Cultural Differences in Vicarious Optimism

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Abstract

Prosocial behaviour is impacted by the beliefs people have about others. The maintenance of these beliefs is biased: people are *vicariously* optimistic when forming beliefs about the future of others they care about. This vicarious optimism impacts prosocial behaviour and might be shaped by the culture people live in. We investigated this question by measuring learning from good and bad news for oneself, friends, and strangers in a large, pre-registered study of Chinese and American participants (N=963). American participants updated their beliefs in response to better-than-expected "good news," but neglected worse-than-expected "bad news" when learning about themselves (optimism bias) and others (vicarious optimism) compared to Chinese participants. Chinese participants showed vicarious optimism only when learning about a friend, while American participants showed the most vicarious optimism when learning about an identifiable stranger. Our results provide evidence that culture might shape social behaviour by biasing learning about the future of others.

Belief, learning, prosocial, culture, optimism

Cultural Differences in Forming Beliefs about Others

Beliefs about the future outcomes of others shape social behavior. These beliefs matter in all areas of social life, from low-level process such as how people visually perceive the actions of others (Schwarz et al., 2018) to how people and society behave towards others (Schwarz et al., 2016). For instance, a parent might have beliefs about how likely their child is to succeed in school, and these beliefs might be more optimistic than the beliefs of the child's teacher. The beliefs parents and teacher form about the likelihood of academic success will impact then the child's actual academic success (Davis-Kean, 2005; Rosenthal & Jacobson, 1968; Tenenbaum & Ruck, 2007). Believing that academic success is likely will lead parents and teacher to behave accordingly, offering challenges and support in line with their beliefs (Friedrich et al., 2015). Just as beliefs about one's own future matter for achievement, happiness, and health (Carver & Scheier, 2014; Sharot, 2011), so do the beliefs other people form about one's future. But how are these beliefs about the future of others formed? While the formation of beliefs about one's own future have received tremendous attention (Sharot & Garrett, 2016), relatively little is known about the factors that impact the formation of beliefs about the future of others.

When forming beliefs about others, people start with an initial belief about the likelihood of success, and then update their beliefs when learning more. Recent work suggests this learning process is impacted by how much a person cares about the person they are learning about (Kappes et al., 2018). In particular, the more they care, the more they will show *vicarious optimism* when learning about the other person's future, leading them to neglect bad news (information suggesting that chances for success are worse than expected) while readily incorporating good news (information suggesting that chances for success are better than expected) (Kappes et al., 2018). This impact of concern for the other person helps to explain why parents might be able to sustain more optimistic beliefs about their child's future

than the child's teacher; the parents might neglect to integrate negative news into their beliefs, while the teachers do not. Importantly, this vicarious optimism then impacts subsequent behaviour towards the child: the more vicariously optimistic parent or teacher are, the more likely they will be to help the child succeed (Kappes et al., 2018).

Given the crucial role beliefs about the future of others play in guiding social behaviour, it is important to examine how culture – whose primary function is to regulate social behaviour (Markus & Kitayama, 1991; Triandis, 2018) – impacts the formation of such beliefs. If the formation and maintenance of beliefs about the future of others impacts social behaviour, then cultural settings would need to impact the formation of these beliefs as well to successfully regulate social behaviour amongst its members. For instance, if a child is a student in America, would their parents and teachers form different beliefs about the child's future than if the child is a student in China? Culture has been shown to impact the concern people feel for different categories of others (Hofstede, 2001; Markus & Kitayama, 1991; Santos et al., 2017; Triandis & Gelfand, 1998) as well as the level of optimism in their beliefs about their self (Heine et al., 1999; Heine & Hamamura, 2007). These two factors are related to how people form beliefs about the future of others (Kappes et al., 2018), suggesting that culture will impact how much vicarious optimism people show when forming beliefs about others.

In the present research, we conducted a large, pre-registered experiment to investigate differences between American and Chinese participants in how they *form* and *maintain* beliefs about others and themselves. While previous research extensively studied the beliefs people have in various cultural settings, we were interested in examing the underlying *learning process*. If people, for instance, are more optimistic about the future of a friend in one cultural setting compared to another, then what is the underlying process that leads to the formation of these different beliefs? Similarly, with respect to self-regarding beliefs – what is

the mechanism that might lead to cultural differences in the beliefs people have about their own future? Put differently, one might state that we know that culture impacts the beliefs people have, but that we do not know why how cultural settings achieve this. And finally, this research also focuses on a topic that received relatively little attention in cultural psychology, the concern Americans feels for other people. While much attention has been paid in cultural comparisons to American's individualism and self-regarding tendencies, less is known about how much Americans comparatively care for others.

Optimism in Forming Beliefs about the Self and Others

Most people hold optimistic beliefs about their future in general (Carver & Scheier, 2014; Uchida et al., 2018), about specific future events (Shepperd et al., 2015), and about their own abilities (Taylor et al., 2000). The prevalence of optimistic beliefs in all areas of life suggests that people, somehow, have the ability to maintain optimistically skewed beliefs even when encountering contradicting evidence. In the last decade, research showed that a pervasive learning bias underlies the development and maintenance of these optimistic beliefs; people change their beliefs about their future more readily when confronted with good news compared to bad news (Garrett et al., 2014; Korn et al., 2014; Kuzmanovic et al., 2015; Moutsiana et al., 2013; Sharot et al., 2011; Sharot, Guitart-Masip, et al., 2012; Sharot, Kanai, et al., 2012). For instance, people readily change their beliefs when learning that their chance of getting divorced once during their lifetime is lower than expected, but resist updating these same beliefs if they learn their chance of getting divorced is higher than expected.

This optimistic learning bias is related to unrealistic optimism, biased self-perceptions, and flawed financial beliefs (Eil & Rao, 2011; Kuhnen, 2014; Peysakhovich & Karmarkar, 2015; Russo et al., 1996; Sharot et al., 2011) and might be fuelled by self-enhancing motivations (Greenwald, 1980; Taylor & Brown, 1988; Weinstein, 1980). People

want to see themselves and their future positively, which potentially leads them to reject unwanted bad news relative to good news. Conversely, people who lack self-serving motivations (e.g., depressed people) not only lack optimistically biased beliefs (Sharot, 2011), but also fail to show the underlying optimistic learning bias (Garrett et al., 2014; Korn et al., 2014).

A series of studies recently showed that people not only have an optimistic learning bias for beliefs about their own future, but also a vicariously optimistic bias for beliefs about the future of people they care about (Kappes et al., 2018). For instance, in one study, participants either learned that person X was willing to give up a substantial amount of money to save a stranger from electric shocks (likeable person) or that person X was not willing to give up money to save a stranger from electric shocks (unlikable person) (Study 3). Thereafter, all participants performed a vicarious learning task about the future of person X. Results of this preregistered study showed that participants had substantial vicarious optimism when forming beliefs for the likeable version of person X, but not for the unlikable version. Similarly, manipulating the concern for a stranger, by making them identifiable (Study 2a, b) increased vicarious optimism for the stranger. And the degree of vicarious optimism for strangers was predictive of altruistic behavior toward similar strangers (Study 4).

Taken together, these findings suggest that optimism is not restricted to learning about one's own future outcomes and that vicarious optimism indexes concern for others. When forming beliefs about the future of another person people care about, they readily update their beliefs readily when presented with good news that indicate success is more likely than expected but will do so only weakly when presented with bad news that indicate success is less likely than expected. Participants in these studies showed a protective mechanism that helps to maintain optimistic beliefs about the future of people they care about. Since these optimistic beliefs are a key determinant of prosocial behaviour, vicarious optimism might be

an important process helping to maintain people's prosocial behaviours towards other people. Furthermore, vicarious optimism might also protect people from worrying about people they care about, providing similar benefits as an optimistic bias when learning about the self.

Cultural Differences in Belief Formation about Others

Cultural differences in the beliefs about oneself and one's own future have been extensively studied (Dufner et al., 2019; Heine et al., 1999; Heine & Hamamura, 2007). However, relatively little is known about the differences in the formation and maintenance of these beliefs. What are the learning processes that give rise to cultural differences in beliefs?

Vicarious optimism when learning about the future of other's is driven by the concern people feel for the specific person they are updating their beliefs about (Kappes et al., 2018). Because cultural settings differ in the concern they instil for other people (Hofstede, 2001; Markus & Kitayama, 1991; Santos et al., 2017; Triandis & Gelfand, 1998), this suggests that vicarious optimism will be impacted by how much a cultural setting suggests concern for different members of society. Western cultural settings are characterized by an individualistic stance which promotes concern for strangers by stressing universal human rights and the dignity of each individual (Schwartz, 1990). Stronger individualism is related to stronger volunteering and charitable giving towards strangers (Allik & Realo, 2004; Kemmelmeier et al., 2006). Yet, such concern for strangers might come at the expense of closer social relationships with family and friends (Triandis et al., 1985; Vandello & Cohen, 1999). Individualistic cultural settings have higher divorce rates (Lester, 1995) and individualistic people as well as people in individualistic cultural settings show less of a difference in their loyalty to their friends compared to strangers (Talhelm et al., 2014).

