

The Origin of Cross-Cultural Differences in Referential Intuitions: Perspective Taking in the Gödel Case

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1. INTRODUCTION

How do proper names refer? This question about reference is critical for philosophers studying language, linguists investigating meaning and reference, and psycholinguists interested in how children acquire names. Over the past century, philosophers have put forward two classical theories to explain the link between a name and the entity it refers to, i.e., *the descriptivist theory* proposed by Frege (1892/1948), Russell (1905) and Searle (1958) among others, and *the causal-historical view* most notably advocated by Kripke (1980). On the former account, a name gets its referent through associated definite descriptions. Thus, when a speaker uses a name, they typically refer to whoever best fits the descriptive content attached to that name. For instance, the name “Kamala Harris” refers to the lady Kamala Harris because she is the sole individual who could uniquely satisfy the descriptive content “the first female vice president of the United States” that is commonly associated with the name nowadays. In contrast, according to the Kripkean causal-historical view, a name refers to a person via a link that is originated in the initial naming ceremony and then gets passed down through a community of speakers. Kripke contends that proper names are rigid designators and they continue to refer to the individuals who were initially given the name, even when they turn out to have none of the properties that speakers associate with this name (1980). That means, on the causal-historical picture, the name “Kamala Harris” would still refer to the person Kamala Harris even if she had not been elected the vice president of the United States.

In the philosophical literature, the received wisdom is that Kripke supported his causal-historical view of reference with the famous “Gödel” thought experiment. Suppose the only thing most people have heard about the mathematician Kurt Gödel is that he is the person who proved the incompleteness of arithmetic, which thus is the only possible definite description these people could associate with Gödel. And now imagine that the person who bears this name (Kurt Gödel) didn’t actually prove the theorem, but instead stole it from a fellow named Schmidt who did all the work. In this case, the descriptivist theory predicts that the name “Gödel” would refer to Schmidt, because Schmidt is the person best fitting

the definite description usually attached to that name. But Kripke intuitively thinks that “Gödel” would still refer to Gödel because it was he, not Schmidt, who was initially given that name (Kripke 1980: 83–4). Most Anglo-American philosophers agree with Kripke and for decades the descriptivist view seem to have lost ground.

However, the dominance of Kripkean intuitions is questioned by Machery *et al.* (2004; hereafter referred to as MMNS 2004), a widely discussed paper in experimental semantics. They presented stories modeled on the Gödel case to undergraduates in the United States and China and found that whereas Americans tend to have intuitions consistent with Kripke’s causal-historical view of reference, the Chinese speakers are more likely to report intuitions in line with the Fregen-Russellian descriptivism. If these findings accurately reflect the reality of people’s use of proper names, they would be suggestive of a “cross-cultural style of semantics” (MMNS 2004), or in Martí’s words, “semantic multi-culturalism” (Martí 2009). Over the past fifteen years, MMNS’s seminal research has sparked varied reactions among philosophers, leading to the emergence of dozens of follow-up studies. While some researchers tweaked the words of the original probes to examine the reliability of MMNS’s cross-cultural findings, others questioned the role of intuition in philosophical studies of reference. But the cross-cultural findings hold up across a number of experiments that attempt to control for ambiguities and confounds in the original study (see Machery *et al.* 2009, 2010; Machery *et al.* 2015; Sytsma *et al.* 2015; Beebe & Undercoffer 2015, 2016; Islam & Baggio 2020). Interestingly, in our recent study (Li *et al.* 2018), using a novel experimental design we have not only replicated the cross-cultural differences in referential intuitions but also found that such cultural patterns are already present at age seven. Both American children and adults are more likely to have intuitions compatible with the causal-historical view than the Chinese subjects across different age groups. These findings naturally raise the important question of what cause(s) the systematic variation in people’s referential intuitions.

Thus far, this question has been surprisingly underexplored in the literature. But Sytsma & Livengood (2011) has shed light on the research project that seeks to answer this question. Crucially, they pointed out that the original vignettes MMNS (2004) used are problematic because they involve ambiguity in the epistemic perspective that participants adopt in answering the test questions. Such perspectival ambiguity is caused by the structurally intrinsic knowledge asymmetry in the Gödel-style vignettes, such that the speakers in the hypothetical story settings are always misinformed and ignorant of the details of the historical events whereas the narrator and the participants outside of the story world are omniscient and thus always have privileged knowledge about the events. Consequently, there are two epistemic perspectives relevant in the Gödel thought experiment, i.e., *the hypothetical speaker’s perspective* and *the narrator’s/participants’ perspective*. Although participants are expected to answer the survey questions from the perspective of the narrator, they could nonetheless naturally adopt the hypothetical speakers’ perspective. As a result, the observed cultural patterns in participants’ responses to the survey vignettes might simply reflect the distinct perspective taking strategies rather than genuinely differentiated patterns of referential intuitions. If this conjecture is proven to be the case, it would point to the illusory nature of semantic multi-culturalism and could probably shift the focus away from Kripke’s Gödel thought experiment in experimental semantics.

In this paper, we aim to trace the origin of the systematic cross-cultural variations in referential intuitions by investigating the effects of perspective taking on people’s responses in the Gödel-style probes through two novel experiments. Here is how we will proceed. In

section 2, we first briefly introduce the MMNS (2004) study, and then critically review the two relevant studies conducted by Sytsma and colleagues (i.e., Sytsma and Livengood 2011; Sytsma *et al.* 2015). In section 3, we introduce the literature on cross-cultural variation in perspective taking in cultural psychology, which together with the conjecture of perspectival ambiguity leads to the hypothesis of our current study. In sections 4 and 5, two new experiments on how perspective taking affects people's responses in hypothetical stories modelled on the Gödel thought experiment will be reported. Based on the empirical findings, in section 6 we argue that the robust cross-cultural variations thus far observed in people's responses to the Gödel cases are largely attributable to culturally specific perspective-taking strategies, which provides new support for the proposal previously made by Sytsma and Livengood (2011). The implications of the experimental results for the ongoing work of testing the theories of reference of names and for the current metaphilosophical debate on the robustness of philosopher's intuitions are also drawn in this section. Finally, the major conclusions and contributions of the current study are highlighted in section 7.

2. PERSPECTIVAL AMBIGUITY IN THE GÖDEL VIGNETTES

MMNS (2004) investigated whether philosophers' intuitions elicited in famous philosophical cases are universally shared by ordinary folks, assuming that such intuitions are uniformly held among philosophers (i.e., the uniformity assumption). They presented a set of vignettes modelled on the Gödel thought experiment Kripke used in argumentation against the descriptivist theory of reference (1980). The Gödel vignette reads as follows:

Suppose that John has learned in college that Gödel is the man who proved an important mathematical theorem, called the incompleteness of arithmetic. John is quite good at mathematics and he can give an accurate statement of the incompleteness theorem, which he attributes to Gödel as the discoverer. But this is the only thing that he has heard about Gödel. Now suppose that Gödel was not the author of this theorem. A man called "Schmidt" whose body was found in Vienna under mysterious circumstances many years ago, actually did the work in question. His friend Gödel somehow got hold of the manuscript and claimed credit for the work, which was thereafter attributed to Gödel. Thus he has been known as the man who proved the incompleteness of arithmetic. Most people who have heard the name "Gödel" are like John; the claim that Gödel discovered the incompleteness theorem is the only thing they have ever heard about Gödel.

When John uses the name "Gödel," is he talking about:

- (A) the person who really discovered the incompleteness of arithmetic?
- (B) the person who got hold of the manuscript and claimed credit for the work?

Designed in this way, answer (A) is consonant with the descriptive view and answer (B) is consistent with the causal-historical view. Hence, participants who choose (A) are considered to have descriptive intuitions and those who choose (B) are regarded as holding causal-historical intuitions. The probes were presented to a number of Western English-speaking undergraduates from Rutgers University and Chinese-speaking undergraduates from the University of Hong Kong. It was found that while a large proportion of the Western undergraduates (58%) responded in accordance with the causal-historical view by answering (B), a much smaller number of the Chinese participants did so (29%). The differences between the intuitive responses of these two demographic groups were statistically significant. Further, the data indicate that there is also a considerable degree

of variation within both the Western and Eastern cultural groups¹. Such cross-cultural and intra-cultural variations in folks' referential intuitions led MMNS to conclude that philosophers' intuitions about prominent cases are not universally shared by lay people, which calls the traditional intuition-based practice of theorizing about reference into question. From their perspective, it is wrong for philosophers to assume *a priori* the universality of their own referential intuitions. The intuitions philosophers generate from their armchairs are shaped by their own culture and academic training. In order to determine the correct theory that underlies the use of names across cultures, philosophers need to get out of their armchairs and radically revise their methodology (MMNS 2004: 10).

