operationalize the click-through rate for the tablet as the number of times a version of the advertisement was clicked/reach  $\times 100$  (To & Patrick, 2021). We predicted that the click-through rate to the exhibit would be higher among Facebook users who read that the tablet had been unintentionally discovered.

## Method

### Participants

A total of 6,152 Facebook users (18+ years of age in the United States) saw one of the two versions of the advertisement. The advertisements ran for one full day (a 24-hr period).

### Procedure

Random non-overlapping participants (Facebook, 2022) were shown advertisements corresponding to one of two Biography of Discovery conditions: Intentional or Unintentional. All participants read that a university's behavioral lab was working with a natural history museum to promote one of its online exhibits and that "An archaeologist found a tablet from ancient Mesopotamia with 4,000-year-old cooking recipes carved into it embedded in the side of the hill." Facebook users who saw the Intentional Discovery version of the advertisement read "When interviewed about the find, the archaeologist stated: 'When I was at the hill, I was leading an expedition in order to find artifacts like this tablet and I am happy that we did.'" (see "Intentional," Figure 7). Facebook users who saw the Unintentional Discovery version of the advertisement read "When interviewed about the find, the archaeologist stated: 'When I was at the hill, I had not been leading an expedition. I did not intend to find artifacts like this tablet but I am happy that we did.'" (see "Unintentional," Figure 7). All participants then read "Click this ad to learn more about this exhibit, see a video of the recipes being cooked, and learn the recipes yourself to cook at home!" All participants who clicked on either version of the advertisement were taken to a debriefing page before being redirected to the online exhibit featuring the tablet.

## Results and Discussion

### Preference

A chi-square analysis revealed that Facebook users clicked on the advertisement at a marginally significantly higher rate when the tablet was unintentionally discovered (3.7%) than when the tablet was intentionally discovered (2.9%),  $\chi^2(1, N = 6,152) = 3.01, p = .083$ ;  $OR = 1.28$ , 95% CI [0.97, 1.69].

Although Facebook users' preference in this field study for the unintentionally discovered tablet was relatively weaker than preference for unintentionally discovered resources demonstrated in our laboratory experiments, this result is consistent with the effect that we propose and offers initial evidence for its ecological validity in a noisy real-world environment. Facebook users who read that the Mesopotamian tablet had been discovered by an archeologist unintentionally clicked on the advertisement to visit the online exhibit at marginally higher rates than Facebook users who read that the tablet had been discovered intentionally.