In contrast, one central feature of collectivist cultural settings is that they make a sharp distinction between friends and strangers, and how much one should care for them (Triandis et al., 2001). East Asian cultural settings such as China emphasize interdependence

with and concern for family and friends (Grossmann & Na, 2014), potentially at the expense of concern for strangers (Triandis et al., 2001). For instance, stronger endorsement of interdependence is associated with stronger motivations to help family and friends, but not strangers (Janoff-Bulman & Leggatt, 2002). Similarly, people in collectivistic cultural settings are more likely to show loyalty to their friends compared to strangers (e.g., nepotism) than people in individualistic cultural settings. Since concern for others drives vicarious optimism (Kappes et al., 2018), cultural differences in concern for friends versus strangers imply there may be cultural differences in vicarious optimism directed towards friends vs. strangers. Hence, one potential reason why people in individualistic cultural settings show more prosocial behaviour towards strangers than people in collectivistic cultures might be that in the former, they form and maintain more optimistic beliefs about the future of strangers.

However, individualistic cultural settings might not universally increase the concern people feel for strangers, rather only for those strangers that fit within the individualistic meaning-making framework (Markus & Kitayama, 1991). Manipulations aimed at increasing the concern people feel for others highlight the specificity of how cultural settings influence concern for strangers. In Western cultural societies, individualising a person with a name and photograph increases the concern people feel for that person (Jenni & Loewenstein, 1997; Kogut & Ritov, 2005). This manipulation has also been shown to increase vicarious optimism for strangers in participants in the US (Kappes et al., 2018). Yet, for more collectivist cultural settings, individualising does not increase the concern people feel for another person (Kogut et al., 2015). Hence, it seems reasonable to predict that individualizing strangers will increase vicarious optimism for American participants, but less so in Chinese.

Vicarious optimism is also partially related to optimism in learning for the self (Kappes et al., 2018), and cultural differences in vicarious optimism might additionally emerge

because different cultural settings might modulate learning biases for the self. While the optimism bias in learning about one's own future has been studied mostly in Western countries (US, UK, Germany), Chinese participants show an optimistic learning bias about the self as well (Ma et al., 2016). However, at the moment, we do not know if participants in individualistic cultural settings exhibit different levels of an optimism bias when learning about the self, compared to participants in collectivistic settings. However, since optimistic beliefs for oneself are stronger in individualistic cultural settings than collectivist ones (Heine et al., 1999; Heine & Hamamura, 2007), this suggests that American participants will exhibit a stronger optimistic bias in learning compared to Chinese participants. And since the stronger the optimism in learning for self, the stronger the vicarious optimism (Kappes et al. 2018), one might additionally suggest that American participants will exhibit stronger vicarious optimism when learning about others in general compared to Chinese participants.

The Present Research

We investigated if the cultural setting changes the way people maintain beliefs about the future of others and the self. We suggest that cultural settings shape vicarious optimism in belief formation via two factors. First, we preregistered two specific hypotheses about the relation of culture and vicarious optimism for friends relative to strangers. We predicted that Chinese participants would show stronger vicarious optimism when learning about the future of a friend than a stranger, and that for Chinese participants, individualising a stranger would have little impact on vicarious optimism. In contrast, for the American participants, we predicted that vicarious optimism would differentiate less between friends and strangers than for Chinese participants, and that individualising a stranger would increase vicarious optimism. Second, culture is related to optimism, and optimism in learning for the self is related to vicarious optimism (Kappes et al., 2018). This line of reasoning suggests that American participants would show stronger vicarious optimism overall than Chinese, fuelled

by a stronger optimism bias in learning for the self. We preregistered our prediction of stronger optimism bias for self for American compared to Chinese participants[1].

We tested these predictions in a large sample of American and Chinese participants recruited online. American participants often score highest on optimism and individualism when compared to other countries (Hofstede, 2001; Markus & Kitayama, 1991; Triandis & Gelfand, 1998); two factors that we assumed would drive potential differences in vicarious optimism. In contrast, Chinese participants are comparatively less optimistic and individualistic than American participants, even though differences within the country exist (Talhelm et al., 2014). Hence, a sample of American and Chinese participants would allow us to test the above outlined predictions between collectivistic and individualistic cultural settings in learning about the self and others.

We measured optimism for self and others with variations of a well-established learning task (Figure 1) (Kappes et al., 2018; Sharot et al., 2011). Participants had to imagine a series of negative life events happening to a specific person (target). In the self-version, participants imagined these life events happening to themselves, in the other-version, participants imagine the life events happening to either a friend, a stranger introduced with a picture and a name (identifiable stranger), or an anonymous stranger (unidentifiable stranger). After imagining the life events, participants estimated how likely it was that the event would happen to the target in the future. This first likelihood estimate indicates their initial belief, and corresponds closely to what previous research measured when investigating difference in optimism (e.g., Heine et al., 1999; Heine & Hamamura, 2007). However, we are interested in examining how these beliefs were changed and maintained when receiving new information. Hence, after indicating their initial estimate, participants thereafter learned the actual likelihood that the negative life event would happen on average to a person like the target.

[1] https://osf.io/twr7e/?view_only=3a9c286faedc4dd78aca53c9888244ce

This likelihood information determined whether participants received good or bad news. Good news were defined as receiving an average likelihood below what the participant initially expected, thereby learning that a negative life event is less likely to happen to the target than expected. Bad news were defined as receiving an average likelihood that is higher than the initial estimate, thereby learning that a negative life events is more likely to happen to the target than expected. Thereafter, participants estimated again how likely they thought it was now that the negative life event would happen to the target. The difference between the first and the second estimate, or update, allows one to compute how much participants changed their estimate when receiving either good or bad news, indicating the underlying learning process.

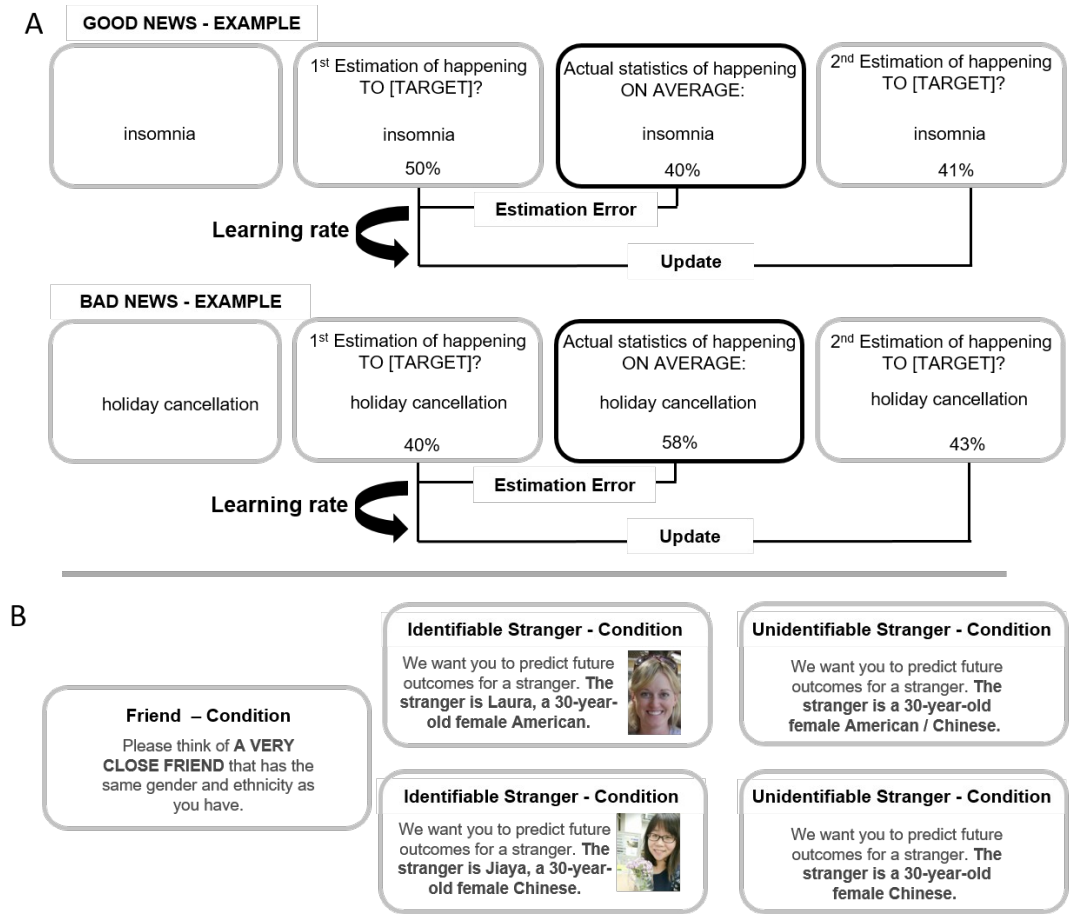


Fig 1. (A) Learning Task. Participants imagined a negative event happening to a target individual (themselves, a friend, or stranger), estimated the likelihood of the event happening to the target, learned about the average likelihood for that event, and finally re-estimated the

likelihood. A “good news” event (top) was defined by a first estimate that was higher than the average likelihood. The estimation error was then calculated by subtracting the first estimate from the average likelihood and update was calculated by subtracting the second estimate from the first estimate (good news update = first estimation – second estimation). The learning rate indicated how well the estimation error predicts subsequent update. A “bad news” event (bottom) was defined by a first estimate that was lower than the average likelihood. The estimation error was then calculated by subtracting the average likelihood from the first estimate and the update was calculated by subtracting the second from the first estimate (bad news update = second estimation – first estimation). Again, the learning rate indicated how well the estimation error predicts subsequent update. (B) Three Other – Conditions: Predicting the future for a friend (left), an unidentifiable stranger (middle) or an identifiable stranger (right).