The MMNS study has generated a growing body of literature on referential intuitions over the last fifteen years. One prominent theme in the response literature is that MMNS failed to show what they intended to show, primarily due to flaws in the original Gödel-style vignettes, such as the semantic vs. speaker's reference ambiguity and the perspectival ambiguity. Notably, Ludwig (2007), Deutsch (2009) and Heck (2018) pointed out that the survey questions like "when John uses the name 'Gödel', is he talking about . . ." are ambiguous between a *semantic* reading and a *pragmatic* reading. For speakers could use the name "Gödel" to talk about the person X to whom the name "Gödel" literally and semantically refers in the language. But people could also use the name "Gödel" with the specific intention to refer to a particular person Y who indeed bears another name. Such ambiguity between semantic reference and speaker's reference casts doubt on claims about cultural variation in referential intuitions, as participants might be simply answering different questions. Over the years, Machery and colleagues have provided a number of replies to this objection (Machery & Stich 2012; Machery *et al.* 2015; also see a nice summary of the replies in Heck 2018). But as Heck (2018) has shown, their replies are ineffective as the ambiguity remains even after attempts to rephrase the original probes, and importantly the most natural interpretation of the Gödel-style probe questions is the pragmatic reading. According to Heck, this holds true even when the proper name in question is changed into a definite description. Heck's supposition is supported by a set of data in an informal experiment² showing that in cases similar to the Gödel vignettes, the overwhelming majority of participants (i.e., 38 out of 39) can only be naturally interpreted as having responded to pragmatic cues in the probes. These results are striking, but it would be more convincing if the same pattern obtains when the small-scale classroom survey is extended into a more formal controlled experiment. By and large, the semantic *vs.* speaker's reference interpretation in the Gödel cases still remains contested, suggesting that further research is needed to empirically investigate into the noted ambiguity between these two forms of reference³. This is a critical question, but it will not be the focus of our current study.

- 1 It is worth noting that under the uniformity assumption of philosophers' intuitions, the high intra-cultural variance in both cultural groups is striking in its own right, irrespective of the cross-cultural differences.
- 2 For details of the experiment, see the appendix of Heck (2018).
- 3 A recent experimental study on the reference of proper names by Islam & Baggio (2020) bears upon the speaker's reference issue in the Gödel-style vignettes. But the researchers did not explicitly test *semantic reference vs. speaker's reference*; instead they offered a theory of *speaker's reference* to account for the cross-cultural findings.

Instead, what primarily concerns us in this paper is the perspectival ambiguity detected in the Gödel vignettes. Specifically, *Sytsma and Livengood (2011)* critiqued that *MMNS (2004)* did not clearly specify which epistemic perspective participants should adopt in order to respond to the survey questions. It is unclear whether the answer choices in the original vignettes should be read from the narrator's epistemic perspective or rather from the imaginary speaker John's epistemic perspective (2011: 319). This question is important because there is asymmetry between what John knows in the Gödel story and what the narrator knows in telling the story. From the narrator's perspective, Schmidt is the person who discovered the incompleteness theorem and Gödel is the one who stole the manuscript and claimed credit for it. However, from John's viewpoint, as far as he knows, it is Gödel who has discovered the theorem. While *MMNS* expected participants to read the vignettes from the narrator's perspective, there is nothing that could forestall participants to take John's perspective. If the participants did read the answer choices from John's perspective, then their answers allow for alternative explanations. They might choose answer (A) which is commonly supposed to be in line with the descriptive view in the extant literature, although they have causal-historical intuitions (*Sytsma & Livengood 2011: 157*).

To substantiate their suspicions, *Sytsma & Livengood (2011)* ran a series of experiments to examine the influence of perspectival ambiguity on participants' responses. They first developed two different versions of the original Gödel vignette, each emphasizing a distinct epistemic perspective, i.e. John's perspective and the narrator's perspective (p. 322).

John's Perspective:

When John uses the name 'Gödel', does John think he is talking about:

- (A) the person who the story says really discovered the incompleteness of arithmetic? Or,
- (B) the person who the story says got hold of the manuscript and claimed credit for the work?

Narrator's Perspective:

When John uses the name 'Gödel', is he actually talking about:

- (A) the person who the story says really discovered the incompleteness of arithmetic? Or,
- (B) the person who the story says got hold of the manuscript and claimed credit for the work?

Two groups of English-speaking participants in the United States were presented with either of these two vignettes (i.e. between-subject design). Another group of English-speaking undergraduates was given the original Gödel case as a baseline condition. It was found that 22% of the participants in John's perspective case gave the causal-historical answer (B), and 57.4% of the participants in the narrator's perspective case answered in the same way, in comparison to 39.4% in the baseline condition. When the narrator's perspective is further clarified in another variation of the original probe to clear the "residual ambiguity" in epistemic perspective (i.e., Clarified Narrator's Perspective, p.324), around 74% of the ordinary English-speaking participants responded with the causal-historical answer (B).

Clarified Narrator's Perspective:

Having read the above story and accepting that it is true, when John uses the name 'Gödel', would you take him to actually be talking about:

- (A) the person who (unbeknownst to John) really discovered the incompleteness of arithmetic?

- (B) the person who is widely believed to have discovered the incompleteness of arithmetic, but actually got hold of the manuscript and claimed credit for the work?

In yet another experiment where these four versions were presented to each American participant (i.e., within-subject design), the proportion of people showing causal-historical responses were 42.9% for the original probe, 31.4% for the John's perspective probe, 57.1% for the narrator's perspective probe, and 74.3% for the clarified narrator's probe respectively. Sytsma & Livengood took these results to show that emphasizing John's epistemic perspective significantly reduced the chances of giving the causal-historical answer while emphasizing the narrator's perspective significantly increased that probability. They thus challenged the reliability of MMNS's findings of cross-cultural variation in referential intuitions, and charged that MMNS's attack on the traditional practice of appealing to intuitions was unsuccessful.

In a subsequent cross-cultural study (i.e., Sytsma *et al.* 2015), the above suite of English vignettes was given to a group of Westerners in the U.S. as a baseline. The Japanese translations of these probes were presented to a group of Japanese speakers, and a third group of Western participants received the probes translated from Japanese back into English. It was observed that the two groups of Westerners are quite sensitive to the perspectival differences. In the English baseline study, the rate of causal responses was the highest in the Clarified Narrator's Perspective case (69%) and the lowest in John's Perspective case (31%). Roughly the same pattern held up in the reverse translation study. By contrast, the Japanese participants did not show much sensitivity to the probes that vary in the specific epistemic perspective, the proportion of causal responses being within the range of 30%–40% across the probes. According to Sytsma *et al.* (2015), this batch of results indicates that even after controlling for the ambiguity in epistemic perspectives as well as the language of probes, the clear cross-cultural pattern can still be observed in Westerners' and Easterners' intuitions about the reference of names in the Gödel case, thus confirming that the uniformity conjecture of philosopher's intuitions does not hold.

Taken together, the above two studies by Sytsma and colleagues seem to show that the perspectival ambiguity cannot account for the systemic cultural differences in Westerners' and Easterners' referential intuitions. If this is the case, then there must be something else that is driving the cultural divide in the responses to the Gödel vignettes. Nonetheless, there is also an alternative explanation that the perspectival ambiguity actually does affect people's referential judgments, but the method Sytsma and colleagues adopted failed to detect such impact. We suspect this alternative explanation is right for the following reasons.

On the one hand, the clarification techniques Sytsma and Livengood (2011) adopted to remove the epistemic ambiguity in the Gödel vignettes is not as effective as they had conceived. Just as their experiments demonstrated when they thought the narrator's perspective probe is clear enough in terms of the intended epistemic perspective, a considerable number of participants nonetheless interpreted the probe from John's perspective, thus compelling them to add the clarified narrator's perspective version (i.e., Study 2) for further clarification. Relatedly, the suite of probes Sytsma and Livengood created did not properly eliminate the ambiguity between semantic reference and speaker's reference. In particular, all the four probes contained the phrase "talking about" and the two probes

that aimed to stress the narrator's perspective used the word "actually". These two phrases, however, are both ambiguous, and using them to disambiguate the test question might incur just the opposite of the intended interpretation (Machery *et al.* 2015:71)⁴. As such, the attempts to develop different variations of the same vignette have generated skepticism about the ceiling of our ability to clarify the ambiguity in the original Gödel case (e.g. Heck 2018:11). Because of such trickiness in re-formulating the test questions, Sytsma and Livengood themselves suggested that there might still be better ways to control for the epistemic ambiguity as well as the ambiguity between speaker's and semantic reference (2011:329).