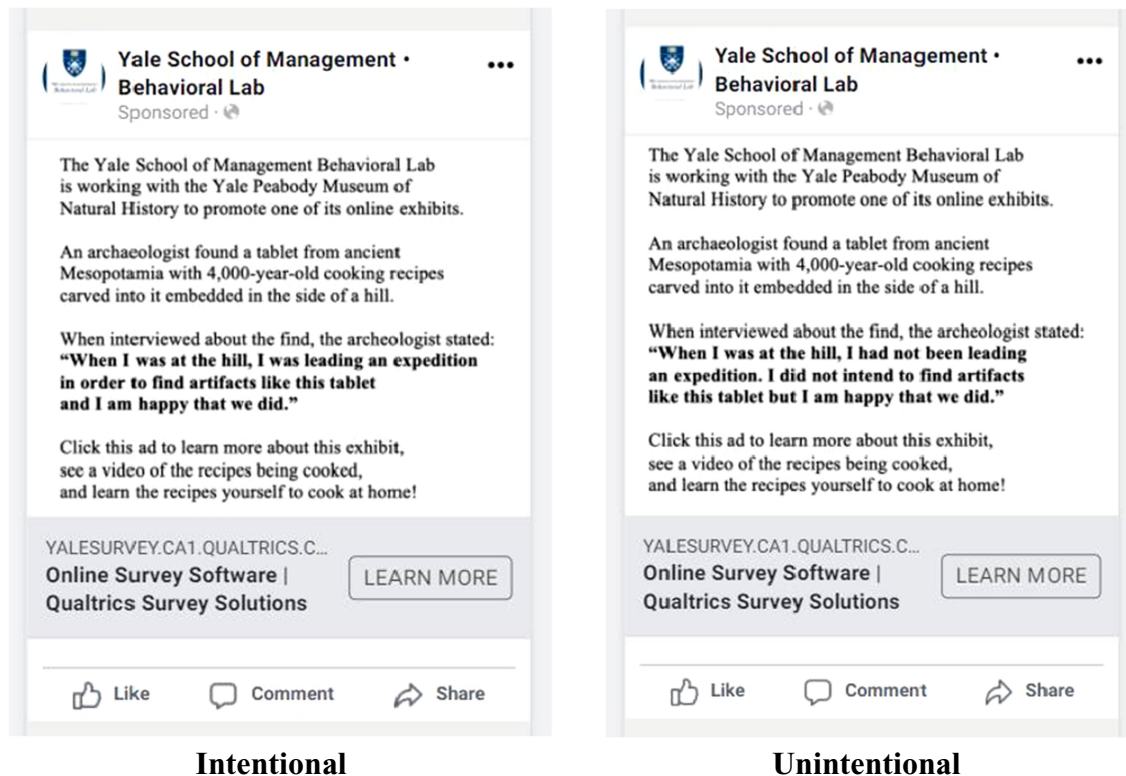
### General Discussion

The biographies of objects have been shown to shape preference as people take into account not only the instrumental properties of an object but also facets of its history (Argo et al., 2006, 2008; Avery et al., 2010; Cho & Schwarz, 2008; Fuchs et al., 2015; Hong & Wyer, 1989; Keller, 2020; Newman & Bloom, 2014; Newman & Dhar, 2014; Newman et al., 2011, 2014; Paharia et al., 2011; Reich et al., 2018). The current research advances our understanding of the influence of biography by examining a previously unexplored narrative—the biography of the discovery of historical and natural resources. Specifically, across eight laboratory studies and one field experiment, we find evidence for heightened choice of and preference for unintentionally discovered resources compared with intentionally discovered ones. We find that this effect is driven by heightened counterfactual thinking about how unintentional discovery might not have occurred leading to increased perceptions of the discovery's fatedness. Importantly, we identify that choice of unintentionally discovered resources over intentionally discovered resources occurs only when the discoverer is an expert and not a novice.

### Theoretical Contributions

The current research is the first to reveal increased choice of and preference for resources that were unintentionally discovered over otherwise identical resources that were intentionally discovered, and that this influence is shaped by heightened counterfactual thought about how an unintentional discovery might not have occurred leading to increased perceptions of the discovery's fatedness. This illuminates a novel mechanism through which information in object biography about the mere intention behind the discovery of a resource can drive choice and preference. In doing so, the present studies contribute to recent literature illuminating the positive effects of unintentionality on inferences, such as mistakes involved in hedonic product creation (Reich et al., 2018), intentionality during creation to make a product environmentally friendly (Newman et al., 2014), and coincidence leading to duplicate artwork (Newman & Bloom, 2012).

**Figure 7**  
Facebook Advertisements for Study 7



**Intentional**

**Unintentional**

Further, this result expands our understanding of the influence of object biography (Argo et al., 2006, 2008; Avery et al., 2010; Cho & Schwarz, 2008; Fuchs et al., 2015; Hong & Wyer, 1989; Keller, 2020; Kruger et al., 2004; Morales, 2005; Newman & Bloom, 2012; Newman & Dhar, 2014; Newman et al., 2014; Paharia et al., 2011; Reich et al., 2018). The current research illuminates a previously unexplored narrative, the biography of discovery, as a unique type of object biography that can mold preference. By doing this, the current research opens a door to encourage the pursuit of understanding what other elements of the biography of discovery beyond intentionality may also influence choice and preference, and how such processes may operate.