Methods

Participants

For the American sample, we recruited participants via Mturk.com and paid them $2.40 in line with US minimum wage. Participants had to live in the Unites States and their first language had to be English. Of the sample, 71.8% self-identified as white, 10.7% as black, 8.6% as Hispanic, 6.4% as Asian Western, and 2.6% as other. For the Chinse sample, we recruited participants via Sojump and paid them 15 RMB (about $2.40). Participants had to live in China, and all participants self-identified as Chinese. All participants were between the ages of 18 and 30. The age limit was based on pilot data that showed that American participants recruited online tended to be older than Chinese participants.

Our target sample size was 1200, with 600 American and 600 Chinese participants. We used the software program G*Power to conduct a power analysis. Our goal was to obtain .80 power to detect a small to medium effect size of f = .1 - .3 at the standard .05 alpha error probability for most of our comparisons. Since we do not know the effect sizes of potential cultural differences, we chose a power of .8 to detect potential small to medium effect sizes between the conditions (see preregistration for details).

We recruited 1204 participants but lost 51 American participants due to a programming error and hence ended with 1153 participants, 605 Chinese and 549 American participants (M age: 25.26, SD = 3.2, 522 female, 632 male). In line with our preregistration and to ensure the reliability of our measures (i.e., learning rates, updates; Kappes et al., 2018), participants had to provide at least three valid updates after good and three valid updates after bad news per learning task (i.e., task for self and others) and had to change their initial estimates on more than 20% of the trials. We had to exclude 191 participants, using these criteria, leaving a total of 963 participants (518 Chinese participants, 445 American participants, see SOM-R for demographic differences between the samples).

The study had a 2 (within: learning about self versus learning about other) x 3 (between: learning about friend versus identifiable stranger versus unidentifiable stranger) x 2 (between: American versus Chinese participants) mixed factor design.

Procedure and Materials

All materials can be found at OSF[2]. After indicating their demographics, participants were randomly assigned to either start with the Self condition of the learning task, or with one of the three Other conditions of the learning task (see Figure 1). The latter was either the Friend condition, Identifiable Stranger condition, or Unidentifiable Stranger condition. For the Friend condition, participants were prompted in the beginning to name a friend of theirs that they felt very close to and who had the same gender and a similar socio-economic and educational background. For the Identifiable Stranger condition, participants were introduced first to a stranger by reading their name and a short description about the person as well as seeing a picture of the stranger. For the American participants, they saw different American strangers, matched to participants' gender. For the Chinese participants, they saw different Chinese strangers, again matched to participants' gender. For the Unidentifiable Stranger

[2] https://osf.io/twr7e/?view_only=3a9c286faedc4dd78aca53c9888244ce

condition, participants read the same description of a stranger as in the Identifiable Stranger condition but did not see a name or a picture of the stranger.

In each condition, participants saw 30 different short descriptions of negative life events (e.g., luggage lost by airline) presented in a random order. We used 30 different events for the Self condition and the Other conditions of the learning task (lists were randomly assigned to either the Self or Other conditions). We ensured that base rates used for feedback were normally distributed around the midpoint of the scale we used, such that there was equal room for providing over- and underestimations (see Garrett & Sharot, 2016, for details). The lists of events did not include very rare or very common events, and participants were told that the average likelihood was never lower than 3% or higher than 77%. The first list had a mean base rate of 26.93 (SD = 15.67, Minimum 6, Maximum 58), the second list had a mean base rate of 27.13 (SD = 13.87, Minimum 10, Maximum 69).

In line with previous research, we calculated two different dependent variables to assess the optimism bias for the self, friend and the two strangers: an update bias and a learning rate bias (see Chowdhury et al., 2014; Garrett et al., 2014; Garrett & Sharot, 2014; Kappes et al., 2018; Kappes & Sharot, 2018; Korn et al., 2014; Moutsiana et al., 2013; Sharot et al., 2011; Sharot, Guitart-Masip, et al., 2012; Sharot, Kanai, et al., 2012). First, we calculated the difference in belief updating in response to good and bad news. Trials were classified as good news when the base rate was lower than participants' first estimate of the likelihood of the negative event happening, and as bad news when the base rate was higher than participants' first estimate of the likelihood of the event happening. Update for good news was calculated by subtracting the second estimate from the first estimate (good news update = first estimation – second estimation); higher numbers indicate that participants lowered their estimate (e.g., good news update of 10 = first estimation 40% - second estimation 30%). Update for bad news was calculated by subtracting the second from the first

estimate (bad news update = second estimation – first estimation); higher numbers indicate that participants increased their estimate (e.g., bad news update of 10 = second estimation 40% - first estimation 30%). An update bias variable was created by subtracting the update after good news from the update after bad news.

Second, we calculated the learning rate for good and bad news. The learning rate indicates how well participants integrate good news and bad news into their beliefs (e.g., Moutsiana et al., 2013; Sharot et al., 2011), and is specified by the predictive relation between the estimation error and the subsequent update. For good news, we calculated for each person the unstandardized regression coefficient between the estimation error (here: 1st estimation – base rate) and the update (here: 1st estimation – 2nd estimation). For bad news, we also calculated for each person the unstandardized regression coefficient between the estimation error (here: base rate – 1st estimation) and the update (here: 2nd estimation –1st estimation). Higher numbers for both learning rate for good news and bad news indicate a better integration of the unexpected evidence into the updated belief. A learning rate bias variable is created by subtracting the learning rate for good news from the learning rate for bad news. Given that both indicators were associated with the same pattern of results, we report the learning rate results here and the update bias results in the Supporting Information (SOM-R).

As preregistered, to control for influences of different first estimates and estimation errors between both conditions (Garrett & Sharot, 2014; Kappes et al., 2018), we entered the mean differences in estimation errors for good and bad news for each condition as co-variates in the analyses below. The learning process is influenced by the starting point (initial estimate or belief) and the distance between this starting point and the average likelihood information. For instance, a person who has an initial estimate of 50, might then receive an average likelihood information of 40, and in response change to their belief to 45 (update of 5).

Another person who has an initial estimate of 60 for the same event might go down to 50 (update of 10). Importantly, in this example, the difference in update can completely be explained by the difference in estimation error (the difference between the first estimate and then average information). So, to ensure that the differences between cultural settings reported below are, for instance, not related to differences in the first estimate participants gave, but rather are related to differences in the subsequent learning process, we controlled for the difference in estimation errors in line with the methodological recommendations on measuring biases in learning (Garret & Sharot, 2014; 2017; Sharot & Garret, 2021). For instance, if American participants made on average higher first estimates for negative life events happening to them, then they would receive good news with larger estimation errors. Such larger estimation errors would then lead American participants to learn more from good news compared to Chinese participants, simply as a function of the different estimate errors. Controlling for average differences in estimation errors excluded this possible alternative explanation (Garrett & Sharot, 2017).

Individual Difference Measures related to Cultural Orientation

At the end of the survey, participants filled out various standardized questionnaires to measure individual differences (see SOM – Methods, for full list of materials, Means, SDs, and correlations). In order to measure cultural differences in self-construal, we used the Self-Construal Scale (Singelis, 1994). People in Western cultural settings tend to think of themselves as unique and separated from others (independent self-construal), while people in East Asian cultural settings tend to view themselves as connected to others and embedded in relationships (interdependent self-construal). We further measured horizontal and vertical dimensions of individualistic and collectivistic orientations (Triandis & Gelfand, 1998). Participants high in vertical collectivism perceive themselves as part of a collective, while accepting inequalities. In contrast, participants high in horizontal collectivism see themselves

also as part of a collective, while rejecting inequalities. Participants high in vertical individualism see themselves as independent individualists and accept inequality, while participants high in horizontal individualism do not accept inequality.