On the other hand, the narrative style of the Gödel story as well as the format of the test questions used in the studies by Sytsma and colleagues and other related studies are inappropriate for eliciting general folks' intuitive judgments about the reference of proper names. For one thing, the Gödel story starts with John's current knowledge status, then asks readers to imagine the far past where (unbeknownst to John and his community) some crimes were secretly committed, and finally emphasizes the limited knowledge John has contemporarily, regardless of the preceding descriptions of the historical event. Such narration could be conceptually challenging for ordinary speakers as it calls for counterfactual reasoning⁵. No matter how the imagined historical crime is narrated, there is the live possibility that participants reject the counterfactual information given in the story (e.g., they simply do not accept the supposition that Gödel was not the author of the mathematical theorem). If this is the case, the responses participants give may not accurately reflect their genuine intuitions about the reference of names. For another, the standard test questions as used in the original MMNS study and Sytsma *et al.*'s studies, however restated, involve metalinguistic discourse that calls for meta-linguistic judgements instead of linguistic judgments. For lay people, to reflect on how they think reference should be determined is supposedly much harder than showing how they actually use names. Hence, in order to improve the experimental design, researches are increasingly replacing the meta-linguistic judgement task with truth-value judgement task (abbreviated as TVJ task) commonly used in psycholinguistics (see Machery *et al.* 2009; Li *et al.* 2018) or tasks that are designed to directly test linguistic usage (see Domaneschi, Vignolo & Di Paola 2017; Devitt & Porot 2018).

- 4 While "talking about" is supposed to elicit judgments about semantic reference, it could nonetheless be naturally read as asking for speaker's reference. That means the question about whom John is talking about could be read as either "to whom does *John intend to refer* when he uses 'Gödel'?" or "to whom *does the name 'Gödel'* refer according to the rules of the language John speaks?". Likewise, the word "actually" as used in "is he *actually* talking about" and "would you take him to be *actually* talking about", could also invite two interpretations: "John's *specific intention* to refer to somebody in a specific setting" vs. "John's *general intention* to refer to someone in following the linguistic conventions of the language he speaks".
- 5 We consider this is highly likely in at least most of the Gödel-Schmidt-style cases. But just as one anonymous reviewer has pointed out, there are some other alternative versions of the Gödel vignette in the extant literature, like the Tsu Ch'ung Chih case in Machery *et al.* (2009), that did not rely on counterfactual reasoning.

Here, it is worth mentioning the controversy around the use of TVJ tasks in experimental semantics. Notably, Martí (2009, 2020) pointed out that MMNS (2004) failed to show what they intended to show by asking about participants' meta-linguistic, not linguistic, intuitions about proper names. In response, Machery *et al.* (2009, hereafter "MOD") designed a TVJ task to elicit people's linguistic intuitions about the reference of proper names, and they found that linguistic intuitions and meta-linguistic intuitions are largely congruent. But Martí (2012) disagreed and insisted that the problem remains in the MOD study since the TVJ task is just another way of testing meta-linguistic judgment. Devitt and Porot (2018) as well as Domaneschi & Vignolo (2019), however, agreed with MOD that TVJ tasks could elicit linguistic judgment about the usage of proper names, and usage is a proper source of evidence for reference theory. Nonetheless, Domaneschi & Vignolo (2019) also argued that the TVJ tasks designed by MOD and other researchers like Li *et al.* (2018) who have used a similar design did not provide relevant data for testing theories of reference because the truth-value judgments were affected by an ambiguity in the truth predicate. Specifically, they contended that "true" in the Gödel experiments can mean what is *true from the narrator's perspective* or *from the hypothetical character's perspective*. Nevertheless, their study did not clearly show how participants understand the "ambiguous truth predicate". Particularly, in experiment 2, the formulation of the test question biased participants towards the experimenter's expected answer whereas the question in experiment 3 simply invited participants to imagine what the teacher could have told her students about the historical event. It is thus doubtful how their experiments can inform us of people's understanding of truth in the experimental scenario. Additionally, the "ambiguity in truth predicate", in our opinion, is essentially the same ambiguity first noted by Sytsma and Livengood (2011). But with the focus on the "ambiguous truth-value judgments", Domaneschi & Vignolo's experiments cast little light on how the ambiguity in epistemic perspectives affects people's responses. In short, we believe that in well-designed experiments, TVJ tasks could legitimately provide linguistic judgments about the reference of proper names.

To sum up, in consideration of the above-mentioned issues in the experimental design of prior studies that are inspired by the seminal work of MMNS (2004), we deem that the perspectival ambiguity conjecture still awaits further experimentation, in order for us to have a better understanding of the systematic and robust variations between Easterners' and Westerners' responses in the Gödel thought experiments. In the remainder of this paper, we will address this issue empirically via a novel experimental paradigm. Below we first introduce the generation of our working hypothesis on the basis of findings from cultural psychology.

3. CROSS-CULTURAL VARIATION IN PERSPECTIVE TAKING

To reiterate, prior studies in experimental semantics have repeatedly documented systematic cross-cultural variations in people's referential intuitions about proper names and tentatively suggested the plausibility that such cultural patterns might be induced by different perspective taking strategies. Intriguingly, an independent line of research in cross-cultural psychology shows that the use of perspective taking skills is also dependent on culture. Notably, several studies have found that Chinese speakers growing up in a Chinese culture appear to be better perspective takers than native speakers of English growing up in America.

For instance, in a referential communication task⁶ that required perspective taking (i.e., the other speaker's, one's own, or a shared perspective) in order to identify the referents of definite expressions like "*the small candle*" amongst a set of competitor objects, Wu and Keysar (2007) found that compared with Americans, the Chinese participants were almost unaffected by their privileged knowledge ground and could always succeed in distinguishing between the other speaker's perspective from their own. They were also much faster in locating the target referent than the American participants were. These results were taken to show that Chinese speakers excel at resolving perspective-taking problems, and most critically they indicate that perspective taking is a function of culture. Chinese culture that is characterized as collectivistic and interdependent focuses more on the other people, whereas American culture that is described as individualistic and independent focuses more on the self. It thus appears more natural for Chinese speakers to take the other's perspective than Americans when interpreting other's words and actions, enabling them to show minimal degree of egocentrism (p.605).

Indeed, in a subsequent study, Wu *et al.* (2013) reexamined the data from Wu & Keysar (2007) through a more fine-grained analysis of the time course of the cultural differences. It was revealed that the Chinese participants also showed an egocentric bias at the beginning of the referential processing, but they managed to suppress such interference earlier and more effectively than their American counterparts did. This new finding is indicative of the possibility of a shared process underlying perspective taking and communication across cultures. That is, both Chinese and American speakers may be disposed to interpret others' instructions from their own perspective in the initial place, and correct themselves subsequently when required. If this is the case, then the observed cultural differences must arise during this late correction stage. In a word, the reanalysis, while somewhat contradictory with the previous account of Wu and Keysar (2007) that postulates no traces of egocentrism among the Chinese speakers, is still consistent with the cultural patterns of perspective taking among Easterners and Westerners. What differs is just the explanation of how and when the cross-cultural differences emerge.

Relatedly, Luk *et al.* (2012) studied the effect of culture on perspective taking in Chinese-Western bicultural speakers (i.e., Chinese-English bilingual undergraduates in Hong Kong) via a cultural priming paradigm⁷ followed by a referential communication game. It was

- 6 This is a task commonly used by researchers to study the role of perspective-taking in language comprehension (and production) in experimental settings (Keysar *et al.* 2000). In this task, typically, a participant and an experimenter sit on the two sides of an array of slots with objects. They play the role of addressee and director respectively. Because some slots are blocked, the addressee and the director each could see different things from their own perspective. When the experiment begins, the director would give instructions containing definite expressions like "*the small candle*" to the addressee for him to move the designated objects around. The referring expression, however, picks out a different candle from the director's viewpoint (the candle visible to them mutually) than from the addressee's viewpoint (the tiny candle that could only be seen by him). This experimental paradigm provides a window into how people resolve ambiguity in communication by using information about perspectives (i.e., the director's, their own, or a shared perspective).
- 7 Culture priming is an experimental technique that has been commonly employed to study how culture shapes people's actions, emotions and motivations amongst bicultural individuals (Hong *et al.* 2000). In tasks of culture priming, it is generally assumed that people who have internalized more than one culture could switch between different cultural lenses in response to culturally-laden symbols. Some representative symbols for the mainstream American culture include the American flag and

observed that the bilingual adults exhibited more perspective taking errors in the Western cultural icon priming condition than the Chinese priming condition. Indeed, the participants primed with the American icons had always failed to use their perspective taking skills when interpreting the other speaker's directions. These results are in line with the findings of Wu and Keysar (2007) in showing that Chinese speakers outperformed Americans in tasks that necessitate considerations of other's mental states, and hence suggestive of the robust effect of culture on perspective taking. It could be the case that the Chinese cultural framework has led to a more prominent representation of the *other* and hence enhanced the bilinguals' perspective taking ability, whereas the American cultural network has heightened the notion of *self* and thus weakened the participants' perspective taking ability (p.354).

