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Abstract

Storytelling is an important avenue for social learning, proposed to have enabled humans to acquire, preserve, and transmit rich environmental knowledge over generations. Through stories, learners can be taught the causal structure of their environment and guided in decision-making by the knowledge or behavior of others in similar situations. We explored this process of learning and transmission in the context of an exploration-exploitation dilemma. Using a multi-armed bandit and narrative transmission task (N=262), we investigated if adaptive vs. non-adaptive narratives influence decision-making behavior and performance, and whether participants could identify and transmit adaptive narratives to help future participants. We found partial evidence that adaptive narratives facilitate navigating the explore-exploit trade-off. Surprisingly, we found that participants did not identify and transmit adaptive information; instead, they transmitted the narratives they received. We interpret these findings in terms of experimental limitations and cultural evolutionary processes.

Keywords: exploration-exploitation trade-off; narratives; social learning; multi-armed bandit task

Introduction

Whether significant (e.g., choosing a job or romantic partner) or trivial (e.g., choosing a route to work or a meal for dinner), many of the decisions that humans make over their lives occur under conditions of uncertainty. As we rarely have complete knowledge of the world, making "good" decisions requires a careful balance between exploring different options to gain information and exploiting the best option identified thus far to ensure positive outcomes. This challenge is known as the *exploration-exploitation trade-off* (Cohen et al., 2007; for a review see Mehlhorn et al., 2015).

Although decisions in these contexts are occasionally made based on our personal experience alone, more often than not, our decisions are also informed by information from others (Bandura, 1971; Kameda & Nakanishi, 2003). When opportunities for social learning are provided via observation of others' choices or outcomes, researchers have found that performance in exploration-exploitation trade-offs improves under many circumstances. However, social learning can occur not only directly through observation of others, but indirectly through symbolic communication of others' experiences. Narratives and storytelling are a case in point; stories can convey information about how the world operates by guiding the learner through a causal sequence of events experienced by another person or character (e.g., Bruner, 1990; Scalise Sugiyama, 2001). In doing so, learners can be taught how to navigate adaptation challenges in their environment without directly experiencing the situation themselves or needing to infer the psychological processes of the observed actor from their behavior alone (Moore & Hills, 2022; Morin et al., 2019; Wiessner, 2014). These are some of the reasons why narratives are proposed to have played a fundamental role in human adaptation, facilitating the acquisition and preservation of survival information across generations (e.g., Bruner, 1990; Scalise Sugiyama, 2001, 2011, 2024).

Despite these claims about the utility of *narrative social learning*, however, it has remained a neglected pathway for social learning in research to date. In this paper, we investigate whether narrative social learning can aid or hinder decision-making in exploration-exploitation dilemmas. If narratives are to serve an adaptive function in decision-making, they must (1) influence behavior, (2) provide an adaptive benefit in the decision environment, and (3) contain adaptive information when transmitted to others. In what follows, we first introduce multi-armed bandits, a prototypical decision task for examining exploration-exploitation dilemmas, discuss the effect of social learning in this task environment, and review the literature on narrative effects on judgment and decision-making, to describe our experiment and expectations.

Multi-Armed Bandits and Social Learning

A common experimental paradigm for investigating exploration-exploitation dilemmas is the multi-armed bandit (MAB; Robbins, 1952), in which participants are presented with a set of options (e.g., different locations on a planet) with unknown probabilities of producing a reward (e.g., fruit) and repeatedly choose among them to maximize their overall rewards. In these tasks, adaptive behavior and performance can be assessed by whether people engage in the right balance of exploration and exploitation for their specific environment. In classic MABs, where the reward probabilities are stationary, participants perform optimally by exploring initially to learn the payoffs of each option and then exclusively exploiting the most rewarding option (Speekenbrink, 2022). In restless MABs where reward probabilities change over time, much like real-world contexts, participants perform optimally by engaging in more exploration throughout the task to learn and adapt to the dynamics of the payoff environment (e.g., Daw et al., 2006; Speekenbrink, 2022; Speekenbrink & Konstantinidis,

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2015).