Results

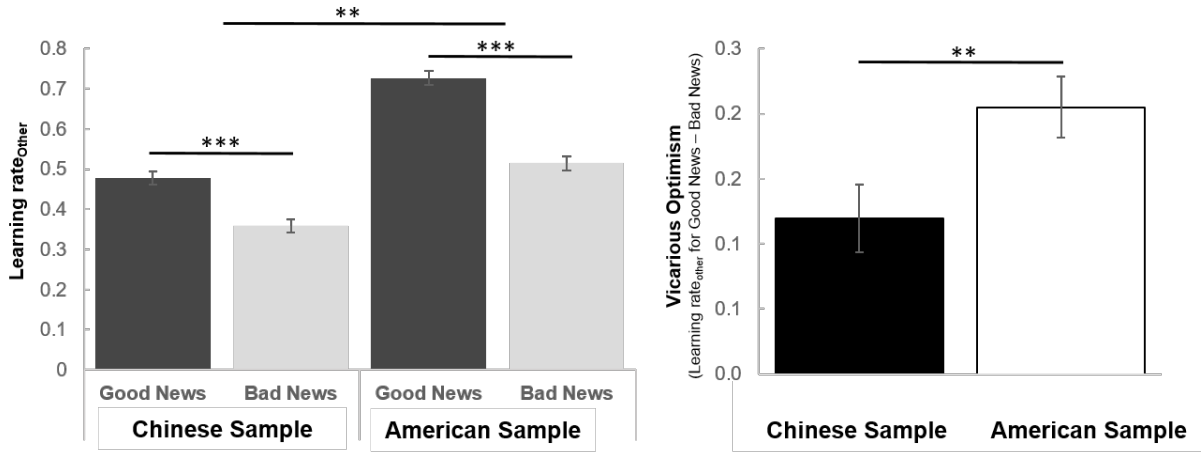
Cultural Differences in Vicarious Optimism

First, we wanted to test if cultural differences in vicarious optimism exist, and if these cultural differences depend on the target of learning. We examined these questions by using the learning rates as dependent variable (we report the same set of analysis for the update in the SOM Results) and entered into a mixed ANOVA valence (good news versus bad news) as within-subject variable, and Other condition (Friend versus Identifiable versus Unidentifiable Stranger), as well as culture (Chinese versus American) as between-subject variables. As preregistered, we controlled for the difference in prediction errors between good news and bad news in all the relevant analyses reported below.

We replicated past research showing vicarious optimism in learning about the future of others: participants favored good news over bad news when learning about the future of others (main effect of valence: $F(1,956) = 102.14$, $p < .0001$, $\eta^2 partial = .10$). We also find a main effect for culture, $F(1,956) = 154.61$, $p < .0001$, $\eta^2 partial = .14$, showing that Chinese participants had on average lower learning rates than American participants (Figure 2, left). The finding that Chinese participants changed their beliefs less in response to new information (independent of the type of news they received) than American participants was unexpected, at might be caused by a host of different variables, which we will address in the Discussion. Importantly, we found an interaction effect between culture and valence, $F(1,956) = 6.93$, $p = .009$, $\eta^2 = .007$. Chinese participants showed on average less vicarious optimism than American participants (see Figure 2). However, the effect size of this cultural

difference was relatively low, in line with our idea that culture does not impact learning about others per se, but rather that cultural differences dependent on the person that people learn about.

Figure 2. Depicted are the learning rates for others separated for good news and bad news (left) and the vicarious optimism score (learning rate for good news – bad news) (right) for Chinese (n = 518) and American participants (n = 445). Chinese participants showed less vicarious optimism compared to American participants. Error bars in all figures represent standard error of the mean. **p<.01, *** p<.001



We expected that culture would affect vicarious optimism differently, depending on who participants learned about. And indeed, we find the predicted three-way interaction between valence, culture, and Other condition (Friend versus Identifiable versus Unidentifiable Stranger), $F(2,956) = 6.71$, $p = .001$, $\eta^2 partial = .01$ (Figure 3). To unravel these interactions, we started by examining the vicarious optimism participants displayed within the Chinese sample and then turned to the American sample.

Within the Chinese sample, we expected to find greater vicarious optimism when learning about a friend compared to learning about both identifiable and unidentifiable strangers. And we did not expect a difference between the identifiable and the unidentifiable stranger, in line with the idea that for people in interdependent cultural settings individualization of strangers has little impact on the concern they feel for strangers (Kogut et al., 2015). We found the expected interaction between valence and type of other (Friend

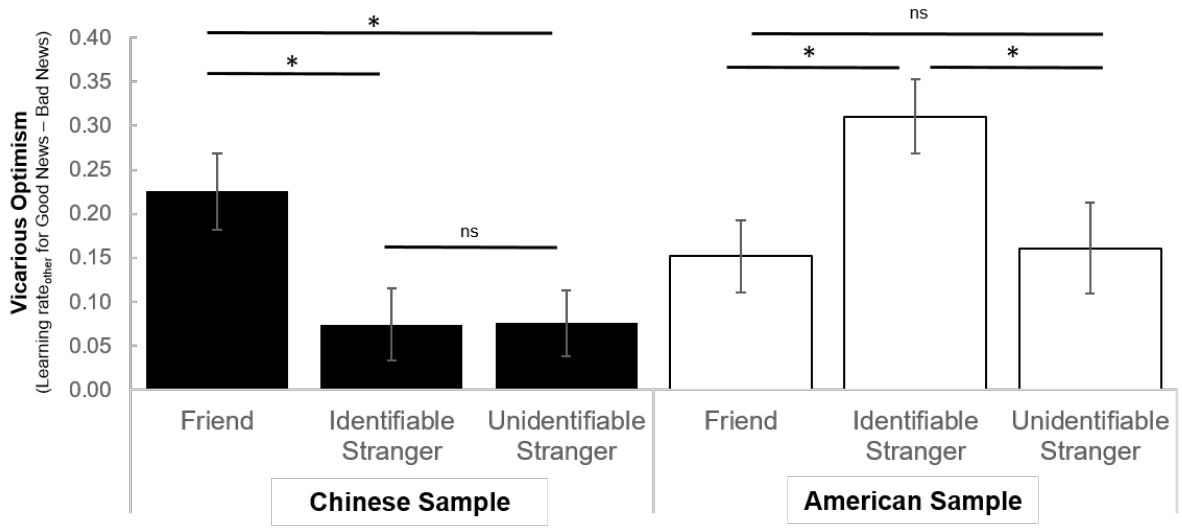
versus Identifiable Stranger versus Unidentifiable Stranger), $F(2,514) = 3.877$, $p = .02$, $\eta^2 partial = .01$, suggesting that Chinese participants learned differently depending on the target (Figure 3, left side)[3]. Chinese participants showed stronger vicarious optimism for their friends compared to identifiable strangers, $F(1,338) = 5.55$, $p = .019$, $\eta^2 partial = .016$, and compared to unidentifiable strangers, ($F(1,338) = 6.08$, $p = .014$, $\eta^2 partial = .018$) (Figure 3). There was no difference in vicarious optimism for the unidentifiable stranger and the identifiable stranger, ($F(1,360) = 0.0002$, $p = .98$). It is also worth noting that Chinese participants did not exhibit vicarious optimism in their learning for the identifiable stranger (*CI*:-.01, .146) or the unidentifiable stranger (*CI*:-.004, .154). This pattern of results confirms our prediction that Chinese participants show a marked difference in learning for a friend versus strangers, potentially reflecting the different cultural orientation towards a friend versus a stranger.

We observed a different pattern of results in the American sample. Similar to Chinese participants, Americans' learning depended on the target (interaction between valence and type of other, $F(2,441) = 4.64$, $p = .01$, $\eta^2 partial = .021$) (Figure 3). Unexpectedly, we found that American participants showed more vicarious optimism when learning about an identifiable stranger compared to when learning about a friend, ($F(1,334) = 7.32$, $p = .007$, $\eta^2 partial = .021$). Also unexpectedly, they showed the same amount of vicarious optimism when learning about a friend and when learning about an unidentifiable stranger, $F(1,299) = .129$, $p = .72$. However, as predicted in our preregistration, American participants showed more vicarious optimism when learning about an identifiable stranger compared to an unidentifiable stranger, ($F(1,248) = 5.38$, $p = .021$, $\eta^2 partial = .021$), replicating previous research (Kappes et al., 2018). In contrast to the Chinese participants, American participants exhibited vicarious optimism in their learning for both the identifiable stranger

[3] See Figure S1 for the learning rates, separated for good and bad news.

(*CI*: .235, .412) and the unidentifiable stranger (*CI*: .046, .248), again replicating previous research (Kappes et al., 2018).

