Preference for Normative Information Over Social Information: A Vignette Experiment Testing Content Bias at Three Phases of Transmission

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This study aimed to investigate norm bias, a novel type of content bias, in cultural transmission. Using online vignettes with 106 participants, we investigated whether participants preferred normative information over social information. Following the method of Stubbersfield et al. (2015), we examined norm bias in three transmission phases: choose-to-receive, encode-and-retrieve, and choose-to-transmit. The results showed that normative information was preferred over social information in the choose-to-receive and choose-to-transmit phases, but not in the encode-and-retrieve phase, suggesting that normative information may be more likely to be transmitted over social information.

Introduction

The process of information transmission within human societies is selective and biased rather than random, and certain types of information are more likely to be transmitted than others. In the field of cultural evolution, social or cultural informational transmission process has been investigated under the name of "social learning" (Laland, 2004). Two categories of social learning biases have been identified: context bias and content bias. Context bias is a preference for information that can be influenced by the environment or context, not from the information itself (Mesoudi, 2011). Examples are "majority bias" (Kameda et al., 2022), "prestige bias" (Henrich & Gil-White, 2001), or "frequency-dependent bias" (McElreath et al., 2008). As the name suggests, all focus on the number or properties of information holders. The other type of bias, which is the focus of this study, is content bias.

Content bias is a preference for certain information

(Boyd & Richerson, 1985; Henrich & McElreath, 2003; Richerson & Boyd, 2004). Various types of content bias have been identified (Stubbersfield, 2022): survival bias, a preference for content related to life and death or health (Nairne & Pandeirada, 2008); social bias, a preference for content related to social interaction and social relationships between individuals (Mesoudi et al., 2006); emotional bias, a preference for content that arouses some emotion highly (Eriksson & Coultas, 2014; Heath et al., 2001; Nichols, 2002); stereotype consistency bias, a preference for content that matches stereotypes (Clark & Kashima, 2007; Kashima, 2000; Lyons & Kashima, 2006); and minimally counterintuitive (MCI) bias, a preference for content that minimally violates intuitive expectations, such as physical laws (Barrett & Nyhof, 2001; Boyer, 1994; Norenzayan et al., 2006).

Content bias can function in three different transmission phases: the choose-to-receive phase (e.g., which stories one wants to read), encode-and-retrieve phase (e.g., which stories one remembers), and choose-to-transmit phase (e.g., which stories one talks to others about). As proposed by Eriksson and Coultas (2014), to test a content bias in informational transmission, the three phases of information should be considered. Stubblefield (2022) discussed that each content bias identified in previous studies can function differently in each of the three phases. Many studies investigating information transmission biases have focused only on the encode-and-retrieve phase, but Eriksson and Coultas (2014) pointed out the importance of focusing on both the choose-to-receive and choose-to-transmit phases. Between these two, the choose-to-transmit phase is considered to be particularly important in cultural evolution as this is the major force that spreads information (Stubbersfield, 2022).

This study proposes norm bias as a new content bias. Here, we define "norm" as a shared understanding of obligation, permission, and prohibition (Crawford & Ostrom, 1995). Previous empirical research has shown that people have a cognitive tendency to pay attention to norms. Young children have the ability to perceive a norm (Kalish, 2006) and can even enforce it on others (Rakoczy et al., 2008). Furthermore, studies utilizing Wason-selection tasks have shown that logical reasoning increases in the context of norm violation (Cosmides & Tooby, 1992). These studies suggest that humans possess a keen ability to detect norms.

Normative information is a type of social information, but as the aforementioned definition suggests, it is characterized by two key aspects. First, normative information refers to "what one ought to do" (i.e., obligation, permission, and prohibition; Crawford & Ostrom, 1995). Second, if the information is normative, we assume that it is already shared among the social group. This aspect of conventionality is an important characteristic of social norms (Rakoczy & Schmidt, 2013; Searle, 1995). Although the content bias of normative

information has not been studied exclusively, previous studies tested the content bias of conventional information in the domain of stereotypes (Clark & Kashima, 2007; Kashima, 2000; Lyons & Kashima, 2006). Stereotypes are socially shared information (i.e., convention) that plays a role in both individual and collective cognitive processes (Kashima, 2000; Lyons & Kashima, 2006) and creates common ground among those who share the stereotypical information (Clark & Kashima, 2007). This common ground increases social connectivity (e.g., social bonding or belonging) among informational senders and receivers (Clark & Kashima, 2007). A line of experimental studies suggested that stereotype-consistent information is more likely to be transmitted when the information sender has communicative intention with the receivers (Clark & Kashima, 2007; Kashima, 2000; Lyons & Kashima, 2006). This is because the function of stereotype-consistent information lies in its social sharedness and conventionality, aiming to create common ground among informational senders and receivers (Clark & Kashima, 2007).