At present, much of the research on social learning in MABs has focused on *observational social learning*, where people have access to others' choices (e.g., Deffner et al., 2020; McElreath et al., 2005; Toelch et al., 2010) or outcomes (Ortmann & Luhmann, 2023; Witt et al., 2024) while making their own decisions. In many cases, this access to social information resulted in better performance than individual learning (e.g., Danwitz & Von Helversen, 2025; Kameda & Nakanishi, 2003; Toyokawa et al., 2014). Social learning allows people to quickly gain more information about the world, and thus reduce uncertainty more efficiently, than they can alone. More specifically, two possible functions of social learning that may be applicable to MABs are *Confirmation* (Bergerot et al., 2024; Nickerson, 1998), whereby social information is used to affirm and to reduce uncertainty about one's existing strategy or choices, and *Scaffolding* (Vygotsky, 1978; Wood et al., 1976), whereby it guides people to relevant information or choices they might not have otherwise found by individual learning alone. However, this adaptive benefit is not without boundaries; for example, social learning is of little utility when the environment is too unstable to learn (e.g., McElreath et al., 2005; Turner et al., 2023) and can result in worse performance when providing "bad" models of behavior (e.g., Adrian et al., 2019).

Nevertheless, the singular focus on learning via *observation* limits the scope of research on human social learning. In reality, humans often have the opportunity to learn via *symbolic communication* where a sheer behavior can be assigned symbolic meaning and situated within causal frameworks for how the world works. Symbolic communication also removes the need for learners to be physically present at the time the target behavior is performed. This allows for people to learn from or emulate the behavior of a wider array of models, including people distantly connected to the teacher or learner, those from the past, or even completely fictional characters.

Narratives and Storytelling

A clear example of symbolic communication is narrative and storytelling. Broadly, narratives consist of a causal sequence of events that are driven by the decisions and actions of at least one character (e.g., Kashima et al., 2008; Ryan, 2007). As stories communicate streamlined chains of events, they can simplify noisy or complex environments into clearer blueprints for how the world operates, directing learners' attention to the important features of the environment relevant to survival and tacitly instructing them how to act for a rewarding outcome (e.g., Bietti et al., 2019; Scalise Sugiyama, 2024). In this way, storytelling is proposed to have played a key role in the acquisition, preservation, and transmission of environmental knowledge across generations.

Narratives have been found to facilitate the retention of information in memory (e.g., Mar et al., 2021; Mesoudi et al., 2006) and influence beliefs, attitudes, intentions, and behaviors (e.g., Braddock & Dillard, 2016; Zebregs et al., 2015). People are also more likely to transmit narratives containing survival-relevant information – for example, content that is social (e.g., Mesoudi et al., 2006; Stubbersfield et al., 2015), emotionally-valenced (e.g., Breithaupt et al., 2022; He et al., 2023; Kashima et al., 2020), or related to threats (e.g., Acerbi, 2022; Blaine & Boyer, 2018; Stubbersfield et al., 2015). Overall, these studies provide preliminary indications that narratives should impact behavior and performance in exploration-exploitation dilemmas (e.g., Vaisarova et al., 2024), and be biased to transmit survival-relevant information when shared with others.

The Current Study

Building upon this past research, the current study investigated whether narrative social learning could aid decision-making in an exploration-exploitation dilemmas. We also examined whether adaptive narratives are favored for transmission to others. To do so, we used an MAB task with between-person manipulations of the environment and narrative learning condition. Participants were provided with a narrative that encouraged exploitation, exploration, or no narrative at all as a control. They then completed a MAB task in either a Stationary or Dynamic environment. After the task, we assessed people's understanding of the environment and asked them to select a narrative to transmit to future participants. For each environment, we examined participants' exploration and exploitation behaviors as well as their outcomes (i.e., adaptation) under individual learning only (via the control) and narrative social learning. Finally, we measured whether the Exploit or Explore Narrative is favored in transmission.