Figure 3. Chinese participants (n = 518, left side) showed more vicarious optimism when learning about a friend, than when learning about an identifiable or unidentifiable stranger. American participants (n = 445, right side), in contrast, showed less vicarious optimism when learning about a friend than an identifiable stranger, the same vicarious optimism for a friend and an identifiable stranger, and more vicarious optimism when learning about an identifiable stranger compared to an unidentifiable stranger. Error bars in all figures represent standard error of the mean. * p<0.05, ns = non-significant



So far, we compared vicarious optimism for different targets within each culture but did not compare the vicarious optimism across cultures. We predicted and confirmed that Chinese participants would show a stronger difference in vicarious optimism for a friend and an identifiable stranger compared to American participants, $F(4,673) = 12.87$, $p < .001$. However, we did not find support for our prediction that vicarious optimism for a friend versus an unidentifiable stranger would be stronger in the Chinese sample compared to the American sample, $F(4,629) = 1.78$, $p = .18$. We observed a trend supporting our prediction that the difference in vicarious optimism for an identifiable versus an unidentifiable stranger would be stronger in the American sample compared to the Chinese sample, $F(4,609) = 3.52$, $p = .06$.

Mechanisms for Cultural Differences in Vicarious Optimism

We identified two possible factors underlying cultural differences in vicarious optimism: differences in optimism about one's *own* future and differences in cultural orientation (i.e., individualism vs collectivism). We predicted that Chinese participants would show less of an optimism bias when learning about their own future compared to American participants. We tested this prediction by using the learning rates as dependent variable (we report the same set of analysis for the update in the SI Results), and entered in an ANOVA with repeated measures valence (good news versus bad news) as within-subject variable, and culture (Chinese versus American) as between-subject variable. As preregistered, we controlled for the difference in prediction errors between good news and bad news in the analyses reported below.

Replicating previous research with American participants (Sharot & Garrett, 2016) and Chinese participants (Ma et al., 2016), we find a main effect of valence; participants optimistically updated their beliefs more in response to good news compared to bad news, $F(1,960) = 170.06$, $p < .001$, $\eta^2 partial = .15$. Furthermore, as for learning about others, we find lower learning rates for learning about the self in Chinese participants compared to American participants, $F(1,960) = 105.38$, $p < .001$, $\eta^2 partial = .099$. And most importantly, we find the predicted interaction effect between culture and valence, $F(1,960) = 13.47$, $p < .001$, $\eta^2 partial = .01$ (Figure 4A). Chinese participants showed less of an optimism bias in their learning ($M = .15$, $SE = .025$) about their future than American participants ($M = .28$, $SE = .026$). This suggests that one potential source for the cultural differences in vicarious optimism is a cultural difference in optimistic learning about the self. And indeed, replicating previous research (Kappes et al., 2018), we find a positive correlation between vicarious optimism in learning about others and optimism in learning for the self, $r(963) = .353$, $p < .001$: the stronger the optimism for self, the stronger participants' vicarious optimism (Figure 4B).

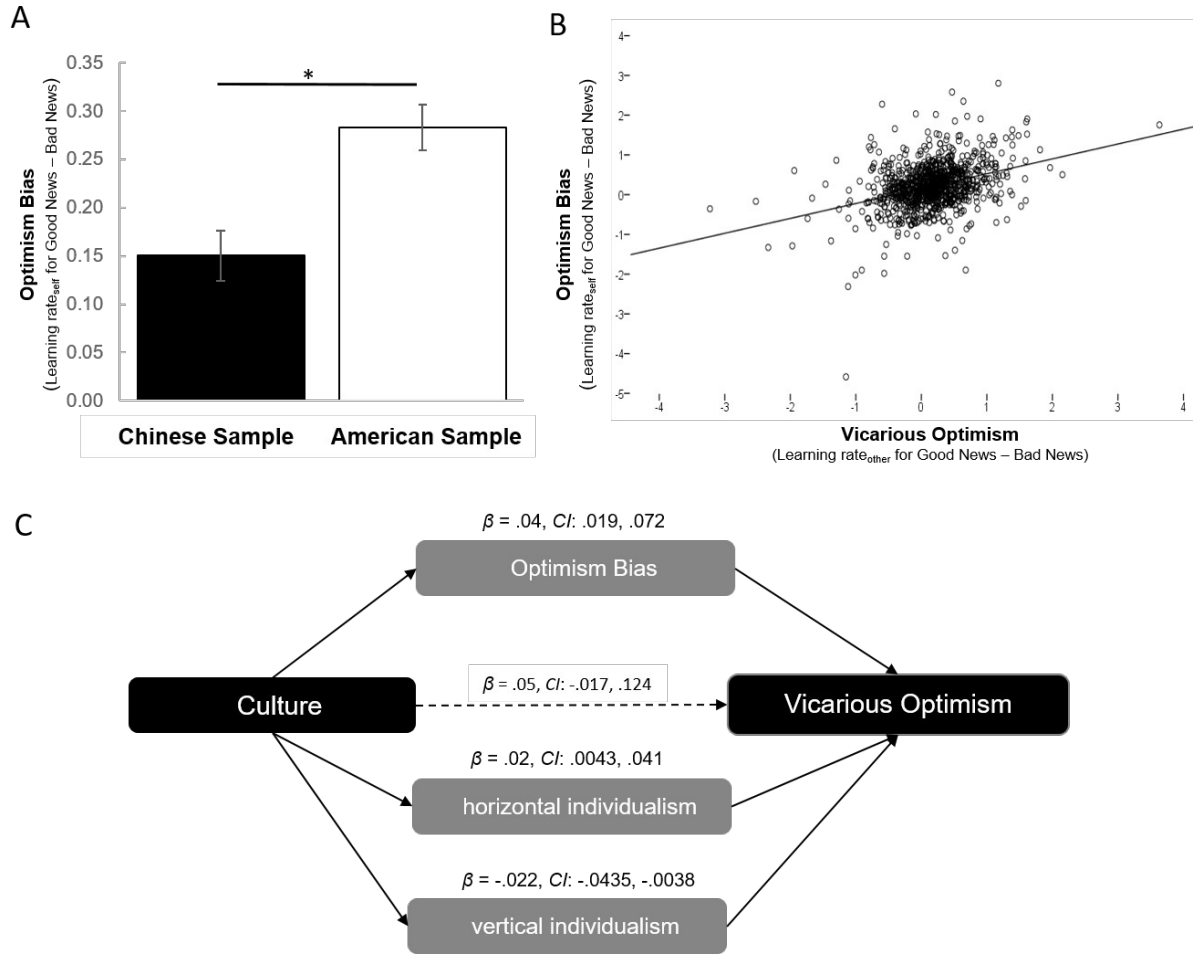
We further explored whether differences in cultural orientation might be another source for the differences in vicarious optimism between the American and the Chinese sample. We expected American participants to emphasize the importance of individualism and equality (horizontal structure) within society when compared to Chinese participants (Triandis & Gelfand, 1998). Confirming this prediction, American participants endorsed horizontal individualism more strongly than Chinese participants, $t(948) = 6.90$, $p < .001$, and tolerated unequal (vertical) individualism less than Chinese participants, $t(946) = 8.028$, $p < .001$. American participants also tolerated unequal (vertical) collectivism less than Chinese participants, $t(951) = 7.945$, $p < .001$. We did not find differences in horizontal collectivism between samples, $t(947) = .71$, $p = .48$.

We further expected that American participants would view themselves as more unique and separated from others (independent self-construal), while Chinese participants would view themselves as more connected to others and embedded in relationships (interdependent self-construal). And indeed, American participants reported higher scores on the independent self-construal scale, $t(960) = 2.37$, $p = .018$, and lower scores on the interdependent self-construal scale, $t(960) = 6.23$, $p < .001$ compared to Chinese participants. Taken together, these findings suggest that American participants had a stronger perception of themselves as individuals among equal others, while Chinese participants had a stronger sense of connectedness with others, and more tolerance for inequality.

Next, we examined whether cultural differences in individualism, collectivism, and self-construal were related to vicarious optimism. We entered the measures for cultural orientation in an explorative regression analysis, predicting vicarious optimism for all targets. We found that two dimensions significantly related to vicarious optimism: horizontal individualism (tendency to strive to be distinct from others without demanding special status), $\beta = .130$, $p = .001$ and vertical individualism (tendency to strive to be distinct and

desire special status), β = -.107, p = .003. These results support the idea that horizontal orientations increase vicarious optimism for strangers (identified and unidentified), while vertical orientations might decrease vicarious optimism for strangers.

