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# A Cross-Cultural and Intra-Cultural Investigation of the Misinformation Effect in Eyewitness Memory Reports

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**ABSTRACT**

The culture in which individuals are socialised can play a role in shaping their eyewitness memory reports. Drawing on self-construal theory, we examined cultural differences in the misinformation effect. In a mock witness paradigm, participants sampled from collectivistic (Ghana; $n = 65$) and individualistic (United Kingdom; $n = 62$) cultures were exposed to misleading post-event information (PEI). Participants provided a free-recall account and then completed a recognition task that included misinformation items. Cultural differences in misinformation endorsement were not observed in free recall. However, participants from the collectivistic culture endorsed more misleading items in the recognition task than those from the individualistic culture. We also found that in the respective cultures, individual-level cultural orientation was related to the misinformation effect. These findings provide preliminary insights into the role of culture in susceptibility to misleading PEI and further highlight the importance of eliminating leading or suggestive questioning from investigative interviewing practices.

## 1 | Introduction

Information provided by eyewitnesses plays an important role in investigations and legal proceedings (Wells et al. 2020). Errors in eyewitness accounts can, therefore, have grave implications for the criminal justice system. One of the common sources of such errors is misleading post-event information (PEI) (Frenda, Nichols, and Loftus 2011; Loftus 2005). Exposure to misleading PEI can compromise eyewitness evidence, impairing its legal usefulness (Luna and Migueles 2009). Consequently, investigators have to be aware of the potential impact of misinformation, whatever the source, when conducting investigative interviews.

Recent trends in migration have made it more likely that investigators will interview eyewitnesses from different cultures (Anakwah, Sumampuw, and Otgaar 2023; de Bruïne,

Vredeveldt, and van Koppen 2018). Psychological processes across cultures may differ and the eyewitness memory reports may be shaped by cultural factors such as cultural differences in construal of the self (Anakwah et al. 2020; Hope et al. 2021). Given that previous work suggests that cultural factors may play a role in memory conformity and reporting of constructive false memories (Oeberst and Wu 2015; Petterson and Paterson 2012; Wang et al. 2021), then there is reason to believe that the reporting of misleading PEI may also vary across cultures.

### 1.1 | The Misinformation Effect and Culture

The change in memory for a witnessed event resulting from exposure to erroneous information about the event has been referred to as the misinformation effect (Frenda, Nichols, and

Loftus 2011; Loftus 2005). One account of the misinformation effect contends error occurs when misleading information alters the original memory trace (Belli et al. 1994; Loftus 1979, 2005). Proponents of this alteration hypothesis suggest that there is a permanent loss of the original information after an eyewitness accepts misleading information (Loftus 2005). Other perspectives have argued that both the original information and the misleading information are maintained in memory but during retrieval, the misleading information becomes more accessible because of its recency (Bekerian and Bowers 1983). The misinformation effect has also been accounted for within the source monitoring framework. Source monitoring entails a set of cognitive processes involved in attributing the source of an information (Lindsay 2008). According to this framework, the misinformation effect occurs because individuals make source misattributions when discriminating between information sources (Lindsay 2014). Others have suggested that the misinformation effect may be amplified due to demand characteristics or social demands (McCloskey and Zaragoza 1985) such that individuals who have forgotten the original information may be likely to select the misleading information when confronted with a memory test. According to this demand characteristic perspective, individuals may remember both the original information and misleading information but choose the misleading information because they view the source (interviewer) to be credible (McCloskey and Zaragoza 1985).

Regardless of which perspective best accounts for the well-documented misinformation effect, how attentional resources are allocated may have implications for the extent of the misinformation effect (Ayers and Reder 1998; Loftus 2005). For example, misleading information is more likely to impair memory for an original event when attentional resources at the time of encoding were divided or limited in some way (Frenda, Nichols, and Loftus 2011; Loftus 2005). During encoding individuals attend to central details more than peripheral details (Burke, Heuer, and Reisberg 1992). As a result, it is likely that individuals have stronger memories for central details than background details (Ibabe and Sporer 2004). Hence, susceptibility to misleading information may be stronger for the latter than the former (Paz-Alonso, Goodman, and Ibabe 2013). What individuals attend to in visual scenes, however, has been shown to vary across cultures (Gutchess and Indeck 2009; Masuda and Nisbett 2006). Therefore, it is possible that the culture in which individuals are socialised may have implications for the misinformation effect. Thus, susceptibility to misleading details about central and background details[1] may vary depending on the culture of socialisation.