We expected the Exploit narrative to increase exploitation behaviors and the Explore narrative to decrease them, relative to the Control. In regards to performance, we expected the Exploit narrative to improve performance (i.e., adaptation) in the Stationary environment, but to hinder it in the Dynamic environment, where greater exploration is more adaptive. Similarly, we expected the Explore narrative to improve performance in the Dynamic environment, but to hinder it in the Stationary environment where greater exploitation is more adaptive. Finally, we explored whether narratives containing adaptive information – Exploit in the Stationary and Explore in the Dynamic environment – were more likely to be transmitted.

Method

Participants

We recruited participants on Prolific and compensated them £5.25. After excluding those participants who failed three or more attention or comprehension checks[1], we retained 262 participants (134 women, 118 men, 8 non-binary, 2 preferred not to say), aged between 18 and 83 (M = 37.34, SD = 12.82), for our analyses. Participants were randomly assigned to a narrative and environmental condition: Stationary Exploit (N

[1]The study and exclusion criteria were pre-registered: https://osf.io/8a6pc/

Figure 1: **Choice Display in the bandit task.** The order of locations on the screen was randomized for each participant and fixed for all trials in the year. The images were designed to be visually distinct while still containing the same number of plants and environmental features to avoid participants using observable biodiversity as indications of fruit availability.

= 45), Stationary Explore (N = 46), Stationary Control (N = 44), Dynamic Exploit (N = 41), Dynamic Explore (N = 43) and Dynamic Control (N = 43).

Procedure and Experimental Material

The experiment comprised three sections that were completed sequentially at participants' own pace; (1) the MAB task, (2) post-MAB learning assessment, and (3) narrative transmission. On average, the experiment took 30 minutes to complete.

The MAB Task. To facilitate engagement, participants were told they would be searching an alien planet, *Planet Zeptar*, for *xerube* fruit to feed the local colony of aliens called *Glorps*. The task was divided into three rounds of 75 trials, which participants were told represented three years on the planet. In each trial, participants were shown three locations on the planet, e.g., the *Waterfall*, the *Lake*, and the *River*, and selected which location they would like to search for fruit (Figure 1 illustrates the interface). The set of locations changed each year, but were constant across trials in the same year.

At the start of each year, the probabilities of finding fruit at each location were initialized at 0.75, 0.60, and 0.45. The assignment of these probabilities to the locations was randomized for each participant and kept hidden. After selecting a location, participants were shown whether they had found one fruit or none, and their total score was updated. Therefore, participants could estimate the probability of finding fruit at each location through their experience of sampling the options and observing the outcomes.

Environmental Manipulation. For those in the Stationary Condition, the probabilities of each location producing fruit were constant across trials. Therefore, only minimal exploration was required to identify the best location. Once found, it was most adaptive to exploit the single location, even with occasional misses, than to engage in further exploration. In contrast, in the Dynamic Condition, the probabilities for each location were switched abruptly after trials 25 and 50 without warning. Therefore, multiple periods of exploration were required throughout the experiment to identify the best location to exploit.

Narrative Learning Manipulation. Participants in the Control condition received no narrative and were left to learn through individual trial-and-error alone. Participants in the other two conditions received a simple folktale-like narrative about two aliens, *Glorpee the Explorer* and *Zorga the Persistent*, who had opposing strategies for finding fruit on Planet Zeptar. Glorpee's strategy was one of exploration, described as swapping continuously between locations and search strategies to learn more about the planet. Contrarily, Zorga's strategy was one of exploitation, described as sticking to the one location thought to be best, even in the face of occasional setbacks [2]. The narrative ended with one alien succeeding and the other failing and dying out, to imply which strategy was most adaptive in the environment – advice that was either helpful or unhelpful depending on the environment the participant was assigned.

Post-MAB learning assessment. Participants reported whether they had a strategy on a four-point scale (1 = No strategy at all, 4 = Had a strategy) and rated how effective they believed it to be (1 = Very bad strategy, 5 = Very good strategy). Environmental beliefs were measured by showing participants a set of plots, each depicting a different environmental condition with written descriptions of how to interpret each (full stimuli in supplementary materials). Participants selected the plot that best captured how they thought the environment behaved in the task, which was then classified into stationary and dynamic (i.e., reward probabilities of the locations changed across the experiment or not). Following this, participants rated their confidence in their environmental belief on a seven-point scale (1 = Very unconfident, 7 = Very confident).