Figure 4. A) Chinese participants (n = 518) showed less optimism than American participants (n = 445) when learning about their own future. B). Across all participants (N = 963), optimism for self correlated with vicarious optimism, $r(963)$= .353, p < .001. C) Mediation analyses for all participants shows that the effect of culture on vicarious optimism was mediated by optimism for self (β = .04, *CI*: .019, .072), horizontal individualism, (β = .02, *CI*: .0043, .041), and vertical individualism (β = -.022, *CI*: -.0435, -.0038)



In a last set of explorative analyses, we tested if the effects of culture on vicarious optimism were mediated by the differences in optimism bias for the self and differences in cultural orientations (Figure 4C). For cultural orientations, we found differences between the American and Chinese sample for two dimensions that were also related to vicarious

optimism: horizontal and vertical individualism. It is important to stress that while these analyses fit well into our theoretical framework, we did not preregister a mediation model and hence, the results should be interpreted with caution. We used the PROCESS macro for SPSS (v3.1, Hayes, 2012) to test in a single model collapsed across all conditions if the effect of culture (X in mediation model) on vicarious optimism (Y) is mediated by optimism for self (M1), horizontal individualism (M2), and vertical individualism (M3), using Model 4 in PROCESS. We found that the indirect effects of culture via optimism for self (β = .04, *CI*: .019, .072), horizontal individualism, (β = .02, *CI*: .0043, .041), and vertical individualism (β = -.022, *CI*: -.0435, -.0038) mediated the effect of culture on vicarious optimism (direct effect of culture on vicarious optimism, β = .05, p = .14, *CI*: -.017, .124).

To test the direction of the effects, we ran the same mediation model with optimism for self as dependent variable (Y) instead of vicarious optimism. We find no evidence that culture impacts optimism for self via horizontal individualism, (β = -.0080, *CI*: -.025, .0087) and vertical individualism (β = -.0052, *CI*: -.0285, .0175), suggesting that cultural orientations uniquely influenced learning about others. However, we do find a partial mediation for the effect of culture on optimism for self via vicarious optimism (indirect effect: β = .035, *CI*: .0085, .065, direct effect of culture on optimism for self, β = .11, p = .0024, *CI*: .024, .041), suggesting that the influence of learning for self and other might be bi-directional.

Discussion

We show that culture impacts the way people form and maintain beliefs about the future of friends, strangers, and themselves. American cultural values with their emphasis on the rights and freedom of individuals seem to foster optimism in learning about oneself and individualized others, while Chinses cultural values with their emphasis on the interdependence between the individual and the respective group seem to foster optimism in

learning about oneself (to a lesser extent) and friends. In particular, we find that American participants showed stronger optimism in learning about their own future and stronger vicarious optimism when learning about the future of others compared to Chinese participants. The cross-cultural differences in vicarious optimism were driven by learning about strangers: American participants showed vicarious optimism when learning about strangers, while Chinese participants did not. And our results further suggest that the difference in learning about strangers is driven by how strongly individualisation resonates with participants. American participants responded to the individualisation of a stranger with increases in vicarious optimism, while Chinese participants did not. In contrast, Chinese participants showed the strongest vicarious optimism when learning about a close friend, while American participants showed similar levels of vicarious optimism when learning about a friend and learning about a stranger. Cultural values matter when people learn about the future of others.

Exploratory analyses suggest that the cultural differences in learning about others are not only driven by cultural orientations, but also by how people learn about their own future. Chinese participants showed less optimism when learning about their own future compared to American participants, potentially limiting the amount of vicarious optimism. These results are in line with previous research showing less optimistic beliefs in East Asian compared to Western samples (Heine & Hamamura, 2007). Our results extend these findings by suggesting that differences in beliefs about the future might be caused by differences in the underlying learning mechanisms. Furthermore, our results are also in line with evidence suggesting that optimistic beliefs about important aspects of the self are universal (Gallagher et al., 2013; Sedikides et al., 2003), since we find a significant optimism bias for self in both Chinese and American participants. Hence, cultural settings shape the degree of optimism in

learning, but the very existence of (some) optimism in learning seems to be independent of culture.

Other cultural differences exist between American and Chinese cultures than the ones we measured. One that might help to further explain our results is regulatory focus (Higgins, 1998), suggesting that some cultural settings foster promotion focus – the motivation to pursue growth – while other cultural settings foster prevention focus – the motivation to maintain security (Kurman et al., 2015). Regulatory focus also impacts how people process unwelcomed information such as negative feedback. For instance, Americans are in general more promotion focused than Chinese participants (Kung et al., 2016), and people who are promotion focused process positive feedback better than negative feedback (Van Dijk & Kluger, 2011). Hence, promotion focus might help to explain why Americans show greater optimism in learning for self and others in general; due to their motivational orientation towards growth, they are better able to process good news, rather than bad news. Yet, regulatory focus might not be able to explain why Chinese participants show stronger vicarious optimism (better learning from good news versus bad news) for a friend, compared to a stranger, or why identifiable manipulations affect learning for strangers differently for Chinese and American participants. Regulatory focus, however, should be included in subsequent studies to better understand the role of motivational modes for cultural learning differences.

One unexpected finding was that Chinese participants changed their beliefs on average less than American participants. One could argue that this finding is at odds with research on cultural differences on self-centred motivations. Previous research has shown that one reason why people take in advice less then they potentially should be is an egocentric bias, the overweighting of one's one option relative to new information (Bonaccio & Dalal, 2006); a finding that has been attributed to the belief than one's belief is superior to other

sources of information (Krueger, 2003). However, this assumption has been challenged (Hütter & Fiedler, 2019). Other factors that might impact how much people take in new information might be how difficult they perceive the prediction task to be (Gino, 2007), how confident people are in the accuracy of their own belief (Fleming et al., 2018; See et al., 2011), and most importantly, how much they trust the advice provided (Bonaccio & Dalal, 2006). And some recent research suggests that American participants might have unrealistically high expectations about the quality of information they are receiving from others (Leong & Zaki, 2018). Hence, a general difference in learning between American and Chinese participants might reflect a host of different variables including different levels of trust towards the information provided.

Limitations

It is important to outline several limitations of the presented results. First, not all our preregistered predictions were supported by the data. For instance, we did not anticipate that American participants would show less vicarious optimism for a friend than an identifiable stranger. In our previous research, we found that in a smaller sample, American participants showed the same amount of vicarious optimism for a friend and an identifiable stranger (Study 2a, Kappes et al., 2018). In the present research, we used six different pictures and names in the Identifiable Stranger condition to ensure that our manipulation did not depend on a specific stimulus set (Wells & Windschitl, 1999), while in our previous research we used three different pictures. Future research should test how much concern for friends and strangers in Western cultural settings is driven by visual imagery. For instance, if our American participants saw a picture of their friend before the learning study, would they have shown more vicarious optimism for their friend compared to the identifiable stranger? And if American participants see a picture of somebody they dislike, would such visual imagery still boost vicarious optimism?

Another limitation of the presented results is that we cannot present conclusive evidence for why culture impacts learning about others. In a set of explorative analyses, we find that the impact of culture on vicarious optimism is potentially mediated by cultural differences in orientations towards others and optimism for the self. A preregistered replication of these results and experimental manipulations of both mediators would offer more conclusive evidence about the mechanisms underlying cultures influence on vicarious optimism. However, the explorative results fit well with the theoretical framework suggested in this article. Endorsement of horizontal individualism increased vicarious optimism for strangers while vertical individualism decreased it, in line with previous research suggesting that constructing the self and others as individuals among equals leads people to care about and help strangers (Allik & Realo, 2004; Kemmelmeier et al., 2006). Furthermore, the present research as well as past research (Apps et al., 2016; Behrens et al., 2009; Buckner & Carroll, 2007; Sul et al., 2015; Suzuki et al., 2012) has shown a strong similarity between learning processes for others and the self. However, our explorative mediation analyses pose a question about direction: does learning about the self influence learning about others or is it the other way around?

It has long been argued that culture affects the way people construct the world around them and thereby guides how people behave (Markus & Kitayama, 1991). And at the heart of culture is how the individual relates to other members, influencing with whom people should cooperate and with whom not. Our results suggest that one potential mechanism guiding how culture shapes cooperation might be vicarious optimism - shaping the beliefs people have about other members of their culture. We find that Chinese participants showed strong vicarious optimism for friends but not strangers, while American participants showed vicarious optimism for strangers. These results mirror cross-cultural differences in cooperation and helping (Allik & Realo, 2004; Kemmelmeier et al., 2006), potentially

suggesting that culture regulates cooperation by impacting how people form and maintain beliefs about others.

Author Contributions

All authors contributed to the development of the study concept and the study design. Testing and data collection were performed by A.K and X.Y. A.K. performed the data analysis, X.Y., M.C., Y.M. helped with the interpretation. A.K drafted the manuscript and all other authors provided revisions. All authors approved the final version of the manuscript for submission.