Cultural differences in individualism–collectivism has been argued to play an important role in shaping cognition (Markus and Kitayama 2010; Masuda et al. 2008). Individualism is a cultural orientation where the individual is viewed as separate from the social context, whereas collectivism is a cultural orientation where individuals are viewed as not separate from the social context but integrated in cohesive social relationship (Hofstede 1983, 2001).[2] Research suggests that individuals socialised in individualistic cultures typically attend more to central (focal) details than those socialised in collectivistic cultures, who typically attend more to background (contextual) details (Ji and Yap 2016; Markus and Kitayama 1991). In their

self-construal theory, Markus and Kitayama (1991, 2010) argue that individuals socialised in individualistic cultures develop independent self-construal, whereas those socialised in collectivistic cultures develop interdependent self-construal. According to this account, individuals with an independent construal of the self view the self as containing more unique dispositions and attributes and, consequently, become more oriented to the properties of an object, developing an analytic perception and attending more to focal events. Individuals having an interdependent construal of the self, however, consider the self to be intricately connected to other members of the society, and value communal living. Early work by Markus and Kitayama (1991) proposed that due to this interdependent view of the self, individuals socialised in collectivistic cultures tend to become perceptually oriented to their surroundings (holistic perception), attending more to the context.

Consistent with the proposed cultural differences in cognitive styles, previous research has demonstrated differences in attentional allocation for visual scenes across cultures (Boduroglu, Priti, and Nisbett 2009; Masuda and Nisbett 2006). For example, in one such study using a visual change detection paradigm (Masuda and Nisbett 2006), North American participants identified changes to focal information more than Japanese participants, who also identified changes to contextual information more than North Americans participants, suggesting that attention to central and contextual details may differ across cultures. In related research on memory error, Wang et al. (2021) found cultural differences in constructive false memories for central and background details. Dutch and Chinese participants were presented with DRM items together with their own name (self-reference) or another person's name (other-reference) in pictures that had various backgrounds. Participants were asked to remember the context in which the items appeared as well as the referential person the items were presented with (i.e. self or other) after which they completed a recognition test. Dutch participants displayed better memory for the focal details, compared to Chinese participants, who displayed better memory for contextual details than Dutch participants did. The results also showed that memory for contextual detail was impaired for the Dutch participants (cf. Chinese participants).

Given the evidence for cross-cultural differences in attentional allocation, memory impairment for central and background details after exposure to misleading PEI may vary cross-culturally. It is plausible that misleading PEI may impair memory performance for central details more than for background details in a collectivist sample, as when attentional resources are distributed broadly at a visual field, there may be fewer cognitive resources allocated to a focal event (Boduroglu, Priti, and Nisbett 2009). Similarly, if individuals from individualistic cultures attend more to focal details than contextual events, their available cognitive resources to process background details may be limited. Consequently, for individuals from individualistic cultures, misleading PEI may impair memory performance for background details more than for central details.

Aside from the possibility of cross-cultural differences in the misinformation effect associated with attention allocation at encoding, witnesses from diverse cultures might differ in their tendency to endorse misleading PEI. Specifically, due to cultural

differences in the independent–interdependent construal of the self, it is possible that individuals from different cultures may respond to social influences differently (Oeberst and Wu 2015). For instance, it may be that individuals from collectivistic cultures who view the self as integrated with the social context may be more sensitive to social influences than individuals from individualistic cultures (Bond and Smith 1996). As such, information from other social sources may influence the accounts provided by individuals from collectivistic cultures. Similarly, if individuals from individualistic cultures view the self as separate from the social context (Markus and Kitayama 1991), they may be less likely to incorporate information from other social sources in their accounts. For example, previous cross-cultural comparisons suggest that cultural differences in self-construal may be associated with social influence, with individuals with collectivistic cultural orientation more susceptible to interrogative compliance than individuals with individualistic cultural orientation (Oeberst and Wu 2015).