Narrative Transmission. Finally, participants again received the story of the two aliens, *Glorpee the Explorer* and *Zorga the Persistent*; however, this time the ending was missing. Participants were presented two endings depicting either the Explorer or Exploiter as the survivor and asked to choose which of these two options to transmit to the next generation with the goal of helping them learn how to navigate the task.

Results

Behavior and Adaptation

To investigate whether narrative social learning influenced decisions and adaptation, we compared participants' exploitation and rewards in different conditions. Narrative learning conditions were coded with the no narrative Control condition as a reference. Environmental conditions were dummy coded as 1 for Stationary and 0 for Dynamic.

[2]Complete narratives in supplemental materials: https://osf.io/4cjyb/

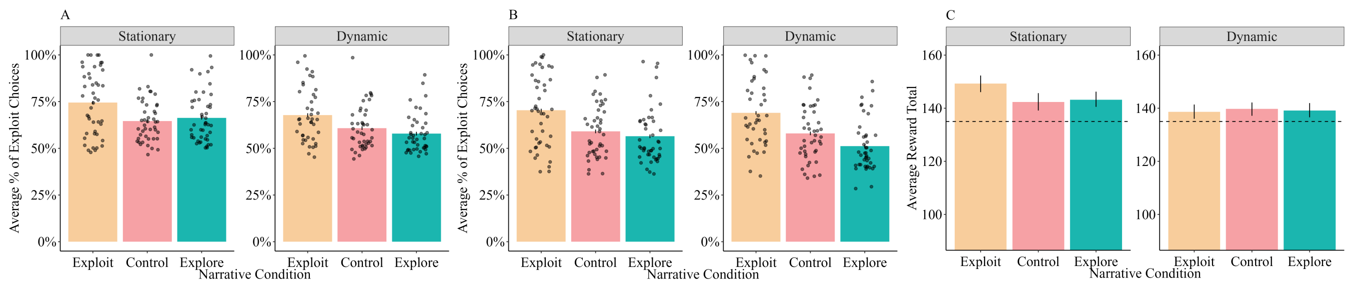

Figure 2: Average percentage of Exploit 1 (A) and Exploit 2 (B) choices by environment and narrative learning condition. (C) Average reward total by environment and narrative learning condition. The dashed line reflects random behaviour. Error bars are bootstrapped 95% confidence intervals.

Exploitation Behavior. There are two common conceptualizations of exploitation (vs. exploration) in the literature. The first is to classify a choice as exploitation when a participant selects a location that they have chosen the most often, or equally most, at that time point (Exploit 1; e.g., Steyvers et al., 2009). The second is to classify a choice as exploitation when a participant selects a location with the highest, or equal highest, observed payoff rate (Exploit 2; e.g., Speekenbrink and Konstantinidis, 2015; or motivation behind ϵ-greedy algorithms for example; Sutton and Barto, 1998). Figure 2 (panels A and B) presents the average proportions of the two types of exploitation respectively.

Binary logistic regressions with a random effect for participant were performed to predict Exploit 1 and 2 choices in each trial by narrative and environment. For both metrics, receivers of the Exploit narrative were more likely to exploit than the no narrative Control (Exploit 1: $\beta = 0.39$; $z = 2.15$; $p = .032$; Exploit 2: $\beta = 0.74$; $z = 5.15$; $p < 0.001$) and the Explore narrative (Exploit 1: $\beta = 0.59$; $z = 4.60$; $p < 0.001$; Exploit 2: $\beta = 0.93$; $z = 6.59$; $p < 0.001$). However, the Exploration narrative did not encourage more exploration (i.e., less exploitation) than the Control condition (Exploit 1: $\beta = -0.02$; $z = -0.13$; $p = 0.893$; Exploit 2: $\beta = -0.18$; $z = -1.31$; $p = 0.190$).

On the other hand, environment predicted only Exploit 1. Those in the Stationary condition tended to revisit a location that they had the most history with more than those in the Dynamic condition ($\beta = 0.38$; $z = 3.65$; $p < 0.001$). This effect was not significant for Exploit 2 ($\beta = 0.15$; $z = 1.28$; $p = 0.200$). There was no significant interaction between environment and narrative learning condition for either metrics of exploitation, suggesting that the influence of the two variables on behavior was independent of each other.