Social norms have the same conventional aspect as stereotype-consistent information because it is thought to contribute to form a common normative ground between informational senders and receivers. Hence, while a previous study already showed social bias (a preference for social information; Mesoudi et al., 2006; Stubbersfield et al., 2015), we considered normative information to show an even stronger preference among social information in the choose-to-transmit phase. In this study, we experimentally tested the presence of norm bias in transmitting information.

It may also be possible that norm bias functions in the choose-to-receive phase. Previous studies suggested that we have selective attention toward norms (e.g., cheater detection; Cosmides & Tooby, 1992), which could probably lead to a preference for receiving normative information. However, being selectively attentive to norms is not the same as being selective in receiving norms, and there is lack of evidence, thus we have not formulated any specific hypotheses regarding the choose-to-receive phase.

Overview of studies
In the experiment, participants were asked to imagine themselves living in a certain society and to receive, memorize, and transmit information about that society. Participants faced three tasks that corresponded to each of the three transmission phases. Participants were shown titles that accurately represented the vignettes and asked which vignette they would like to receive information about (choose-to-receive phase). Next, participants were presented with the details of vignettes only once, and, on the next page, without any waiting time, they were asked what they remembered about them (encode-and-retrieve phase). Finally, participants were shown the vignettes again and asked which vignette they would like to transmit to others (choose-to-transmit phase). This was done to clarify their preferences in each phase.

Following Stubbersfield et al. (2015), before this main experiment, we also conducted a pilot study to select appropriate vignettes to use in the main study. To test our hypothesis, we prepared two types of vignettes: "social vignette," which involves social interactions between individuals and seems to give rise to social bias, and "norm vignette," which involves norms and seems to give rise to norm bias and social bias. Note that normative content is social by definition, but not all social content is normative. We set the social vignette condition to differentiate norm bias from social bias. Additionally, in the pilot study, we set control vignette conditions. However, as we explain later, we failed to identify a valid "neutral" vignette that did not raise any type of content bias. Thus, we were only able to identify the valid norm vignette and the social vignette with the pilot study.

Pilot study
Methods
(a) Participants
A total of 100 participants were recruited by iBridge (a research company). Among them, 26 were excluded (those who chose the same item throughout the entire questionnaire). Thus, data from 74 participants were analyzed (35 males, 39 females, $M_{age} = 34.39$, $SD = 10.24$).

(b) Materials
This study followed Stubbersfield et al. (2015). There were a total of nine vignettes, each containing 14 propositions. The length of the vignettes was within the range of 138–142 characters in Japanese. Among the nine, three were designed to contain normative information (norm vignette), three were designed to contain social information (social vignette), and three were designed to not include information that can cause content biases and contain neutral information (control). For this neutral information, we chose the topic of climates and geography, following previous studies (Mesoudi et al., 2006; Stubbersfield et al., 2015).

(c) Procedure
Participants participated via a research firm (iBridge) and responded based on a form provided by the research firm. They were asked to read each of the nine vignettes and answer six questions (see Supplementary Materials, section A; Stubbersfield et al., 2015) to evaluate norm vignettes, which contained normative and social information, social vignettes, which contained only social information, and control vignettes, which contained none of the information that arouse content biases. Participants rated the content of the stories using a 7-point Likert scale.

Results
We visualized the scores of six items for each vignette (see Supplementary Materials, section B), then analyzed them using the same statistical model as Stubbersfield et al. (2015). For each vignette, we applied a one-way analysis of variance (ANOVA) among items. After applying Bonferroni's correction ($\alpha = .0033$), we found that only in one vignette (here after referred to as Vignette A; see Supplementary Materials, section C), the scores for the social information item and norm information item (see Supplementary Materials, section A) were significantly higher than the scores for all other items ($F(5, 365) = 26.49$, $p < .001$, $\eta^2 = .27$). Therefore, Vignette A was selected as the norm vignette ($M_{norm} = 5.08$, $SE = 0.16$, $M_{social} = 5.23$, $SE = 0.18$).