In brief, the above-mentioned empirical findings on perspective taking among Easterners and Westerners in cross-cultural psychology offer compelling grounds for further probing into the perspectival ambiguity conjecture in the Gödel case in experimental semantics. We therefore hypothesized in the current project that different perspective taking strategies lead to different responses in the original Gödel-style vignette that involves perspectival ambiguity. Specifically, Chinese speakers give seemingly descriptivist-like responses to the Gödel-style cases because they tend to adopt the imaginary speaker's (i.e., the other's) epistemic perspective whereas Americans have causal-historical judgments because they incline to stick with their own perspective. In what follows, we report two new experiments we conducted to test this hypothesis.

4. EXPERIMENT 1

In order to detect the influence of the perspectival ambiguity on participants' responses in the Gödel-style probes, we directly manipulated the epistemic perspective from which the test questions should be answered. Since the original Gödel-style probes are ambiguous perspective-wise, they were adopted to form the *original* condition. We then created two non-ambiguous contrasting conditions, i.e. the *internal* condition and *external* condition. These two conditions are relative to an imaginary and misinformed character named Emily in the stories, with each emphasizing a distinct epistemic perspective. Specifically, while probes in the *internal* condition should be read from the perspective of an equally misinformed character inside Emily's community (e.g. Emily's teacher), probes in the *external* condition should be comprehended from the perspective of an omniscient character who is outside of Emily's world (e.g. a smart puppet named Kermit). We expect participants across cultures to respond differently in the ambiguous *original* condition, but behave similarly in the two non-ambiguous conditions. Details about the vignettes in each condition are described in the *Materials* section below.

4.1. Methods

4.1.1. *Materials* Following our previous study (Li et al. 2018), we created 4 novel stories and designed a TVJ task followed by a set of justification questions. The TVJ task is employed in spite of the controversies in the literature as reviewed in Section 2. For one

superman, and the central icons for the Chinese culture include the Chinese dragon and Confucius etc., as used in Luk et al. (2012). It is posited that, for the same Chinese-American bicultural speaker, exposing him to Chinese and American icons should respectively activate the interpretive frames rooted in Chinese and American culture.

thing, we believe that the TVJ task elicits linguistic judgements rather than meta-linguistic judgements about the name-containing statements, which is the type of response that could potentially bear on the theory of reference. For another, our experimental design avoids invoking the distinction between speaker's reference and semantic reference, since in the natural conversational settings in our study the hypothetical speaker's specific intention to refer by using a certain name is identical to her general referring intention in using that name.

There are two more modifications we have made to the original Gödel probes used in MMNS (2004). Firstly, our stories are narrated in a chronological order, which renders it easier for participants to process the counterfactual information. Secondly, in terms of the plot, these new stories feature a diverse range of events like building a hospital, drawing pictures, baking cakes, and writing books, hence respectively titled *The Hospital in Newrock*, *The Little Prince's Drawings*, *The Town Cake* and *The Classic Book* (see Supplementary Materials for the complete vignettes). The bulk of each story is shared across the three experimental conditions, with only the beginning and ending part being slightly different.

As mentioned earlier, what crucially differ across conditions are the beliefs about the historical events held by people inside and outside of the imaginary speaker Emily's community. To be specific, in the *original* condition, the vignettes are ambiguous with regard to the pertinent epistemic perspective, as both the imaginary speaker Emily's perspective and the narrator's perspective are potentially relevant. Participants may judge the truth-value of Emily's name-containing statements differently depending on the epistemic perspective they choose to take. In the *internal* condition, the instruction reads that Emily has learned⁸ some stories at school. Each week, Emily gets a chance to earn extra credit in class by answering her teacher's questions. The participant's job is to read the stories about what Emily has learned at school and decide if Emily will get extra credit for her answers to her teacher's questions. To answer questions about this possible reward-giving action of Emily's teacher, respondents need to take the perspective of the teacher, whose epistemic status is prescribed to be identical with that of Emily since they live in the same community and are equally misinformed. Further, since answering such award-giving questions essentially entails determining the truth-value of Emily's name-containing statements, we deem the superficial difference in the question format should be orthogonal when comparing results across conditions. In the *external* condition, a cartoon character named Kermit is introduced at the beginning of the vignette. Participants are told that Kermit is smart and literate, and he is going to read some stories and then make several statements about what he has learnt from these stories. Their job is to judge if Kermit is right or wrong. Obviously, in this condition, the TVJ questions should be answered from Kermit's perspective, from which the state of affairs is supposed to be the same as that from participants' viewpoint. The

8 It should be noted that the word "*learn*" as used across the three conditions in the current study is borrowed from MMNS (2004) and has been used in other similar vignettes in experimental semantics. However, it is sometimes argued that learning is factive, which may render the vignettes contradictory. But this is still controversial, for when the probes are translated into Chinese and Japanese, similar response patterns have been obtained. In any case, we suggest that in creating new vignettes in the future this type of words should be used with caution.

vignettes in the three conditions are exemplified by the story of *The Hospital in Newrock* below.

The original condition.

Long ago, a very strong man named Basil lived in Newrock. Basil was shy, so nobody knew about his power. Newrock needed a new hospital, but there wasn't enough money to pay for it. Basil wanted to help, so one night he carried in some wood and built a hospital all by himself. He was so strong that it only took him one night to finish. The next morning, Basil moved out of Newrock without telling anyone about the hospital. He never came back.

That morning, a builder named Flint found the new hospital and went inside to explore. Just then, the town's mayor, George, walked by and saw Flint inside. He thought that Flint built the hospital, so George told the whole town. Soon everyone knew about Flint's accomplishment. Flint, who couldn't hear or speak, couldn't tell them otherwise. Today, people still learn that Flint built the hospital in Newrock, but this is the only thing they have ever heard about Flint. No one has ever heard of Basil.

Emily learned at school that Flint built the hospital in Newrock. Like everyone else, this is the only thing she has ever heard about Flint. She has never heard of Basil.

That night, Emily's dad asked her who built the hospital in Newrock.

Emily said, "Flint was the person who built the hospital."

Question: Is Emily right?

The internal condition.

Long ago, a very strong man named Basil lived in Newrock.

.....

Last week, Emily learned at school that Flint built the hospital in Newrock. Like everyone else, this is the only thing she has ever heard about Flint. She has never heard of Basil.

This week, Emily's teacher asked the class who built the hospital in Newrock.

Emily said, "Flint was the person who built the hospital."

Question: Will the teacher give Emily extra credit?

The external condition.

Long ago, a very strong man named Basil lived in Newrock.

.....

Emily learned at school that Flint built the hospital in Newrock. Like everyone else, this is the only thing she has ever heard about Flint. She has never heard of Basil.

Kermit read the story about the hospital and learned all about Basil and Flint. He also learned about what Emily had learned about the hospital in school.

One day, Kermit's dad asked him who built the hospital in Newrock.

Kermit said, "Flint was the person who built the hospital."

Question: Is Kermit right?

Immediately following each test question is a justification question that invites participants to explain their answers. In order to control for potential order effect, the four stories in each condition occur in a random order. The vignettes are translated into Chinese for use with Chinese participants.