Adaptive Performance: Rewards. The amount of total rewards the participants accumulated provides an approximate indication of how well they have adapted to the MAB environment. Figure 2C plots the average reward totals in each condition.

The effects of environment and narrative learning on adaptive performance were assessed using linear regressions on total rewards [3]. There was a significant interaction between these variables, such that participants who received the Exploit narrative in the Stationary environment tended to perform better than those in the other conditions ($\beta = 8.01$; $p = 0.007$).

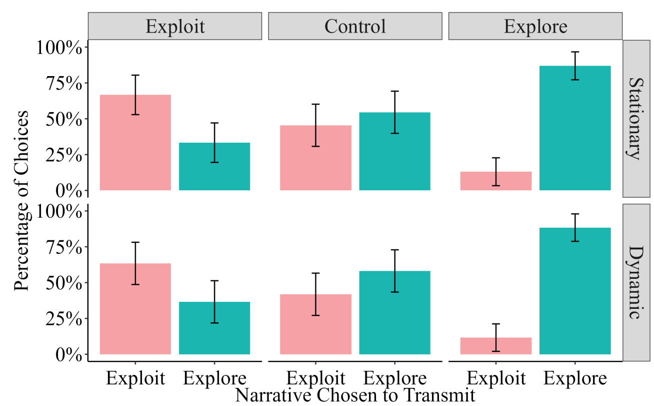

Figure 3: Proportion of Explore vs. Exploit narratives transmitted. Error bars are bootstrapped 95% confidence intervals.

There was no significant main effect of environment ($\beta = 2.60$; $p = 0.215$), Exploit narrative ($\beta = -1.13$; $p = 0.595$), or Explore narrative ($\beta = -0.65$; $p = 0.757$). This indicates that the Exploit narrative enhanced adaptation only in the Stationary environment, whereas the Explore narrative did not enhance adaptation in the Dynamic environment. Moreover, receiving a narrative incongruent with the environment did not hinder adaptation relative to individual learners in the Control.

Narrative Transmission

Finally, we explored whether participants recognized and transmitted adaptive environmental information when sharing a story with others, using binary narrative choice as the outcome variable. Figure 3 displays the proportion of Explore vs. Exploit narratives transmitted by environment and narrative learning conditions.

The effects of environment and narrative learning on narrative transmission were assessed using a binary logistic regression, with transmitting an Exploit narrative coded as 1 and an Explore narrative as 0. Environment was not a significant predictor of narrative transmission, individually ($\beta = 0.13$; $z = 0.27$; $p = .783$) or in interaction with narrative learning

[3]Binary logistic regressions on rewards in each trial were also conducted and are reported in the supplemental materials. Results were robust across both analyses

(Exploit x Stationary: β = 0.02; z = 0.04; p = .965; Explore x Stationary: β = -0.002; z = -0.002 p = 0.998). This suggests that adaptive information was not actively detected and favored for transmission to others.

There was, however, a significant main effect of narrative learning condition, such that participants tended to transmit the narrative they originally received. Specifically, receivers of the Exploit narrative were more likely to transmit the Exploit narrative than the Control (β = 0.91; z = 2.01; p = 0.04), while receivers of the Explore narrative were less likely to transmit the Exploit narrative (i.e., more likely to transmit the Explore narrative) than the Control (β = -1.70; z = -3.00; p = 0.003).

Finally, we included environmental belief (0 = Dynamic; 1 = Stationary) as a predictor in the model. Participants who reportedly believed the environment was Stationary were more likely to transmit an Exploit narrative than those who thought it was Dynamic (β = 0.81; z = 2.34; p = 0.019). However, this did not interact with narrative type or environment, suggesting that this tendency was independent of these other variables.