These findings also contribute to research on the conceptualization and consequences of perceptions of fate (Ersner-Hershfield et al., 2010; Guindon & Hanna, 2002; Hsu & Hwang, 2016; Kim et al., 2021; Kray et al., 2010; Mirvahedi & Morrish, 2017; Sethna, 2017). The present studies contribute to the extant literature by demonstrating the importance of distinguishing between different conceptualizations of the same construct (in this case, fate). While fate has been characterized by some work as the inevitability of an outcome (Kray et al., 2010; Norenzayan & Lee, 2010), fate is also frequently conceptualized as serendipity (Guindon & Hanna, 2002; Hsu & Hwang, 2016; Mirvahedi & Morrish, 2017; Sethna, 2017). These different conceptualizations of fate may have different downstream consequences on appreciation and evaluations. For example, if participants in the present studies perceived unintentional discoveries as inevitable but not as serendipitous, they might not show the heightened preference for unintentionally

discovered resources that we propose. However, literature examining these constructs may not sufficiently distinguish between them, and the current research highlights the importance of doing so.

Finally, the current research may have implications for work demonstrating the role of surprise in gift-giving (Areni et al., 1998; Belk, 1996; Ruffle, 1999; Vanhamme & de Bont, 2008). While surprise has been shown to play a central role in the appreciation of gifts (Areni et al., 1998; Belk, 1996; Ruffle, 1999; Vanhamme & de Bont, 2008), our examination of the unexpectedness of an unintentional discovery leading to heightened perceptions of the discovery's serendipity and ultimately increasing preference for discovered resources raises the question of how perceived serendipity may play a role in gift-giving. Literature suggesting future avenues for gift-giving research has speculated that surprise gifts framed in a way as to make them perceived as more serendipitous may enhance evaluations of the gift beyond those elicited by its surprisingness alone (Kim et al., 2021). Our work offers additional support for the idea that heightening perceptions of serendipity in gift-giving could potentially enhance the positive effect of surprise in gift-giving.

### Practical Implications

Studies 1B-5 and Study 7 show the applicability of this effect to museums and private collectors. Over 6.5 million people visit The Metropolitan Museum of Art in New York City each year (Statista, 2021a), typically generating more than \$100 million in revenue from combined ticket sales and retail (Statista, 2021c). Museums



such as The Metropolitan Museum of Art attempt to attract visitors through the promotion of their exhibits, and identifying the influence of intentionality in the discovery of resources can help inform the creation of museums' promotional materials. Because discovery is an element present in every artifact's biography, understanding how and when unintentionality in an artifact's discovery increases preference for it could help to drive increased ticket sales and sales of replica merchandise. Indeed, the results of Study 5 indicate that people were more likely to choose to receive a replica print of a cave painting that was displayed in a museum when people read that the print had been discovered unintentionally by an expert. One could easily imagine a museum converting a resource such as the resource featured in the field experiment in Study 7, a tablet with cooking recipes from ancient Mesopotamia carved into it, into a cookbook or replica to offer as merchandise for sale, driving heightened preference to the extent that the museum was able to communicate unintentionality in its biography of discovery.

Additionally, this preference for unintentionally discovered resources could affect organizations within secondhand markets. Inspired by works like Marie Kondo's "The Life-Changing Magic of Tidying Up" (Kondo, 2014), there exists a current trend toward "decluttering" by getting rid of old possessions which are causing a donation spike to secondhand stores (Brodesser-Akner, 2016; Roberts & Schmidt, 2019). Second-hand stores should advertise biographical information pertaining to the past unintentional discoveries of their merchandise by experts to increase preference. Similarly, auction houses such as the New York City-based Sotheby's or Christie's, each generating more than one billion dollars in revenue annually (Sotheby's, 2018; Statista, 2021b), could heighten preference for their goods by including references to their unintentional discovery in their descriptions preceding an auction whenever those were made by experts.

Moreover, the results of Study 5 offer practical implications for the construction of communications about discovered resources, delineating when the inclusion of information about a resource's unintentional discovery will heighten preference for the resource. Specifically, Study 5 shows that the preference for unintentionally discovered resources emerges when the discoverer was an expert but is eliminated when the discoverer was a novice. Therefore, Study 5 illuminates when communications advertising a resource would not benefit from the inclusion of information about unintentionality in the resource's discovery. Only when the resource is discovered by an expert will information about the unintentionality of its discovery inspire greater preference for the resource.