Acknowledgments

We thank Binshen Xiong, Wenhao Huang for their assistance in data collection. This work was supported by the National Natural Science Foundation of China (Projects 31771204; 91632118; 31722026 to YM), the Fundamental Research Funds for the Central Universities (2017XTCX04; 2018EYT04 to YM); Open Research Fund of the State Key Laboratory of Cognitive Neuroscience, Beijing Normal University (to MC and YM); Wellcome Trust Institutional Strategic Support Fund grant (204826/Z/16/Z) awarded to J. Savulescu and M. J. Crockett.

The authors declare no conflicts of interest.

References

Allik, J., & Realo, A. (2004). Individualism-collectivism and social capital. *Journal of Cross-Cultural Psychology*, *35*(1), 29–49. http://journals.sagepub.com/doi/abs/10.1177/0022022103260381

Apps, M. A., Rushworth, M. F., & Chang, S. W. (2016). The anterior cingulate gyrus and social cognition: Tracking the motivation of others. *Neuron*, *90*(4), 692–707.

Behrens, T. E. J., Hunt, L. T., & Rushworth, M. F. S. (2009). The computation of social behavior. *Science (New York, N.Y.)*, *324*(5931), 1160–1164. https://doi.org/10.1126/science.1169694

Bonaccio, S., & Dalal, R. S. (2006). Advice taking and decision-making: An integrative literature review, and implications for the organizational sciences. *Organizational*

Behavior and Human Decision Processes, *101*(2), 127–151. https://doi.org/10.1016/j.obhdp.2006.07.001

Buckner, R. L., & Carroll, D. C. (2007). Self-projection and the brain. *Trends in Cognitive Sciences*, *11*(2), 49–57. https://doi.org/10.1016/j.tics.2006.11.004

Carver, C. S., & Scheier, M. F. (2014). Dispositional Optimism. *Trends in Cognitive Sciences*, *18*(6), 293–299. https://doi.org/10.1016/j.tics.2014.02.003

Chowdhury, R., Sharot, T., Wolfe, T., Düzel, E., & Dolan, R. J. (2014). Optimistic update bias increases in older age. *Psychological Medicine*, *44*(09), 2003–2012. http://journals.cambridge.org/abstract_S0033291713002602

Davis-Kean, P. E. (2005). The influence of parent education and family income on child achievement: The indirect role of parental expectations and the home environment. *Journal of Family Psychology*, *19*(2), 294.

Dufner, M., Gebauer, J. E., Sedikides, C., & Denissen, J. J. A. (2019). Self-Enhancement and Psychological Adjustment: A Meta-Analytic Review. *Personality and Social Psychology Review*, *23*(1), 48–72. https://doi.org/10.1177/1088868318756467

Eil, D., & Rao, J. M. (2011). The Good News-Bad News Effect: Asymmetric Processing of Objective Information about Yourself. *American Economic Journal: Microeconomics*, *3*(2), 114–138. https://doi.org/10.1257/mic.3.2.114

Fleming, S. M., Putten, E. J., & Daw, N. D. (2018). Neural mediators of changes of mind about perceptual decisions. *Nature Neuroscience*, 1.

Friedrich, A., Flunger, B., Nagengast, B., Jonkmann, K., & Trautwein, U. (2015). Pygmalion effects in the classroom: Teacher expectancy effects on students' math achievement. *Contemporary Educational Psychology*, *41*, 1–12.

Gallagher, M. W., Lopez, S. J., & Pressman, S. D. (2013). Optimism is universal: Exploring the presence and benefits of optimism in a representative sample of the world. *Journal of Personality*, *81*(5), 429–440. https://doi.org/10.1111/jopy.12026

Garrett, N., & Sharot, T. (2014). *How robust is the optimistic update bias for estimating self-risk and population base rates?* http://dx.plos.org/10.1371/journal.pone.0098848

Garrett, N., & Sharot, T. (2016). *Optimistic Update for Positive Life Events? An Unbiased Test* (SSRN Scholarly Paper ID 2788731). Social Science Research Network. http://papers.ssrn.com/abstract=2788731

Garrett, N., & Sharot, T. (2017). Optimistic update bias holds firm: Three tests of robustness following Shah et al. *Consciousness and Cognition*, *50*(Supplement C), 12–22. https://doi.org/10.1016/j.concog.2016.10.013

Garrett, N., Sharot, T., Faulkner, P., Korn, C. W., Roiser, J. P., & Dolan, R. J. (2014). Losing the rose tinted glasses: Neural substrates of unbiased belief updating in depression. *Frontiers in Human Neuroscience*, *8*. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4147849/

Greenwald, A. G. (1980). The totalitarian ego: Fabrication and revision of personal history. *American Psychologist*, *35*(7), 603–618. https://doi.org/10.1037/0003-066X.35.7.603

Grossmann, I., & Na, J. (2014). Research in culture and psychology: Past lessons and future challenges. *Wiley Interdisciplinary Reviews: Cognitive Science*, *5*(1), 1–14. https://doi.org/10.1002/wcs.1267

Hayes, A. F. (2012). *PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling*. University of Kansas, KS.

Heine, S. J., & Hamamura, T. (2007). In search of East Asian self-enhancement. *Personality and Social Psychology Review: An Official Journal of the Society for Personality and Social Psychology, Inc*, *11*(1), 4–27. https://doi.org/10.1177/1088868306294587

Heine, S. J., Lehman, D. R., Markus, H. R., & Kitayama, S. (1999). Is there a universal need for positive self-regard? *Psychological Review*, *106*(4), 766. http://psycnet.apa.org/?fa=main.doiLanding&doi=10.1037/0033-295X.106.4.766

Higgins, E. T. (1998). Promotion and Prevention: Regulatory Focus as A Motivational Principle. In M. P. Zanna (Ed.), *Advances in Experimental Social Psychology* (Vol. 30, pp. 1–46). Academic Press. https://doi.org/10.1016/S0065-2601(08)60381-0

Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations*. Sage publications.

Hütter, M., & Fiedler, K. (2019). Advice taking under uncertainty: The impact of genuine advice versus arbitrary anchors on judgment. *Journal of Experimental Social Psychology*, *85*, 103829. https://doi.org/10.1016/j.jesp.2019.103829

Janoff-Bulman, R., & Leggatt, H. K. (2002). Culture and Social Obligation: When "Shoulds" Are Perceived as "Wants." *Journal of Research in Personality*, *36*(3), 260–270. https://doi.org/10.1006/jrpe.2001.2345

Jenni, K., & Loewenstein, G. (1997). Explaining the Identifiable Victim Effect. *Journal of Risk and Uncertainty*, *14*(3), 235–257. https://doi.org/10.1023/A:1007740225484

Kappes, A., Faber, N. S., Kahane, G., Savulescu, J., & Crockett, M. J. (2018). Concern for Others Leads to Vicarious Optimism. *Psychological Science*.

Kappes, A., & Sharot, T. (2018). The Automatic Nature of Motivated Belief Updating. *Behavioural Public Policy*.

Kemmelmeier, M., Jambor, E. E., & Letner, J. (2006). Individualism and Good Works: Cultural Variation in Giving and Volunteering Across the United States. *Journal of Cross-Cultural Psychology*, *37*(3), 327–344. https://doi.org/10.1177/0022022106286927

Kogut, T., & Ritov, I. (2005). The" Identified Victim" Effect: An Identified Group, or Just a Single Individual? *Journal of Behavioral Decision Making*, *18*(3), 157. http://www.researchgate.net/profile/Tehila_Kogut/publication/227605573_The_identified_victim_effect_an_identified_group_or_just_a_single_individual/links/0fcfd50636e548b0dd000000.pdf

Kogut, T., Slovic, P., & Västfjäll, D. (2015). Scope Insensitivity in Helping Decisions: Is It a Matter of Culture and Values? *Journal of Experimental Psychology: General*, No Pagination Specified. https://doi.org/10.1037/a0039708

Korn, C. W., Sharot, T., Walter, H., Heekeren, H. R., & Dolan, R. J. (2014). Depression is related to an absence of optimistically biased belief updating about future life events. *Psychological Medicine*, *44*(3), 579–592. https://doi.org/10.1017/S0033291713001074

Krueger, J. I. (2003). Return of the ego--Self-referent information as a filter for social prediction: Comment on Karniol (2003). *Psychological Review*, *110*(3), 585–590. https://doi.org/10.1037/0033-295X.110.3.585

Kuhnen, C. M. (2014). Asymmetric Learning from Financial Information. *The Journal of Finance*, n/a-n/a. https://doi.org/10.1111/jofi.12223

Kung, F. Y., Kim, Y.-H., Yang, D. Y.-J., & Cheng, S. Y. (2016). The role of regulatory fit in framing effective negative feedback across cultures. *Journal of Cross-Cultural Psychology*, *47*(5), 696–712.