It has been argued that besides the cross-cultural differences, there are individual-level differences in individualism–collectivism within cultures (Singelis et al. 1995; Triandis 2001). This within cultural variation may have implications for intra-cultural differences in the misinformation effect. For example, in research using a mock witness paradigm, participants viewed video of a forensic autopsy and later discussed what they saw with a confederate (co-witness), who introduced misleading details in the discussion (Petterson and Paterson 2012). Participants then completed a free-recall questionnaire and a measure of cultural orientation. Mock witnesses high on individualism were less susceptible to memory conformity although there was no association between collectivism and memory conformity. However, this particular study focused on a western context (i.e. culture location was not varied systematically). As such, little is known about cross-cultural differences and intra-cultural variations in the misinformation effect within non-western contexts.

## 1.2 | Current Research

Researchers have focused on the misinformation effect for over four decades. However, conclusions from research in this area have largely been based on Western samples and, to date, cross-cultural research using the misinformation effect paradigm is limited. In this experiment, we examined the misinformation effect across two cultures. Mock witnesses from sub-Saharan Africa and Western Europe received misleading PEI about an incident, and later provided free recall and completed a recognition test for details of the incident. In line with previous research suggesting that individuals from individualistic cultures are less sensitive to contextual details (Boduroglu, Priti, and Nisbett 2009; Masuda and Nisbett 2006; Wang et al. 2021), we expected exposure to misleading PEI to impair memory for original *background details*, for mock witnesses from individualistic cultures more than for mock witnesses from collectivistic cultures. Similarly, in line with past research showing individuals from collectivistic cultures attend broadly to contextual details but are less sensitive to *central details* (Boduroglu, Priti, and Nisbett 2009; Wang et al. 2021), we expected exposure to misleading PEI to impair memory for original central details for mock witnesses from collectivistic cultures more

than for mock witnesses from individualistic cultures. Thirdly, we also expected the cultural groups to differ in the extent to which they endorse misleading items, consistent with the theory on independent–interdependent self-construal (Markus and Kitayama 1991, 2010). Specifically, we expected mock witnesses from collectivistic culture would endorse misleading PEI more than mock witnesses from individualistic culture. The third hypothesis tested is a general one. The first and second hypotheses, which are more specific, do relate to the allocation of (putative) attentional resources at encoding, as predicted by older theories (e.g. Cultural differences in holistic–analytic cognition; Markus and Kitayama 1991).

## 2 | Method

### 2.1 | Participants

One hundred and twenty-seven undergraduates from Ghana (15 males, 50 females, $M_{age} = 19.89$, $SD = 1.44$) and the United Kingdom (30 males, 32 females, $M_{age} = 20.53$, $SD = 2.70$) participated in the study.[3] These participants were born, raised, and lived in the respective countries at the time of testing. The two countries represent the cultural dimensions of interest in the current study: the United Kingdom is more individualistic in orientation, scoring 89 on the Hofstede Index while Ghana is more collectivistic, scoring 14 on the same index (Hofstede, Hofstede, and Minkov 2010).[4] It is important to note that while individual-level cultural orientation did not differ between participants from Ghana and the Netherlands, this is a common observation in previous research showing the use of cultural orientation (self-construal) scale to measure individual-level cultural orientation within and across cultures is highly unstable (see Levine 2003).[5] Thus, the cross-cultural comparison in the current study is based on Hofstede's (1983, 2001) classification of national cultures,[6] used extensively to study cultural differences in behaviour and cognition (de Bruïne, Vredeveldt, and van Koppen 2018; Jobson 2009; Leal et al. 2018; Wang 2004).

Participants in Ghana and the United Kingdom were university students in the respective countries. Participants in both countries were proficient in the English language.[7] Participants in Ghana were recruited through advertisements and announcements at lecture halls. Participants in the United Kingdom were recruited through advertisements and departmental participant pools. Participants recruited in Ghana received GH¢ 10 voucher for phone credits or opted to participate without compensation. Participants in the United Kingdom received course credits or opted to participate without compensation.

### 2.2 | Design

A 2 (Cultural Group: Ghana, United Kingdom)×2 (Misinformation Exposure: Control items, Experimental items) mixed design was used. The between-subject factor was cultural group and the within-subject factor was misinformation exposure. The dependent variables were the number of correct details reported about central and background events, and the number of misinformation details reported about central and background events.