Finally, the result of Study 6 provides initial evidence for the ecological validity of this effect in that people chose one commonplace product over another in a consequential decision at a higher rate when they learned about its unintentional discovery by an expert. That Study 7 was conducted as a field experiment on Facebook using advertisements for an actual resource exhibited on a museum's website offers converging evidence for the ecological validity of the effect presented in this work, and its applicability when crafting public-facing communications in noisy real-world contexts.

### Limitations and Future Directions

By illuminating that biographical information about the unintentional discovery of a resource heightens choice of and preference for

the resource, this research introduces a new area of object biography affecting preference—the biography of discovery. We hope that this initial empirical expedition inspires a research agenda for future research to investigate many other facets of the biography of discovery in order to push the frontier of this previously unexplored area of object biography. Further research should focus on different factors of a resource's discovery beyond the intentionality behind its discovery to map out a more complete understanding of the role of biography of discovery in shaping choice and preference.

Given that heightened counterfactual thought about how discovery might not have occurred is a key driver of preference for unintentionally discovered resources, future research could explore whether individual differences in counterfactual thinking might moderate the effect described in this article. Kasimatis and Wells (2014) cataloged several personality traits such as a need for cognition, chronic optimism, and tendencies toward rumination as influencing the degree of engagement in counterfactual thought. Choice of and preference for unintentionally discovered resources may be especially pronounced in those high on traits encouraging counterfactual thinking, but less so for those low on these traits because counterfactual thinking is less likely to be triggered in their case.

Finally, although we provide evidence for a robust effect of the unintentional discovery of a resource by an expert on heightened preference for that resource across nine studies, the current research relies primarily on controlled laboratory experiments as a way of initially identifying the effect and its underlying mechanisms. The emergence and strength of a preference for unintentionally discovered resources in various highly specific and complex naturalistic settings is an empirical question outside of the scope of the current research. Our Facebook field study does provide initial evidence for the ecological validity of the effect we propose in a naturalistic setting in which the biography of discovery would ostensibly be communicated to influence preference (a museum advertising a historical resource in an exhibit). However, we encourage future research to examine the role of unintentional discovery in other naturalistic settings that lend themselves less clearly to the communication of the event of discovery. Further, we encourage future research to examine the effect in contexts in which other relevant information may conceivably overpower the influence of intentionality in discovery in order to test the limits of the influence of intentionality behind discovery as one competing input to preference.

### Conclusion

This research illuminates a new area of object biography and its influence in shaping choice and preference—the biography of discovery. It does so by demonstrating that unintentionally discovered resources by an expert are preferred to otherwise identical intentionally discovered resources by an expert because unintentionally discovering a resource triggers increased counterfactual thought about how the discovery might not have occurred, which in turn heightens perceptions of the discovery's fatedness. Further, it shows that this preference for unintentionally discovered resources emerges when the discoverer was an expert but is eliminated when the discoverer was a novice. We hope these findings inspire further research exploring the influence on preference of other facets of the biography of discovery of resources and other areas of object biography to attain a more complete understanding of the biographical inputs to choice and preference.

## Context of the Research

The present studies fit into the authors' larger research program focusing on the psychological influences of intentionality. The authors concentrate particularly on ways in which chance or unintentional actions and outcomes can produce value over and above otherwise identical intentional actions and outcomes. This research program calls into question the traditional and more intuitive preference for intentionality and effort in actions and outcomes, encouraging psychological work to reexamine beliefs it has long taken for granted. Additionally, this research illuminates a previously unexplored narrative, the biography of discovery, as a unique type of object biography that can mold preference. In so doing, the authors hope that it inspires a research agenda for future research to investigate many other facets of the biography of discovery in order to push the frontier of this previously unexplored area of object biography.

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