Kurman, J., Liem, G. A., Ivancovsky, T., Morio, H., & Lee, J. (2015). Regulatory Focus as an Explanatory Variable for Cross-Cultural Differences in Achievement-Related Behavior. *Journal of Cross-Cultural Psychology*, *46*(2), 171–190. https://doi.org/10.1177/0022022114558090

Kuzmanovic, B., Jefferson, A., & Vogeley, K. (2015). Self-specific Optimism Bias in Belief Updating Is Associated with High Trait Optimism. *Journal of Behavioral Decision Making*, *28*(3), 281–293. https://doi.org/10.1002/bdm.1849

Leong, Y. C., & Zaki, J. (2018). Unrealistic optimism in advice taking: A computational account. *Journal of Experimental Psychology: General*, *147*(2), 170.

Lester, D. (1995). Individualism and Divorce. *Psychological Reports*, *76*(1), 258–258. https://doi.org/10.2466/pr0.1995.76.1.258

Ma, Y., Li, S., Wang, C., Liu, Y., Li, W., Yan, X., Chen, Q., & Han, S. (2016). Distinct oxytocin effects on belief updating in response to desirable and undesirable feedback. *Proceedings of the National Academy of Sciences*, *113*(33), 9256–9261.

Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, *98*(2), 224.

Moutsiana, C., Garrett, N., Clarke, R. C., Lotto, R. B., Blakemore, S.-J., & Sharot, T. (2013). Human development of the ability to learn from bad news. *Proceedings of the National Academy of Sciences*, *110*(41), 16396–16401. http://www.pnas.org/content/110/41/16396.short

Peysakhovich, A., & Karmarkar, U. (2015). Asymmetric effects of favorable and unfavorable information on decision-making under ambiguity. *Management Science*. http://pubsonline.informs.org/doi/abs/10.1287/mnsc.2015.2233

Rosenthal, R., & Jacobson, L. (1968). Pygmalion in the classroom. *The Urban Review*, *3*(1), 16–20. https://doi.org/10.1007/BF02322211

Russo, J. E., Medvec, V. H., & Meloy, M. G. (1996). The Distortion of Information during Decisions. *Organizational Behavior and Human Decision Processes*, *66*(1), 102–110. https://doi.org/10.1006/obhd.1996.0041

Santos, H. C., Varnum, M. E., & Grossmann, I. (2017). Global increases in individualism. *Psychological Science*, *28*(9), 1228–1239.

Schwartz, S. H. (1990). Individualism-Collectivism: Critique and Proposed Refinements. *Journal of Cross-Cultural Psychology*, *21*(2), 139–157. https://doi.org/10.1177/0022022190212001

Schwarz, K. A., Pfister, R., & Büchel, C. (2016). Rethinking explicit expectations: Connecting placebos, social cognition, and contextual perception. *Trends in Cognitive Sciences*, *20*(6), 469–480.

Schwarz, K. A., Pfister, R., Kluge, M., Weller, L., & Kunde, W. (2018). Do we see it or not? Sensory attenuation in the visual domain. *Journal of Experimental Psychology: General*, *147*(3), 418–430. https://doi.org/10.1037/xge0000353

Sedikides, C., Gaertner, L., & Toguchi, Y. (2003). Pancultural self-enhancement. *Journal of Personality and Social Psychology*, *84*(1), 60–79.

See, K. E., Morrison, E. W., Rothman, N. B., & Soll, J. B. (2011). The detrimental effects of power on confidence, advice taking, and accuracy. *Organizational Behavior and Human Decision Processes*, *116*(2), 272–285. https://doi.org/10.1016/j.obhdp.2011.07.006

Sharot, T. (2011). The optimism bias. *Current Biology*, *21*(23), R941–R945. http://www.sciencedirect.com/science/article/pii/S0960982211011912

Sharot, T., & Garrett, N. (2016). Forming Beliefs: Why Valence Matters. *Trends in Cognitive Sciences*, *20*(1), 25–33. https://doi.org/10.1016/j.tics.2015.11.002

Sharot, T., Guitart-Masip, M., Korn, C. W., Chowdhury, R., & Dolan, R. J. (2012). How dopamine enhances an optimism bias in humans. *Current Biology*, *22*(16), 1477–1481. http://www.sciencedirect.com/science/article/pii/S0960982212006458

Sharot, T., Kanai, R., Marston, D., Korn, C. W., Rees, G., & Dolan, R. J. (2012). Selectively altering belief formation in the human brain. *Proceedings of the National Academy of Sciences*, *109*(42), 17058–17062. http://www.pnas.org/content/109/42/17058.short

Sharot, T., Korn, C. W., & Dolan, R. J. (2011). How unrealistic optimism is maintained in the face of reality. *Nature Neuroscience*, *14*(11), 1475–1479. http://www.nature.com/articles/nn.2949

Shepperd, J. A., Waters, E. A., Weinstein, N. D., & Klein, W. M. P. (2015). A Primer on Unrealistic Optimism. *Current Directions in Psychological Science*, *24*(3), 232–237. https://doi.org/10.1177/0963721414568341

Singelis, T. M. (1994). The Measurement of Independent and Interdependent Self-Construals. *Personality and Social Psychology Bulletin*, *20*(5), 580–591. https://doi.org/10.1177/0146167294205014

Sul, S., Tobler, P. N., Hein, G., Leiberg, S., Jung, D., Fehr, E., & Kim, H. (2015). Spatial gradient in value representation along the medial prefrontal cortex reflects individual differences in prosociality. *Proceedings of the National Academy of Sciences*, *112*(25), 7851–7856. https://doi.org/10.1073/pnas.1423895112

Suzuki, S., Harasawa, N., Ueno, K., Gardner, J. L., Ichinohe, N., Haruno, M., Cheng, K., & Nakahara, H. (2012). Learning to Simulate Others' Decisions. *Neuron*, *74*(6), 1125–1137. https://doi.org/10.1016/j.neuron.2012.04.030

Talhelm, T., Zhang, X., Oishi, S., Shimin, C., Duan, D., Lan, X., & Kitayama, S. (2014). Large-scale psychological differences within China explained by rice versus wheat agriculture. *Science*, *344*(6184), 603–608.

Taylor, S. E., & Brown, J. D. (1988). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin*, *103*(2), 193–210. https://doi.org/10.1037/0033-2909.103.2.193

Taylor, S. E., Kemeny, M. E., Reed, G. M., Bower, J. E., & Gruenewald, T. L. (2000). Psychological resources, positive illusions, and health. *American Psychologist*, *55*(1), 99. http://psycnet.apa.org/journals/amp/55/1/99/

Tenenbaum, H. R., & Ruck, M. D. (2007). Are teachers' expectations different for racial minority than for European American students? A meta-analysis. *Journal of Educational Psychology*, *99*(2), 253–273. https://doi.org/10.1037/0022-0663.99.2.253

Triandis, H. C. (2018). *Individualism and collectivism*. Routledge.

Triandis, H. C., Carnevale, P., Gelfand, M., Robert, C., Wasti, S. A., Probst, T., Kashima, E. S., Dragonas, T., Chan, D., Chen, X. P., Kim, U., De Dreu, C., Van De Vliert, E., Iwao, S., Ohbuchi, K.-I., & Schmitz, P. (2001). Culture and Deception in Business Negotiations: A Multilevel Analysis. *International Journal of Cross Cultural Management*, *1*(1), 73–90. https://doi.org/10.1177/147059580111008

Triandis, H. C., & Gelfand, M. J. (1998). Converging measurement of horizontal and vertical individualism and collectivism. *Journal of Personality and Social Psychology*, *74*(1), 118. http://psycnet.apa.org/journals/psp/74/1/118/

Triandis, H. C., Leung, K., Villareal, M. J., & Clack, F. I. (1985). Allocentric versus idiocentric tendencies: Convergent and discriminant validation. *Journal of Research in Personality*, *19*(4), 395–415.

Uchida, Y., Kitayama, S., Akutsu, S., Park, J., & Cole, S. W. (2018). Optimism and the conserved transcriptional response to adversity. *Health Psychology: Official Journal of the Division of Health Psychology, American Psychological Association*, *37*(11), 1077–1080. https://doi.org/10.1037/hea0000675

Van Dijk, D., & Kluger, A. N. (2011). Task type as a moderator of positive/negative feedback effects on motivation and performance: A regulatory focus perspective. *Journal of Organizational Behavior*, *32*(8), 1084–1105.

Vandello, J. A., & Cohen, D. (1999). Patterns of individualism and collectivism across the United States. *Journal of Personality and Social Psychology*, *77*(2), 279.

Weinstein, N. D. (1980). Unrealistic optimism about future life events. *Journal of Personality and Social Psychology*, *39*(5), 806–820. https://doi.org/10.1037/0022-3514.39.5.806

Wells, G. L., & Windschitl, P. D. (1999). Stimulus Sampling and Social Psychological Experimentation. *Personality and Social Psychology Bulletin*, *25*(9), 1115–1125. https://doi.org/10.1177/01461672992512005