4.1.2. *Participants* The participants include two cultural groups: native speakers of English in the U.S. and native speakers of Chinese in mainland China. The purpose of carrying out this experiment cross-culturally is to see how people from different cultural backgrounds would behave in each condition on the one hand, and to replicate the cross-cultural pattern of responses in the *original* condition on the other hand. The English speakers were recruited on Amazon Mechanical Turk, while the Chinese participants were recruited from the social media platform WeChat. Each participant was paid two dollars or ten yuan in compensation. The participants who are not native speakers of English or Chinese and those who did not complete the whole study were excluded from subsequent analysis. Consequently, within the American cultural group, altogether thirty-eight participants completed the study in the *original* condition (mean age 38; 21 females), forty in the *internal* condition (mean age 35; 14 females) and thirty-eight in the *external* condition (mean age 38; 20 females). With respect to the Chinese sample, there are thirty-eight subjects (mean age 25, 22 females) in the *original* condition, thirty in the *internal* condition (mean age 20; 24 females) and thirty-four in the *external* condition (mean age 21, 20 females).

4.1.3. *Procedure* Experiment 1 used a between-subject design, so each participant was randomly assigned to one of the three conditions on the survey platform Qualtrics. After signing the electric consent form, participants were directed to the four stories in the assigned condition. In the *original* condition, after reading each short story, participants need to judge whether Emily is right in making statements like “*Flint was the person who built the hospital*”. In the *internal* condition, participants are asked to decide if the teacher would give Emily extra credit for answering her questions with the same name-containing statements as used in the *original* condition. In the *external* condition, participants are required to evaluate whether Kermit is right in making statements that are the same as Emily’s in the other two conditions. The study ends with a short demographic questionnaire. It took approximately fifteen minutes to complete the task in each condition.

4.2. Results and analysis

4.2.1. *TVJ task: The proportion of “no” responses* In line with the practice of prior research, the proportion of the negative response “no” in the TVJ task in each of the three conditions will be reported and analyzed below. Since the hypothesis of the study is that different responses in the ambiguous Gödel-style vignettes result from different perspective taking strategies, it is expected that when guided to read the stories and answer the questions from a specified epistemic perspective, ideally speaking, the participants who have understood the materials correctly should be unanimous in their responses. In particular, in the *internal* condition, they should come to the decision that the teacher will give Emily extra credit when Emily asserts that Flint was the person who built the hospital in Newrock, as both Emily and her teacher are in the same community and are similarly misinformed of the historical events. Similarly, in the *external* condition, since the participants and the puppet Kermit are in the same epistemic world that is external to Emily, they all possess privileged knowledge about the events that is not available to Emily and her fellows. As such, they should uniformly judge Kermit to be wrong when he claims that Flint was the builder of the hospital. Consequently, the rate of the negative responses should be the lowest in the *internal* condition (as this is the place where more affirmative “yes” answers are

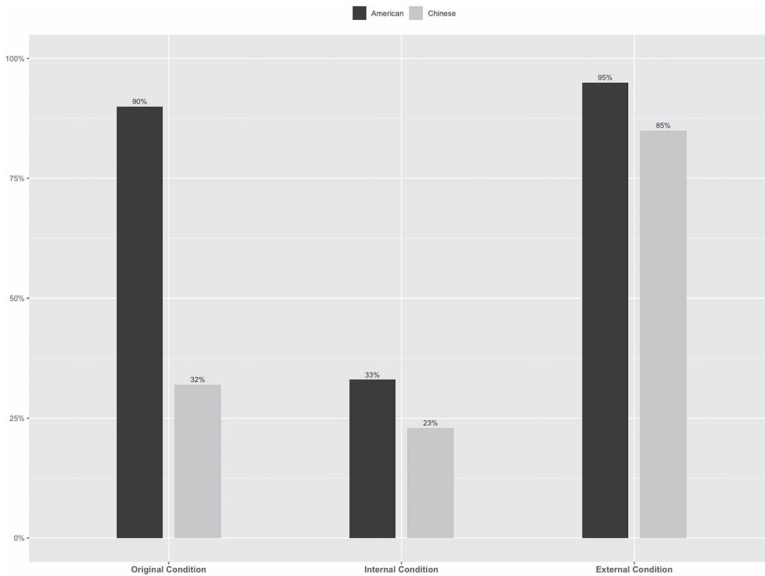


Figure 1 Proportion of “No” Responses in Experiment 1.

expected), and the highest in the *external* condition, possibly with the *original* condition in between if the task is genuinely ambiguous in epistemic perspective.

Figure 1 displays the percentage of “no” responses gathered in each condition. In the *original* condition, Americans responded with “no” 90% of the time, whereas the Chinese participants did so far less often, i.e., 32% of the time⁹. As expected, in both cultural groups, the *internal* condition elicited the fewest “no” answers (i.e. 33% in the U.S. and 23% in China) whereas the *external* condition produced the highest proportion of negative responses (95% in the U.S. and 85% in China).

Although in each condition, the difference or similarity in the proportions of the negative responses from the two cultural groups is evident from the descriptive data, we nonetheless performed chi-square analyses to statistically compare the responses from the American and Chinese participants. In order to avoid type I error, Yate’s continuity correction was applied to the Pearson’s chi-square test. The test results confirmed that there was a statistically significant difference between the Americans and Chinese speakers in the *original* condition with a large effect size ($\chi^2(1) = 106.94$; $p < .05$; Cramer’s $V = 0.5988$), but the difference between the two cultural groups in the *internal* condition did not reach statistical significance ($\chi^2(1) = 2.91$; $p = .088$). In the *external* condition, while both American and Chinese participants answered “no” more than 80% of the time, the chi-square

9 While the descriptive data in the *original* condition as reported here (90% vs. 32%) cannot be directly compared to those in the original MMNS study (58% vs. 29%), the gap between the two cultural groups in MMNS’s study is much smaller. This simple comparison is indeed interesting and it seems to suggest that the selected probes in our study are more effective in driving participants from different cultures towards taking distinct perspectives than the original probes in the MMNS study. Participants’ justification remarks, as will be explicated below, offer some evidence for this supposition.

test indicated that the difference between the two cultural group was significant ($\chi^2(1) = 7.13$; $p < .05$), but the Cramer's V showed the effect size was quite small (Cramer's $V = 0.1688$).

To detect the source of variation between the two cultural groups in the *external* condition, we separately compared Americans' and Chinese's responses to the four vignettes. The results of Fisher's exact tests revealed that they did not differ significantly except in the story of *The Town Cake*, where the percentage of "no" was 97% for the Americans and 82% for the Chinese participants. This means that subjects in the former group are more likely than those in the latter to judge what Kermit said to be wrong in this story. Probably there is something peculiar about this story in the eyes of the Chinese participants. But since the general patterns of responses emerging from the three conditions are very clear culture-wise, we left the minute effect of culture in the *external* condition aside.

Finally, when we compared the responses from the same cultural group across different conditions, no significant differences were observed between the Chinese participants in the *original* condition and those in the *internal* condition ($\chi^2(1) = 2.33$, $p = 0.1269$), or between the Americans in the *original* condition and those in the *external* condition ($\chi^2(1) = 1.69$, $p = 0.1936$). These results evidenced that in the *original* condition where perspectival ambiguity is involved, Americans responded in close parallel to their fellows in the *external* condition whereas the Chinese participants performed much like those in the *internal* condition, leading to the significant differences between the two cultural groups.

4.2.2. Participants' justification remarks We further looked into the justification remarks participants provided for each TVJ question in order to better understand the robust cultural effects in the *original* condition, plus the striking similarity between Americans' responses in the *original* condition and the *external* condition, as well as the close resemblance between the Chinese participants in the *original* condition and the *internal* condition.

To begin with, in the *original* condition, it was observed that, overall speaking, the participants are largely consistent across the four stories, as shown in Figure 2. In the American cultural group, while 84% of the participants responded negatively, only 8% responded positively, and 8% gave both "yes" and "no" responses. In contrast, amongst the Chinese participants, 63% answered "yes", whereas 26% answered "no" and the rest 11% gave mixed answers.

Intriguingly, for each type of responses, subjects in the two cultural groups offered quite similar explanations. For example, the minority of the Americans and the majority of the Chinese participants who judged that Emily is right in making the statements by and large took Emily's perspective and were sympathetic to her for being educated falsely, even though they know clearly whom the historical achievement should really be attributed to¹⁰. Below listed are some of the exemplary remarks these participants have offered.

10 This finding is in close parallel to that of Domaneschi & Vignolo (2019), in which they presented a selection question (see Question 2 in their Experiment 1) to Italian participants asking them to justify their positive response to name-containing statements in the Gödel-like vignette that was adopted from our prior study (Li et al. 2018). What they have found is that participants who answered "true" in response to the imaginary speaker Emily's claim like "*Flint was the person who built the hospital*" tended to understand it from Emily's perspective 74.22% of the time.