**TABLE 1** | Misinformation item matrix showing control and experimental items.

| | Control detail | Misled detail | Detail type | Misinformation type |
|---|---|---|---|---|
| PEI Set A | The courier looked on as the secretary signed for the parcel | As the secretary signed for the parcel, the courier pulled out her mobile phone | Central | Additive |
| | She ran past a woman wearing black clothes | She ran past two school children | Background | Additive |
| | Black jacket | Brown jacket | Central | Contradictory |
| | White desk | Black desk | Background | Contradictory |
| PEI Set B | The courier and the office employee did not shake hands before delivering the parcel | The courier shook hands with the office employee before delivering the parcel | Central | Additive |
| | Just beside the entrance was a bicycle | Just beside the entrance was a dog | Background | Additive |
| | Grey-coloured laptop | Blue-coloured laptop | Central | Contradictory |
| | Yellow shopping bags | Green shopping bags | Background | Contradictory |

Abbreviation: PEI, post-event information.

## 2.3 | Materials

### 2.3.1 | Stimulus Event

The stimulus event was a short film about a theft in a travel agency (Powrie 2015). In the event, a courier wearing a motorcycle helmet is seen entering the office of a travel agency with a parcel. When she enters the office, a receptionist collects the parcel and signs for it. While the receptionist goes to another room to fetch a glass of water, the courier quickly takes a laptop from the office desk and rushes out of the office. When the receptionist returns, she realises the courier is not in the office and notices the laptop is not on the desk. The receptionist rushes out and starts shouting to raise the alarm. She attempts chasing the courier but cannot apprehend her. In the last scene of the event, the courier stops running, removes her helmet, throws it into a nearby garden, and then leaves the scene. The event is approximately 1 min 30 s in duration. The stimuli event, used with permission, is available at: https://osf.io/eu2yc/?view_only=4af87df3143e43f9903f80d0583d0bdb.

### 2.3.2 | Misinformation Items

The stimulus event was piloted to identify misinformation items. In this pilot, 12 participants (5 males, 7 females, $M_{age} = 20.33$, $SD = 2.39$) from Ghana (2 males, 4 females, $M_{age} = 19.00$, $SD = 0.89$) and United Kingdom (3 males, 3 females, $M_{age} = 21.67$, $SD = 2.73$) watched the event and provided a free recall in writing. Participants were also asked to indicate within that written report, which details they perceived as central and background within the event. Participants judgement on centrality was consistent with our operationalisation of central and background details. From the free-recall reports of participants, four items with medium to high memorability were identified as critical (target) items, in line with previous studies (Blank et al. 2013; Van Bergen et al. 2010). These four critical items were 'jacket', 'desk', 'laptop' and 'shopping bags'. These selected items were

categorised as central (jacket, laptop) and background (desk, shopping bags) details by participants in the pilot study. The critical items were manipulated to produce contradictory misinformation items (Huff and Umanath 2018; Van Bergen et al. 2010). For example 'white desk' (correct item) was changed to 'black desk' (misleading item) to develop a contradictory misinformation item. Thus, contradictory misinformation directly contradicts details described in the video event.

Four other (additive) misinformation items were also produced. Additive misinformation are misleading details that could have plausibly been present in the original event (Frost 2000). To produce additive misinformation, participants in the pilot study were also presented with a list of 21 events (central and background) that were either present in or absent from the event. Participants were asked to rate the plausibility of these events to have occurred in the recorded event, on a scale of 1 (*not at all plausible*) to 8 (*extremely plausible*), consistent with Scoboria et al. (2004). Among events that were not present in the recorded event, four of those events that received the highest plausibility rating were selected. The selected events were 'The office employee shook hands with the courier', 'The courier pulled out a mobile phone at the office', 'There were two kids walking at the other side of the street' and 'There was a dog on the pavement outside the office'. Thus, in total eight (additive and contradictory) critical misinformation items, comprising central (4 items) and background (4 items) details were selected for the current study. These critical items were used as control and experimental items in a within-subject misinformation design (see Blank et al. 2013, for similar within-subject misinformation manipulation). The misinformation item matrix is presented in Table 1.