For reference, we also ran a binary logistic regression to predict environmental belief by the manipulated variables. This was non-significant for environment (β = 0.20; z = 0.64; p = 0.518), indicating that people generally struggled to detect the underlying dynamics/ structure of their environment. Narrative learning condition was also not a significant predictor of environmental belief (Exploit: β = -0.09; z = -0.16; p = 0.871; Explore: β = -0.15; z = -0.27; p = 0.787), indicating that people's perceptions of the environment were not influenced by the narrative they received, at least by the end of the experiment.

Discussion

This study investigated how narrative learning may aid or hinder adaptation to exploration-exploitation dilemmas. To tease apart this question of adaptivity, we specifically explored whether narratives (1) influenced behavior, (2) improved performance, and (3) contained adaptive information when shared with others.

In mixed support of our expectations, only the Exploit narrative condition produced higher amounts of exploitation in the task. The behavior of Explore narrative recipients was not significantly different to that of the no narrative Control. Results for performance were also mixed. Rewards were highest for participants who received a congruent narrative (i.e., the Exploit narrative) in the Stationary environment. In contrast, receiving a congruent Explore narrative in the Dynamic environment (i.e., a narrative encouraging to explore more in the environment that required greater exploration to adapt better) did not help, indicating that receiving a congruent narrative did not always improve performance. The incongruent narratives in both environments were also not detrimental to adaptation. Finally, participants appear to have recognized what information was adaptive to transmit in a given environment, as indicated by the environmental beliefs predicting narrative transmission (i.e., Stationary belief predicting transmission of Exploit narrative). However, there was no evidence that they *selectively* transmitted adaptive information, as the manipulated environment did not predict transmission either individually or in interaction with other variables. Instead, there was a general bias to transmit the Explore narrative, as well as a tendency to pass on the narrative received originally.

Interpretation of the Results

The following section attempts to develop a coherent interpretation of the results, seen from the perspective of cultural dynamics (e.g., Kashima et al., 2019; Legare & Nielsen, 2015) while exploring each of these findings in turn.

Finding 1: Receivers of the Exploit Narrative engaged in more exploitation, while receivers of the Explore narrative behaved similarly to the Control. This finding extends past research on attitudes and behavior, demonstrating that narratives can have a tangible impact on decision-making behavior, even outside of health contexts—e.g., where narratives are more personal and emotionally poignant. The asymmetry between the effect of narratives is curious, but could be interpreted as a confirmation bias. As noted in the introduction, one function of social learning is confirmation, whereby the social information is used to affirm one's existing strategy. In the current study, participants were likely already biased to favor exploration: people tended to believe they were in a dynamic environment, regardless of their actual environmental condition. As people tend to explore more to reduce uncertainty in dynamic environments (Speekenbrink & Konstantinidis, 2015), receiving an Explore narrative may have served as confirmation of the tendencies that people already had, producing behavior very similar to the no narrative control. By contrast, the Exploit narrative may have served a scaffolding function, encouraging people to perform behavior contrary to their original proclivities and going beyond what their individual learning alone affords them.

Finding 2: Receiving an Exploit narrative improved performance in the Stationary environment, but did not hinder performance in the Dynamic environment. The Explore narrative did not hinder or improve performance in either environment. The result for the effect of narrative on performance is consistent with Finding 1 and past literature that posits that social learning has adaptive benefits in select circumstances. Specifically, it is beneficial when it provides meaningful information about the environment that can guide people towards more adaptive decisions. The Exploit narrative *scaffolded* people to exploit, going against their proclivity to explore (Finding 1), despite experiencing occasional losses that may otherwise push them to explore. Thus, without explicitly describing the reward environment, the narrative provided a behavioral directive that would be adaptive to follow even if the participant remained unaware of their environment. By comparison, the Explore narrative tended to confirm people's proclivity to explore in uncertain environments when they are going by individual learning alone (i.e., no narrative control; Finding 1). So, the Explore narrative neither aided nor hindered their adaptation to the environment. In this case, their performance simply tracked the control condition without narrative social learning.