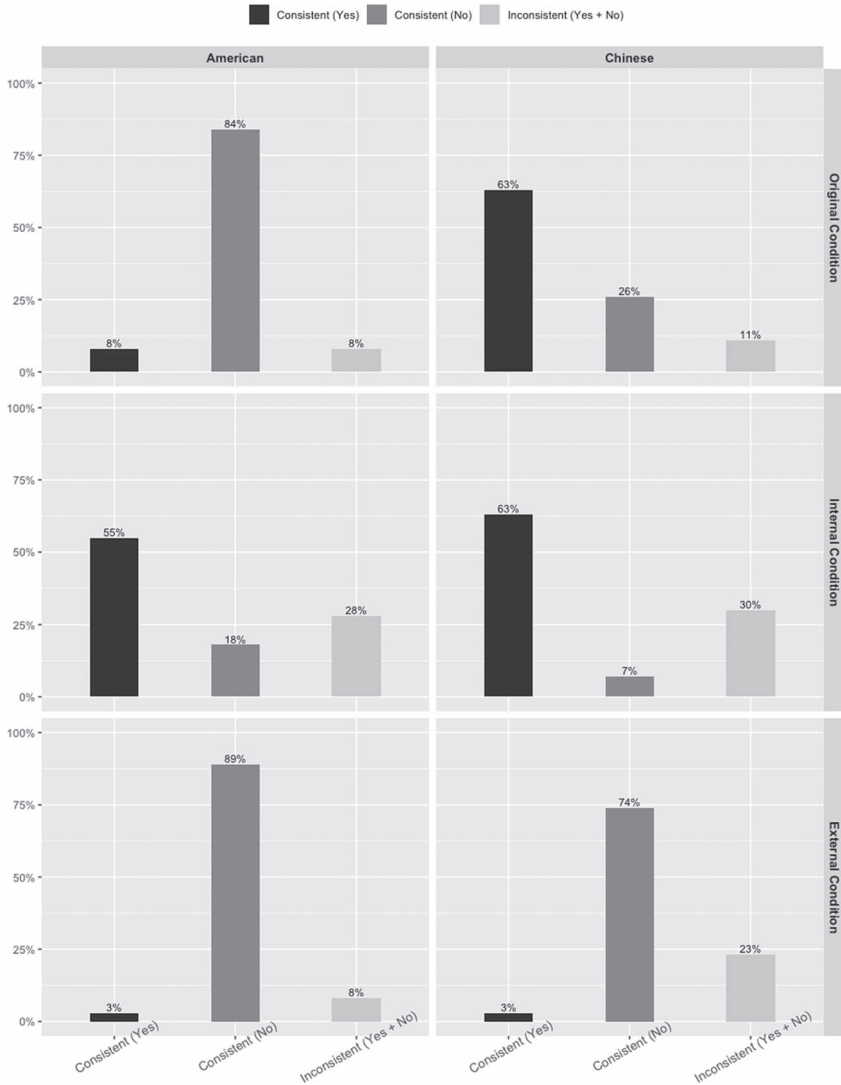


Figure 2 Distribution of Responses across Three Conditions in Experiment 1.

- (1) *“Emily is right because that is what she learned. The first person in these stories should stop leaving the town forever right after they do something.”*
- (2) *“Emily, as a kid, was easily influenced by her surroundings, she said what she was taught.”*
- (3) *“We cannot blame the innocent people. From Emily’s perspective, she is right.”*

As for the overwhelming majority of the Americans and the minority of the Chinese subjects who answered “no”, they showed a strong tendency to stick with the objective history. They have consistently emphasized the factual information available only to themselves concerning who actually drew the pictures, built the hospital, baked the cake and wrote the

book, in spite of Emily's limited and misinformed knowledge about those historical events. Here are some examples:

- (4) *"From an outsider's perspective, Emily is not right because Basil was the individual responsible for the hospital."*
- (5) *"Emily is not right because we as readers know the real person who built the hospital, which was Basil."*
- (6) *"Emily is not right because factually, Walter wrote the book. Just because she is misinformed does not change the facts."*

As for the *internal* condition, 55% of the Americans and 63% of the Chinese participants consistently gave "yes" response across the four stories. In these cases, participants have mostly taken Emily's and the teacher's perspective. They reasoned that according to what is commonly accepted in Emily's community, she was right and thus deserved extra credit for her answer to the teacher's question. The following remarks exemplify the reasoning behind the positive judgments from the participants in both cultural groups.

- (7) *"She gave the commonly accepted correct answer to the question of who drew the pictures."*
- (8) *"Emily's answer agrees with the teacher's belief."*
- (9) *"I think Emily would receive extra credit because everyone in town thinks that Honey baked the cake."*

For the minority of participants who consistently gave "no" responses to the credit-giving question (18% of the Americans and 7% of the Chinese participants), interestingly, a small proportion of them explained that the teacher will not give Emily extra credit because she does not know the accurate history. The rest argued that Emily did not deserve extra credit for her giving a simple answer to the teacher and failing to do thorough investigation. It seems that this latter subgroup of participants did not fully understand the requirement of the credit-giving judgement task or they simply did not accept the rationale of this award-winning task.

In the *external* condition, the vast majority of the participants consistently responded with "no" (89% of the Americans and 74% of the Chinese) and a very small proportion gave "yes" (3% of the Americans and 3% of the Chinese), with the rest being inconsistent across the four stories. The justification remarks indicate both Americans and the Chinese participants have considered Kermit's epistemic perspective and his privileged knowledge status. Here are some of their justification remarks:

- (10) *"Kermit is not right because Walter originally wrote the book."*
- (11) *"Kermit read the story about Basil and Flint, and he knew that Basil had actually been the one who built the hospital."*
- (12) *"Kermit knows the existence of Bob. He is aware that Bob drew these pictures so to say that Sage drew them is incorrect."*

For the very few participants who consistently answered "yes" in the *external* condition, their explanations showed that they did not adopt Kermit's perspective; instead they focused on the commonly accepted knowledge in the story world.

Finally, as displayed in Figure 2, in each condition there is a small proportion of participants from both cultures who gave inconsistent responses¹¹. What is common among these participants is that, unlike the other consistent respondents in the experiment, they have switched their epistemic perspectives while reading through the vignettes. It is found that when they responded “yes”, their explanations mainly center on the misinformed character’s (i.e., Emily’s or her teacher’s) partial knowledge status; but when they answered “no”, their justifications mostly involve the factual details in the eyes of the omniscient beings in the external world (such as the character Kermit, the narrator of the stories, or participants themselves).

In a word, analyses of the justification remarks from both the American and Chinese participants showed that in the *original* condition, when participants judged the name-containing statements to be true, they were thinking from Emily’s perspective; but when they judged the statements to be false, they were considering the actual historical details which are not available to Emily and her community. In the *internal* condition, most participants deemed that the teacher should give Emily extra credit for answering the TVJ-like questions correctly. Their explanations indicated that they have successfully followed the instructions and adopted the epistemic perspective of Emily and her teacher. In the *external* conditions, the overwhelming majority of participants who judged Kermit to be wrong argued that given Kermit’s knowledge status, he should not make those incorrect statements.

4.3. Summary

To sum up, through manipulating the epistemic perspective from which the truth-value of name-containing statements in given contexts is evaluated, we have demonstrated in Experiment 1 that when the proper angle to answer the test questions is explicitly specified in the vignettes, both Americans and Chinese participants can by and large answer the questions as required, by adopting either the perspective of the imaginary speakers in the story setting or taking the perspective of the omniscient people external to the story world. But when the epistemic perspective is ambiguous in the probes, American subjects tended to respond from their own viewpoints whereas the Chinese participants are more likely to respond from the misinformed character’s perspective, hence resulting in the clear cultural patterns of responses. These results have shown that more often than not participants could correctly keep track of the different knowledge status in the hypothetical Gödel-like scenarios and answer the critical test questions from a specific perspective. These findings also suggest that within a cultural group, people could shift between different perspective mind-sets. That is why Americans who are typically assumed to be self-oriented could adopt the other’s perspective when required, and the Chinese who are often considered to be other-oriented could focus on their own perspective when needed (Wu & Keysar 2007:605).

11 Here, despite the fact that the rate of inconsistency in the *internal* condition in both cultural groups is notably higher than that in the other two conditions, we don’t think it is particularly alarming since the vast majority of the participants in this condition responded in a highly consistent manner. But future studies should focus on how to reduce potential noise level in such tasks, and more importantly, on how to manipulate participants’ epistemic perspective even more effectively such that they would not sway in completing the experimental tasks.