### 2.3.3 | Post-Event Narrative

In order to enhance the credibility of the post-event narrative, we prepared a mock news report that gave an account of the incident of theft at the travel agency. The report ended with an

appeal to the general public to provide information about the perpetrator. This mock news report was formatted to resemble a webpage news report (for a similar misinformation format, see Gabbert et al. 2012). Two versions of the report were prepared, with the control and experimental (misled) items counterbalanced across the reports, consistent with previous studies (Blank et al. 2013). Thus, although participants read about the same event, half of them were misled about four of the critical items (jacket, desk, kids and phone) but not the other four critical items (laptop, shopping bag, dog and handshake), and vice versa for the other half of the participants. The post-event narratives are available on OSF at https://osf.io/eu2yc/?view_only=4af87df3143e43f9903f80d0583d0bdb.

### 2.3.4 | Recognition Test

The recognition test consisted of 12 forced-choice questions; eight questions about the critical (target) items and four filler questions. Consistent with Zhu et al. (2013), each question offered four possible response options: the original item, misinformation item, new foil item and, to minimise guessing (Paz-Alonso, Goodman, and Ibabe 2013), a 'Don't know' response option. A sample question is 'The courier was wearing a_____', with response options as 'black jacket' (original item), 'brown jacket' (misinformation item, where this erroneous colour detail is provided in the misinformation narrative), 'blue jacket' (foil item) and 'Don't know'. The 12 forced-choice questions comprised of six questions each about central and background event. The recognition test is available at https://osf.io/eu2yc/?view_only=4af87df3143e43f9903f80d0583d0bdb.

### 2.3.5 | Cultural Orientation Scale

The cultural orientation scale (Triandis and Gelfand 1998) is a 16-item scale that measures self-reported individualism and collectivism on a 9-point Likert-type scale (1 = *never or definitely no* and 9 = *always or definitely yes*). This scale has four sub-scales: horizontal individualism, vertical individualism, horizontal collectivism, and vertical collectivism.[8] Sample items on the scale include '*It is important to me that I respect the decisions made by my groups*' and '*My personal identity, independent of others, is very important to me*'. The scale has a reliability of 0.75 (Gelfand and Realo 1999).

### 2.4 | Procedure

Participants took part in the study individually. After consenting to participate, they watched the recorded event, which was followed by a distraction task (visual illusion task and mathematical problems) for 15 min. Participants were then asked to read the mock news report (post-event narrative) and were told that it was a media report about the incident published after it occurred. The presentation of the post-event narratives was counterbalanced across participants such that half of the participants received PEI Set A while the other half received PEI Set B, whereby each misinformation item was paired with a control item (see Blank et al. 2013; Pansky, Tenenboim, and Bar 2011, for similar within-subjects misinformation methodology). After

reading the post-event narrative, participants were given another distraction task which lasted 10 min (word search and mathematical problems). Following this, participants were asked to provide a verbal free recall of the original event they had viewed in as much detail as possible. This report was audio recorded. After the free recall, participants completed the recognition test. Again, participants were instructed that their responses should be based on what they saw in the event. After the recognition test, participants completed their demographic information and the cultural orientation scale. Afterward, they were debriefed and thanked for their participation. Each test session lasted approximately 45 min.

### 2.5 | Coding

Free-recall responses were transcribed and coded. A coding template for central and background details based on the pilot data was developed. Using this template, the free-recall reports were coded for central and background details, with each detail type additionally coded as correct, incorrect or as endorsing misinformation. Items that were in the event and rightly described as such were coded as correct (e.g. describing that the courier wore a black helmet). Items coded as incorrect were descriptions that were discrepant with the event (e.g. describing the colour of the courier's helmet as red when in fact it was black). Items that were suggested in the post-event narrative but which did not occur in the target event were coded as misinformation endorsement (e.g. when it was suggested in the narrative that the courier shook hands with the receptionist, and participants mention this suggested item in their free recall). Vague or ambiguous responses were not coded. Twenty percent (20%) of the transcripts were randomly selected and coded by a second coder. There was a high inter-coder agreement (intra-crass correlation coefficient) for correct central details (0.88), and correct background details (0.77).