It's also possible that the lack of an adaptive effect of the Explore narrative was driven by our design. As described earlier, the amount of exploration/exploitation that is optimal varies on the reward payoffs. While we manipulated a static or dynamic environment, we held the numerical values of the reward probabilities constant. If a participant was randomly selecting against options in our task, we would expect them to find fruit 60% of the time, suggesting that the reward probabilities in our task were relatively high, i.e., the environment is bountiful and resource abundant. In a resource abundant environment, there is less cost to exploration, which may have biased even the control condition to favor exploration. As a result, we may have limited our ability to detect an effect of the Explore narrative on decision-making behavior. Future work should explore the effect of narrative influence across different levels of resource abundance.

Finding 3: Relevant aspects of people's experience were ignored when transmitting a narrative to others, with narratives received from others appearing more influential instead. While we did not detect an influence of the actual environment on which narrative participants chose to transmit, the perceived environment had some influence. Specifically, those who believed they were in a Stationary environment were more likely to transmit the adaptive Exploit narrative, while those who believed they were in a Dynamic environment were more likely to transmit the Explore narrative. Unfortunately, this generally did not result in adaptive information actually being transmitted, as beliefs about the environment were not well mapped to the experienced environment. We suspect this is driven by people's bias to interpret a non-deterministic reward as a dynamic environment, consistent with Finding 1. Instead, participants tended to transmit the story they received.

At first glance, the participant's passing on the narrative they received may be regarded simply as conformity. It may be an instance of "overimitation" in cultural learning where children accurately imitate an adult model's ritualistic behavior, almost stroke by stroke (e.g., Lyons et al., 2007). However, it may be better interpreted in the imitation-innovation framework (Legare & Nielsen, 2015). In this view, humans need to acquire cultural information flexibly. They need to acquire it as accurately as possible, if it is a traditional cultural convention to be maintained, but also to acquire new skills, if it is potentially more adaptive in the new circumstance. Children solve this problem by "overimitating" a cultural convention, and by adopting an innovative behavior in the context of instrumental learning. Turning this lens to the present case of cultural transmission, people may pass on conventional cultural information as accurately as possible, but transmit innovative cultural information based on their individual learning and experience. In the present experiment, we used highly stylized, folktale-like narratives. This may have lead some participants to treat it as if the task were the transmission of a cultural convention, disregarding their individual learning and experience, while others may have taken it at face value and transmitted advice they believed to be adaptive based on their beliefs. In this regard, it is interesting that the participants were likely to transmit a narrative that aligned with their environmental beliefs.

Limitations and Future Directions. Despite the insights this study provides, there are several limitations to be addressed in future research. First, improving the narrative-environment pairings to allow for better assessment of how narratives may impact behavior and performance in non-stationary conditions. On this end, it would be interesting to include questions post-task about the relevance of the narrative and whether or not participants followed the advice. This would help delineate the reasons why people were or were not influenced by narrative social learning. Furthermore, the narrative transmission component was highly restrictive in scope. While this allowed us to assess at the most basic level whether people would recognize and transmit adaptive information, it limited people's freedom to communicate more flexibly what they believed to be adaptive. Neither story, for example, encouraged employing both exploration and exploitation to achieve success, or suggested the possibility of cooperation and coordination—i.e., multiple agents taking complementary strategies of exploration and exploitation, and sharing their exploits if necessary to cover one another. It also did not allow us to explore whether adaptive information is retained over time or how content might change over iterations of transmission. To best see what variables impact the narratives that people produce, a serial reproduction task (for a review of this task, see Kashima et al., 2019) with greater diversity of narratives should be conducted to allow for multiple generations to reproduce and modify the narrative.

Conclusion

To summarize, this study found preliminary evidence that narratives can facilitate adaptive decision-making. That said, there is further research needed to clarify the mechanisms through which this occurs, specifically which properties of the narrative drive the effect and how these properties best perform the social learning functions of confirmation and scaffolding. Further, we found that incorporating personal experience into a narrative for transmission is not straightforward. Participants may pass on what they have heard if they have not perceived the nature of the environment and, thus, are not aware of a story's adaptive value. Future research is needed to better measure people's learning of the environment, and how their learning influences narrative transmission via their understanding of the environment. Nevertheless, this study is an important demonstration that there is fertile ground for classic experimental cognitive science paradigms to advance our understanding of rich anthropological phenomena in cultural evolution.

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