5. EXPERIMENT 2

Since Experiment 1 adopted a between-subject design, we are not yet sure whether people could shift between different perspectives at the individual level. We therefore carried out a second experiment using a within-subject design to see how individuals would perform when the pertinent epistemic perspective changes from one vignette to another.

5.1. Methods

5.1.1. Materials Experiment 2 adopted the similar TVJ task as in Experiment 1. The vignettes include one story from each of the three conditions, i.e., *The Classic Book* from the *original* condition, *The Hospital in Neurock* from the *internal* condition, *The Little Prince's Drawings* from the *external* condition. The story in the *original* condition always comes first, while the other two stories appear randomly in order. To ensure smooth transition from one condition to another, a brief introduction to the story settings as well as the characters involved in each condition is added (which is similar to the introductory words at the beginning of each of the three conditions in Experiment 1). The critical test questions and accompanying justification questions are exactly the same as those used in the first experiment. The materials were all presented in Mandarin to Chinese participants.

5.1.2. Participants Altogether 73 native speakers of Chinese (mean age 18.2, 30 females) in mainland China participated in Experiment 2. These participants were recruited on the social platform WeChat, and each was paid 10 yuan for their participation.

5.1.3. Procedure Participants accessed the study on the Chinese survey platform Wen Juanxing (<https://www.wjx.cn/>) through QR code shared in WeChat. After signing the electric consent form, they were all directed to the three stories occurring in semi-randomized order. Upon finishing reading each story, participants were asked to judge whether the name-containing statement is true or false and respond accordingly. The study ends with a short demographic questionnaire. It took approximately ten minutes to complete the whole study.

5.2. Results and analysis

As in Experiment 1, the proportions of negative response “no” to the critical test questions are reported and analyzed below. It was found that the Chinese participants responded negatively 44% of the time to the story in the *original* condition, as displayed in Figure 3. Intriguingly, this same group of participants answered “no” much more frequently in the *external* condition, but they did so much less often in the *internal* condition, i.e. 77% vs. 12% respectively. The results of Cochran's Q Test, which is a non-parametric test for ANOVA with repeated measures, showed that the difference between the three conditions was significant ($p < .01$). Follow-up pairwise Cochran's Q tests revealed that the differences indeed lied between the *original* and *internal* condition, between the *original* and *external* condition, as well as between *internal* and *external* condition (all p -values $< .01$). That means individual participants are capable of readily shifting between different epistemic perspectives and responding distinctly accordingly.

As in the first experiment, we also examined participants' justification remarks for their judgments. Again, through their explanations we saw similar patterns of perspective taking in responding to the test questions. In the *original* condition, the majority of

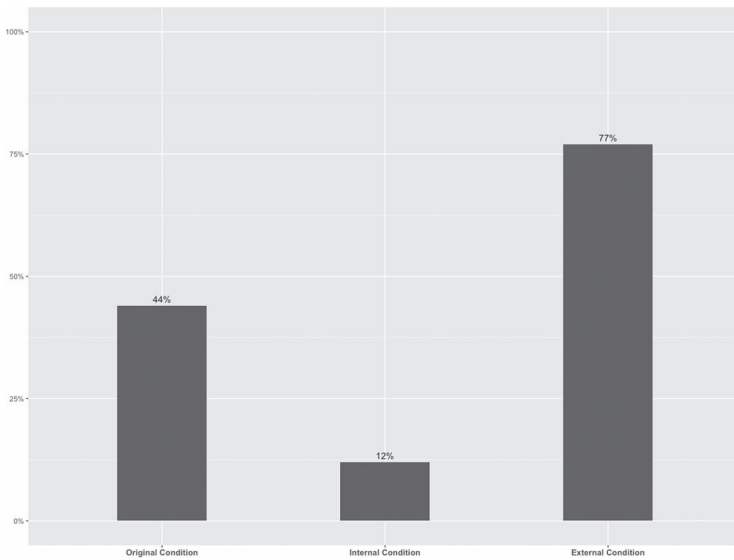


Figure 3 Proportion of “No” Responses in Experiment 2.

participants judged the critical statement to be true, and their explanations indicated that they had considered the imaginary speaker’s limited knowledge status and the widespread misinformation in the hypothetical community; on the contrary, the minority of the participants who judged the statement to be false pointed out who really wrote the classic book despite the popular false belief in the story world. With respect to the *internal* condition, the overwhelming majority of participants considered Emily should receive extra credit for making the statement in response to her teacher’s question, stating that Emily and her teacher share the same knowledge and what she said was what everyone in her town believed. In regard to the *external* condition, the vast majority of participants rejected the statement on the basis of the privileged factual details that are accessible only to them as external judges.

5.3. Summary

Using a suite of probes comprised of stories from three distinct epistemic conditions, we found that individuals from the Chinese culture varied considerably in their perspective taking strategies and ultimate responses to the Gödel-like vignettes when perspectival ambiguity was involved, replicating the intra-cultural variation noted in the literature. But when the pertinent epistemic perspective is clearly defined, they could take the required perspective successfully and respond to the test questions as expected. These results showcased that individuals are capable of taking different perspectives and are ready to switch from one epistemic state to another, making distinct responses accordingly.

6. GENERAL DISCUSSIONS

The current study offered two clear findings. First, through two experiments with a set of novel vignettes, we have provided further evidence that there exist systematic cross-

cultural and intra-cultural variations in people's responses to the Gödel cases. Second, we demonstrated that people could keep track of the different knowledge status in the Gödel-style probes and flexibly shift between the distinct epistemic perspectives both at the group and individual level. Critically, taking different perspectives always leads to different responses to the Gödel-like vignettes both across and within cultural groups, thus confirming our hypothesis about the impact of perspective taking strategies on participants' responses in the Gödel cases.

Particularly, in Experiment 1, when perspectival ambiguity was involved in the probes, the American subjects mostly insisted on their own viewpoint whereas the Chinese participants tended to adopt the imaginary speaker's perspective. These differentiated perspective taking strategies result in a clear-cut cultural pattern in participants' responses to the TVJ tasks, which matches the "cultural style of semantics" repeatedly documented in experimental semantics. That is, while Americans' responses in our study (mostly "no") accord with the previously reported "Kripkean causal-historical" answers, the Chinese participants' judgments (mostly "yes") are distinctively "descriptivist/non-Kripkean", to use the terms commonly used in the literature. Nevertheless, when the vignettes were disambiguated perspective-wise, both Americans and the Chinese successfully adopted the required perspective and gave largely congruent responses. Specifically, in both cultures, laying stress on one's own knowledge status brings about a surge in the rate of negative responses while placing emphasis on the other's perspective leads to a marked increase in the proportion of affirmative answers. Subsequently, in Experiment 2, the Chinese participants, one of the East Asian cultural groups often targeted by experimental philosophers, showed much sensitivity to the manipulation of epistemic perspective in the probes, suggesting that they could indeed readily change their perspective mindsets according to the requirements of the tasks and answer the test questions as expected. In other words, switching perspectives switches responses.

These results reinforce the claims previously made by Sytsma and Livengood (2011) that the epistemic ambiguity in the Gödel case is responsible for the cross-cultural and intra-cultural variation in referential intuitions, in spite of the substantial differences in our experimental techniques. As such, we agree with the proposal put forward by Islam & Baggio (2020) that explaining the variation within and across cultures need not necessarily resort to the competing theories of reference. The alleged differences in intuitions about reference are very likely to be differences of other factor(s) in disguise. In the meantime, the current findings contradict those of Sytsma *et al.* (2015) in showing that unlike Japanese speakers, the Chinese participants are sensitive to changes in epistemic perspectives, and there is not much difference in their responses to the Gödel-style probes and those of the American speakers when the perspectival ambiguity was well controlled for in the experiment (as shown in the *internal* and *external* condition in our study). We suspect the differences between the Chinese and Japanese's response patterns largely stem from the distinct methods used to disambiguate the Gödel probes. Future research may follow up on these two East Asian sub-cultural groups to see whether they would behave similarly in the same experimental context.

Taken together, the current results carry important implications for the ongoing work on testing theories of reference of proper names on the one hand and for the current metaphilosophical debate on the robustness of intuitions in the domain of experimental philosophy on the other hand, to which we turn below.