## 3 | Results

### 3.1 | Overview and Analysis Plan

We examined misinformation effects on memory in this study in two ways. First, we examined *misinformation endorsement* (i.e. the extent to which misinformation is accepted and subsequently reported). Secondly, we examined *memory for original details* after exposure to misinformation. Consistent with previous research (e.g. Blank et al. 2013), misinformation endorsement was assessed in two ways – via recall and recognition tests. Both recall and recognition memory were examined in the current study as measuring performance in both recall and recognition enabled us to access whether cultural differences would be observed in the respective tests. Previous research using recall tests showed cultural differences in eyewitness memory reports (Anakwah et al. 2020). Thus, we used the misinformation paradigm to investigate the effects of culture on recall reports further in the current study. Previous work also shows individuals with collectivistic orientation enhance their memory reporting by using 'Don't know' responses more than individuals with an individualistic orientation (Anakwah et al. 2020). Hence, it is possible individuals with collectivistic orientation will adopt

**TABLE 2** | Mean (standard deviation) of correct details and misleading central and background details for the respective cultural groups in free recall.

| | | Correct details | Misleading details |
|---|---|---|---|
| Central | Ghana | 23.18 (8.18) | 0.12 (0.33) |
| | United Kingdom | 28.31 (7.79) | 0.16 (0.41) |
| Background | Ghana | 5.97 (4.89) | 0.14 (0.39) |
| | United Kingdom | 9.40 (3.56) | 0.06 (0.25) |

this strategy to minimise the impact of misleading PEI when they have the option to select a 'Don't know' option on a recognition test. Thus, using both recall and recognition allowed us to conduct a more thorough examination of the misinformation effect across cultures.

We analysed misinformation endorsement for *recall* using a two-way mixed ANOVA with type of detail (central, background) as within-subject factor and cultural group (Ghana, United Kingdom) as between-subject factor. Analysis of misinformation endorsement for *recognition* memory for the respective types of details was conducted using a two-way mixed ANOVA with misinformation (control, experimental) as within-subject factor and cultural group (Ghana, United Kingdom) as the between-subject factor. Thus, we present three tests of misinformation endorsement for *recognition* memory, using two-way ANOVAs, focusing on (a) cultural differences in misinformation endorsement for central details, (b) cultural differences in misinformation endorsement for background details and (c) whether mock witnesses would endorse misinformation for particular type of details. These analyses enabled us to determine whether mock witnesses from a collectivistic culture would accept and report suggested details more than mock witnesses from an individualistic culture.

Our next analysis focuses on memory for original details after exposure to misinformation. Similar to our analysis on misinformation endorsement for recognition memory, we present two-way ANOVA, with misinformation (control, experimental) as within-subject factor and cultural group (Ghana, United Kingdom) as between-subject factor. The first analysis focuses on cultural differences in memory for original central details. This analysis enabled us to test the hypothesis that exposure to misleading PEI would impair memory for original central details for mock witnesses from collectivistic cultures more than for mock witnesses from individualistic cultures. The second analysis focuses on cultural differences in memory for original background details, where we tested the hypothesis that exposure to misleading PEI would impair memory for original background details, for mock witnesses from individualistic cultures more than for mock witnesses from collectivistic cultures.

Finally, we present two exploratory analyses. Our first exploratory analysis reports a two-way mixed ANOVA on selection of 'Don't know' responses after exposure to misinformation. Our second exploratory analysis focuses on intra-cultural differences in the misinformation effect. Specifically, we examine the relationship between individual-level individualism–collectivism (as reported via the four sub-dimensions of the
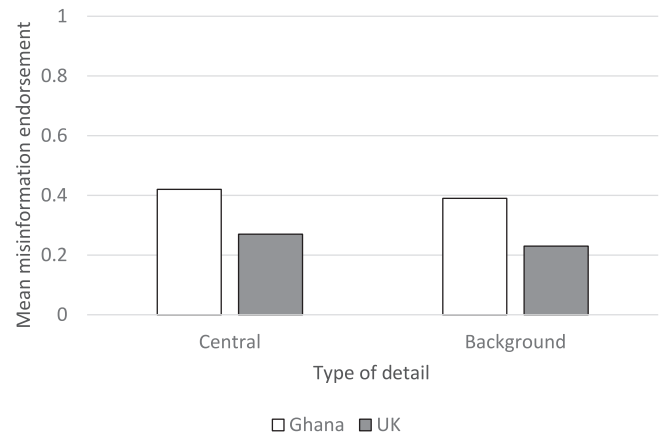


**FIGURE 1** | Mean of misinformation endorsement for central and background details across cultural groups.

cultural orientation scale) and the outcome variables (memory for original details, misinformation endorsement, and Don't know). This analysis enabled us to examine whether individual-level cultural orientation is associated with observed memory effects across cultures. Pearson's *r* correlation was used for this analysis.