Similarly, the ANOVA result showed that only in one vignette (hereafter referred to as Vignette B; see Supplementary Materials, section C), the score for the social information item was significantly higher than the scores for all other items ($F(5, 365) = 18.21$, $p < .001$, $\eta^2 = .20$). Thus, we selected Vignette B for the social vignette ($M_{social} = 4.89$, $SE = 0.18$).

Ideally, as Mesoudi et al. (2006) and Stubbersfield et al. (2015) did, we should have tested a control vignette. However, we ultimately were unable to do that because the three vignettes which were designed to be neutral included environmental or geographical information that was rated to have a high score for survival bias item in our result. This is unexpected since, in the original studies, those vignettes were rated as neutral (score for survival bias was not high). Thus, we only identified the norm vignette and the social vignette in our study.

Main study
Methods
(a) Participants
A total of 109 Japanese participants were recruited via Lancers (a crowdsourcing service) to answer questions in Qualtrics (online survey platform). Among those participants, three were excluded because their answers in the encode-and-retrieve phase were nonsense syllables. Thus, data from 106 participants were analyzed (60 males, 45 females, 1 other, $M_{age} = 44.69$, $SD = 7.92$).

(b) Design
The experiment consisted of three tasks: the choose-to-receive task, encode-and-retrieve task, and choose-to-transmit task. All three tasks used a within-participants design, and two types of vignettes were used: social and norm vignettes. The order of the vignette was counterbalanced.

(c) Materials
We used two vignettes selected in the pilot study. Vignette A included normative information, and Vignette B included social information (see Supplementary Materials, section C).

(d) Procedure
All tasks were conducted using Qualtrics. In the following three tasks, participants were instructed to imagine that they were moving to a new social environment. Those tasks were conducted as follows. The experimental platform consisted of multiple online pages. Participants were instructed to read the instructions on each page or complete the tasks requested. Upon completion, they were instructed to press the button to proceed to the next page. Once participants moved on to the next page, they were unable to return to the previous page.

(i) Choose-to-receive task
Participants were shown the titles of vignettes without revealing their details. They were asked to select which title they were most interested in knowing more about.

(ii) Encode-and-retrieve task
Participants were asked to read both vignettes silently,

from beginning to end, without taking any notes. After they finished reading, without any waiting time, they were instructed to write down everything they remembered on the next page, without looking at the vignettes. There was no time limit, and no distracting task was given after reading.

(iii) Choose-to-transmit task
Participants were asked to read the vignettes again (without any time limit) and imagine that there was someone else who was also moving to the new social environment. They were asked which information they would prioritize sharing with another person who had no information about the new environment and had not read the vignettes.

Results
Below, we reported the result of each task separately. All analyses were conducted with JASP (Jeffreys's Amazing Statistics Program). This software is a free and open-source statistics package developed by the University of Amsterdam (https://jasp-stats.org/). Results are visualized in Figure 1.

(a) Choose-to-receive task
We tested whether the proportion of those who chose the norm vignette was significantly higher than those who chose the social vignette. As shown in Figure 1A, the norm vignette (86%, $n = 91/106$) was more likely to be chosen than the social vignette (14%, $n = 15/106$) (binomial test, $p < .001$), suggesting that participants preferred to receive normative information rather than merely social information.

(b) Encode-and-retrieve task
To measure how much participants memorized information, we used proposition analysis (Kintsch, 1974), whereby text data input by a participant is divided into propositions, and then the number of retrieved propositions is counted. The mean number of retrieved compositions was compared between the two vignettes. As shown in Figure 1B, a *t*-test revealed no significant difference between the vignettes with normative and social information ($M_{norm} = 3.63$, $SD = 2.49$, $M_{social} = 3.68$, $SD = 2.09$, $t(105) = -0.189$, $p = .85$, $d = -0.018$). The normativity of information did not contribute to the encode-and-retrieve phase.