6.1. *How (not) to test theories of reference*

To reiterate, in this paper we have provided compelling evidence that the systematic cross-cultural variations in referential intuitions repeatedly observed in the Gödel cases are largely attributable to the distinct perspective taking strategies favored in the Western and East Asian cultures. But what then are the theoretical or empirical implications of these findings? In our view, what these results show is not so much how the reference of a proper name is fixed as how (not) to test theories of reference. Note that the primary aim of the current study is to examine how the noted perspectival ambiguity affects people's responses in the Gödel-style vignettes, instead of directly testing the two classical theories of reference. This has been the overarching question that motivates us to design the two experiments via manipulating the relevant epistemic perspectives across different conditions. Because of this focus on perspectivalism, we do not yet have strong grounds to make claims about how our findings bear on the theories of reference of names.

To be specific, post hoc reflections on the experiments suggest that only the *original* condition in the current study is most likely to elicit judgements that could directly bear on the fundamental issue of reference, whereas the other two conditions may mainly serve the purpose of comparing participants' response patterns under different modes of perspective taking. For in the TVJ tasks in the *original* condition, judging the truth-value of the critical statements (i.e., *Flint was the person who built the hospital*) requires participants to figure out the reference of proper names like "Flint" occurring therein. Hence, in theory, the significant differences in American and Chinese speakers' judgments of the statements could be the result of their different views on who "Flint" refers to in the scenarios. But as revealed by the findings reported in sections 4 and 5, these variations are more likely to arise from the differentiated perspective taking tendencies, which thus undermines the conjecture of distinct manners of fixing the reference of names. With regard to the other two contrasting conditions, insofar as they go, the experimental results seem to be compatible with any theory of how the reference of proper names is set in English and Chinese. Specifically, in the *internal* condition, most English and Chinese speakers judge that Emily will get extra credit from her teacher, which is correct because she has said what she was taught irrespective of what "Flint" refers to. Similarly, in the *external* condition, most participants from both cultures judged Kermit to be wrong, since according to the story settings he presumably knows everything about the historical events but he just keeps repeating what the vignette says. For these reasons, the current data cannot yet proffer clear evidence on how people across cultures genuinely fix the reference of proper names. Further experiments are needed to investigate into this reference issue by controlling for ambiguity in epistemic perspectives and other related confounding factors in the vignettes.

Nonetheless, the current results do shed light on the method of testing theories of reference, in that they have raised questions about the reliability and validity of using the Gödel-style probes as pumps of referential intuitions. In particular, after around 15 years of development of experimental semantics, there is still a lack of consensus on how to best test theories of reference of proper names. The most popular practice has been to pit classical descriptivism against the causal-historical view in slightly different variants of the Gödel thought experiment. However, as shown in the current study, the Gödel-style probes may not always be an appropriate tool to evaluate the divergent predictions of the two theories. For despite various techniques of tweaking the wording of the vignettes, the inherent feature of knowledge asymmetry is retained in the modified versions of the Gödel story that incorporate hypothetical speakers in the settings. In such cases, people from different

demographic backgrounds are very likely to adopt different epistemic perspectives, possibly based on factors like which viewpoint is more salient or immediately available to them. It thus becomes doubtful whether experiments like MMNS (2004) and other similar ones can successfully test referential intuitions at all. Aside from the issue of vignette construction, there is also the critical question of what types of questions should be used in the test. Thus far, mainly four kinds of tasks have been employed in the literature, i.e., tests of linguistic intuitions, tests of metalinguistic intuitions (or in Mart's latest words, reflections on use, 2020), direct tests of linguistic usage, TVJ task, among which the last one is the most widely used task format. But as reviewed in section 2, there is still much controversy surrounding TVJ tasks, particularly about the nature of the judgements. Following Devitt and Porot (2018), we believe TVJ task remains a proper and feasible method of eliciting people's judgments about the usage of names, though admittedly there might be even better pumps which awaits further exploration. Additionally, we would also like to propose that whatever the question format is, researchers should seek to delve deeper into the reasons and justifications behind participants' responses. Without the first-hand account from participants, it is very likely that their responses get interpreted erroneously and inferences are drawn inappropriately due to researcher's theoretical biases.

Finally, it is important to point out that we restrict our conclusions to the Gödel-style probes only, for currently the vignettes used to elicit people's referential judgments are quite limited. While we in the current study, as well as Li *et al.* (2018) and Beebe & Undercoffer (2016), have tried to expand the scope of the vignettes by constructing novel stories and narrating them in different manners, the probes are nevertheless essentially similar to the classical Gödel story in that they all involve certain level of secrecy and misinformation. Hence, we do not yet know whether Easterners and Westerners would differ systematically in cases that do not contain such epistemic asymmetry or perspectival ambiguity. Relatedly, it is still unclear whether people's referential judgments in the more general scenarios are universal or not. It is possible that in normal daily settings language users' referential intuitions do not differ across or within cultures. Alternatively, it is probable that people do differ in their referential judgements, yet the existing experimental paradigms using the Gödel case fail to reveal the genuine differences in people's intuitions about reference. Thus, future studies that aim to probe into the referential mechanism of proper names have to construct novel probes that avoid the current problems and limitations, which admittedly is a difficult task.

6.2. *Robustness of intuitions in experimental philosophy*

It is also worthwhile to link our current study to the ongoing debate about robustness of philosophical intuitions in the broader field of experimental philosophy, notably between Knobe (2019) and Machery & Stich (2019). For the past twenty years or so, experimental philosophers have sought to empirically examine whether philosophical intuitions in domains like semantics, epistemology, moral philosophy, etc. vary according to demographic factors like cultural background, gender, educational/professional background, age, etc., among which the cultural effect is perhaps one of the most widely researched topics. Interestingly, while early experimental research seems to suggest that people's intuitions about many philosophical issues are subject to cultural influences systematically, the more recent studies appear to show that such intuitions are indeed more stable than previously thought (Williamson 2019, Knobe 2019). In particular, Knobe cited 30 empirical studies to support his observation that philosophical intuitions are

surprisingly robust across demographic groups, and continued to propose that many of these intuitions might be innate. This means that, according to Knobe, there might be virtually no genuine cross-cultural differences in experimental philosophy, and the demographic variability of intuitions has been overestimated. Knobe's account of the experimental findings has been strongly contested by Machery & Stich (2019) in which they took efforts to assemble an even longer list of 90 empirical studies to show the strong impact of demographic factors on philosophical intuitions. According to Machery & Stich, Knobe has shockingly misrepresented the vast body of literature in experimental philosophy and consequently misread the metaphilosophical implications they carry.

What interests us most in this tussle among the leading experimental philosophers is the portrayal of the cross-cultural differences in the famous Gödel case. Specifically, in his arguments, Knobe cited the cultural variation in people's referential intuitions first discovered by Machery *et al.* (2004) and later replicated in a number of studies as the shining counter example to the above-mentioned trend in research on robustness of philosophical intuitions (p.34). The success of replication in this area of research led Knobe to conclude that there is indeed a real demographic difference in intuitions about reference between Western and East Asian participants, which has remained a deeply important finding in experimental philosophy. The present study, however, offers counter-evidence to even this most celebrated exception of robust intuitions in experimental philosophy by showcasing that the observed cross-cultural differences can actually be explained away by factors that are already familiar from cultural psychology, i.e., perspective taking strategies favored by the different cultural groups. In other words, our results resonate with Knobe (2019)'s claims to a large extent: despite the statistically significant differences in people's responses to various probes of philosophical interests, there might be a surprising degree of robustness of philosophical intuitions across cultures. Future research in experimental philosophy needs to explore such robustness through more reliable and valid tools.

7. CONCLUSION

To sum up, through using a novel method of assessing the Gödel cases, our study has offered a compelling case that the robust cultural effect on referential intuitions observed in the Gödel-style probes is mainly due to differences in perspective taking tendencies between Western and East Asian populations. This research thus not only offers a better understanding of the alleged "cross-cultural style of semantics", but also contributes to experimental semantics (albeit negatively) in suggesting that the Gödel-style probes are inappropriate for testing theories of reference. It also echoes the claim that philosophical intuitions might be more robust than the experimental philosophy literature has suggested. Therefore, future studies that aim to examine whether referential intuitions are universal or not and to find which theory of reference is correct need to create novel probes that do not involve ambiguity in epistemic perspectives as the famous Gödel-Schmidt-like cases do in the first place. It would also be interesting to investigate how perspective taking in the Gödel vignettes affects young children from the Western and Eastern cultures, given that the cultural differences are found to be already present at age seven (Li *et al.* 2018).

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