## 3.2 | Misinformation Endorsement

Cultural group did not have a significant effect on the number of misinformation details reported in free *recall* $F(1, 125) = 0.12$, $p = 0.73$, $\eta_p^2 = 0.001$. Type of detail also did not have a significant effect on the reporting of misinformation details in free *recall* $F(1, 125) = 1.43$, $p = 0.234$, $\eta_p^2 = 0.011$. Similarly, there was no significant interaction effect between cultural group and type of detail on the reporting of misinformation details in free *recall* $F(1, 125) = 2.71$, $p = 0.102$, $\eta_p^2 = 0.021$ (see Table 2).

In addition to misinformation endorsement in *recall*, we also report analysis for misinformation endorsement in *recognition* memory. We conducted a mixed factorial ANOVA with cultural group (Ghana, United Kingdom) as a between-subject factor and misinformation condition (control items, misled items) as a within-subject factor. The dependent variables were the total number of misleading items selected (endorsed) for central details and the total number of misleading items selected for background details. There was a significant main effect of cultural group on the endorsement of misleading items about central details $F(1, 125) = 4.77$, $p = 0.031$, $\eta_p^2 = 0.04$. Participants from Ghana endorsed more misleading items about the central

event than did participants from the United Kingdom (see Figure 1). There was also a significant main effect of misinformation on the endorsement of misleading items about central details $F(1, 125) = 41.87$, $p < 0.001$, $\eta_p^2 = 0.25$. Participants selected experimental (misleading) items ($M = 0.58$, $SD = 0.75$) more than control (non-misleading) items ($M = 0.11$, $SD = 0.34$), for central details. The interaction between cultural group and misinformation was not significant, $F(1, 125) = 3.24$, $p = 0.074$, $\eta_p^2 = 0.03$.

There was a significant main effect of cultural group on the endorsement of misleading items about background details, $F(1, 125) = 5.50$, $p = 0.021$, $\eta_p^2 = 0.04$. Participants from Ghana selected misleading items about background details more than did participants from United Kingdom (see Figure 1). There was also a significant main effect of misinformation on the endorsement of misleading items about background details, $F(1, 125) = 57.78$, $p < 0.001$, $\eta_p^2 = 0.32$. Participants selected more experimental (misleading) items ($M = 0.59$, $SD = 0.77$) than they did for control items ($M = 0.04$, $SD = 0.23$), for background details. The interaction between cultural group and misinformation on the endorsement of misleading items about background details was also significant $F(1, 125) = 8.34$, $p = 0.005$, $\eta_p^2 = 0.06$. A planned comparison revealed participants from Ghana selected more misleading items than control items for background details ($p < 0.001$). Participants from United Kingdom also selected more misleading items than control items for background details ($p = 0.001$). The difference in misinformation endorsement between control items and misleading items was higher for participants from Ghana (0.02 vs. 0.77, difference = 0.75) than participants from the United Kingdom (0.06 vs. 0.40, difference = 0.34; see Table 3).

We also assessed whether mock witnesses from the respective cultures would be more susceptible to endorsing misinformation about particular type of details (central and background details). For control condition, we found participants from Ghana endorsed significantly more misleading items about central details than background details, $F(1, 64) = 5.85$, $p = 0.018$, $\eta_p^2 = 0.08$. Participants from United Kingdom, however, did not significantly differ in the endorsement of misleading items about central and background details, $F(1, 61) = 0.66$, $p = 0.419$, $\eta_p^2 = 0.01$. For the experimental condition, we found that there was no significant difference in the endorsement of misinformation for central and background details by participants from Ghana, $F(1, 64) = 0.23$, $p = 0.635$, $\eta_p^2 = 0.004$ and United Kingdom, $F(1, 61) = 0.164$, $p = 0.687$, $\eta_p^2 = 0.003$ (see Table 3).