(c) Choose-to-transmit task
We tested whether the proportion of those who chose the norm vignette was significantly higher than the social vignette. As shown in Figure 1C, the vignette that included normative information (85%, $n = 90/106$) was significantly preferred over the vignette that included social information (15%, $n = 16/106$) (binomial test, $p < .001$), suggesting that participants preferred to transmit normative information rather than merely social information.

Discussion
The objective of the present study was to investigate how norm bias can function in the three transmission phases proposed by Eriksson and Coultas (2014). As we hypothesized, for the choose-to-transmit phase, there was
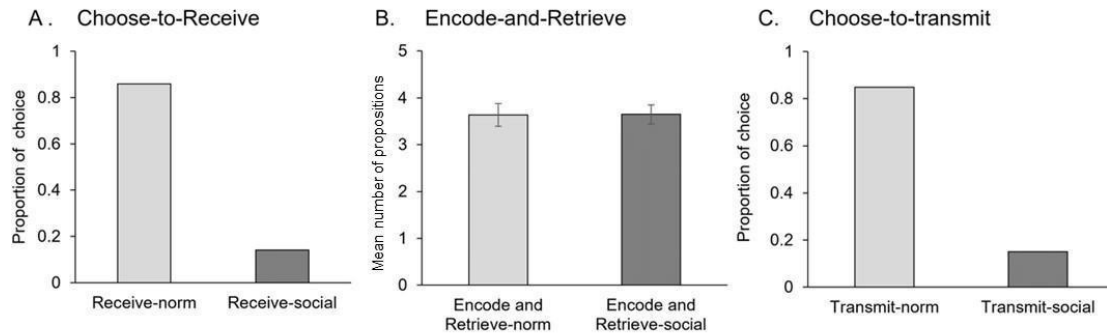
Figure 1. Participants' responses on the norm vignette and the social vignette in three phases (A: Choose-to-receive phase; B: Encode-and-retrieve phase; C: Choose-to-transmit phase). Error bars show standard errors of means.

a stronger preference for the vignette containing normative information than the one containing social information alone. For the other two transmission phases, we found norm bias in the choose-to-receive phase but not in the encode-and-retrieve phase.

First, the result in the choose-to-transmit phase was consistent with our hypothesis. Like stereotype-consistent information, normative information was significantly preferred in the choose-to-transmit phase. Previous studies have shown that stereotype-consistent information is more effectively transmitted when the information senders have communicative intention with receivers (Lyons & Kashima, 2006). This is because shared stereotype-consistent information can have a function to increase social connectivity between the information sender and the receiver (Clark & Kashima, 2007). Thus, normative information may be preferred in the choose-to-transmit phase because norm bias may serve a similar function to stereotype-consistency bias. Moreover, although norm bias is considered to be part of social bias, the difference between social information and preferences at the three phases suggests that norm bias is not exactly the same as social bias and the two can be separate.

Second, although we did not have a hypothesis, the result also shows norm bias can function in the choose-to-receive phase. However, the result is understandable given that young children and adults quickly perceive norms (Cosmides & Tooby, 1992; Rakoczy et al., 2008). The bias in normative information in receivers should enable more efficient norm transmissions.

There are several limitations to the present study. To test the norm bias in social transmission, we chose a context unrelated to morality. However, moral norms are an important topic to be explored. As moral foundation theory (Graham et al., 2013) or morality as cooperation theory (Curry et al., 2019) suggests, human morality can be separated into several domains, and each domain can be related to certain cooperation or evolutionary problems. Thus, it will be interesting to test whether norm bias functions similarly in each moral domain. Our vignette experiment also showed that we have biases in transmitting social norms, but the current result was only obtained in a controlled experimental setting. Further studies, such as those focusing on folkloristic materials, might test whether normative information is preferred in actual social traditions. Future research in these directions

should also be encouraged.

Author contribution
M.K., J.A., and Y.N. designed the study. M.K. and Y.N. conducted the research. M.K. conducted the data analysis. M.K. and Y.N. wrote the manuscript.

Ethical statement
The research was conducted in accordance with the protocol approved by the ethics committee of Keio University (ID: 220110202) and in accordance with the ethical guidelines of Keio University.

Data accessibility & program code
The dataset is attached as the Supplementary Dataset.

Supplementary material
Electronic supplementary materials are available online.

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