## 3.3 | Memory for Original Details

To examine the impact of misinformation on memory for original details for the recognition task, we compared the number of correct responses for control and experimental (misled) items. A mixed factorial ANOVA was conducted with cultural group (Ghana, United Kingdom) as between-subject factor and misinformation (control items, experimental items) as a within-subject factor. The dependent variables were the total number of correct central details (memory for original central details) and the total number of correct background details (memory for original background details) selected in the recognition task. Memory for original central details after exposure to misinformation was similar across cultural groups, as there was no significant difference between participants from Ghana and the United Kingdom $F(1, 125) = 1.02$, $p = 0.315$, $\eta_p^2 = 0.01$ (see Table 4). We followed up on the lack of significant difference between the cultural groups with a Bayesian mixed ANOVA using JASP. The main effect model was compared to the null model. We found a Bayes Factor of $BF_{01} = 4.47$, showing a substantial evidence for the null hypothesis.

There was a significant main effect of misinformation exposure on the number of correct central details selected, $F(1, 125) = 51.95$, $p < 0.001$, $\eta_p^2 = 0.29$. Misleading (experimental) items ($M = 1.18$, $SD = 0.75$) impaired participants' memory for original central details more than did control items ($M = 1.72$, $SD = 0.49$), in the recognition task. The interaction between cultural group and misinformation was significant $F(1, 125) = 4.75$, $p = 0.031$, $\eta_p^2 = 0.04$. A planned comparison revealed memories for original central details were impaired by misleading items more than control (non-misleading) items, for both participants from the United Kingdom ($p = 0.001$) and Ghana ($p < 0.001$). The difference in memory for original central information between misleading and control items was higher for participants from Ghana (1.75 vs. 1.06, difference = 0.69) than participants from United Kingdom (1.68 vs. 1.31, difference = 0.37) (see Table 3 for means of control and experimental items for the respective groups).

The cultural groups did not significantly differ in memory for original background details after exposure to misinformation, $F(1, 125) = 3.04$, $p = 0.084$, $\eta_p^2 = 0.02$ (see Table 4). We followed-up this finding with a Bayes Factor analysis which showed substantial evidence for the null hypothesis ($BF_{01} = 3.00$). There was, however, a significant main effect of misinformation on the number of correct background details selected $F(1, 125) = 38.36$,

**TABLE 3** | Means (standard deviation) of memory for original details and misinformation endorsement for misleading and control items by cultural groups on the recognition task.

| | | Memory for original details | | Misinformation endorsement | | Don't know | |
| | | Control | Misleading | Control | Misleading | Control | Experimental |
|---|---|---|---|---|---|---|---|
| Central | Ghana | 1.75 (0.43) | 1.06 (0.77) | 0.12 (0.33) | 0.72 (0.78) | 0.11 (0.31) | 0.17 (0.42) |
| | United Kingdom | 1.68 (0.54) | 1.31 (0.71) | 0.11 (0.35) | 0.44 (0.69) | 0.21 (0.41) | 0.26 (0.51) |
| Background | Ghana | 1.34 (0.67) | 0.57 (0.66) | 0.02 (0.12) | 0.77 (0.82) | 0.49 (0.66) | 0.49 (0.66) |
| | United Kingdom | 1.27 (0.66) | 0.89 (0.68) | 0.06 (0.31) | 0.40 (0.66) | 0.47 (0.56) | 0.56 (0.62) |

**TABLE 4** | Means (standard deviation) of memory for original details and misinformation endorsement by cultural group on the recognition task.

| | | Memory for original details | Misinformation endorsement |
|---|---|---|---|
| Central | Ghana | 1.41 (0.47) | 0.42 (0.40) |
| | United Kingdom | 1.49 (0.47) | 0.27 (0.40) |
| Background | Ghana | 0.95 (0.41) | 0.39 (0.38) |
| | United Kingdom | 1.08 (0.41) | 0.23 (0.38) |

$p < 0.001$, $\eta_p^2 = 0.24$. Participants memory for original background details was impaired more when they were misled (experimental; $M = 0.72$, $SD = 0.69$) than when they were not misled (control; $M = 1.31$, $SD = 0.66$). The interaction between cultural group and misinformation was marginally significant $F(1, 125) = 4.19$, $p = 0.043$, $\eta_p^2 = 0.023$. Both participants from Ghana ($p < 0.001$) and the United Kingdom ($p = 0.006$) reported more correct control items than misled items. The difference in memory for original background details between control items and misleading items was higher for participants from Ghana (1.34 vs. 0.57, difference = 0.77) than participants from the United Kingdom (1.27 vs. 0.89, difference = 0.38) (see Table 3).

To assess whether the cultural groups are more susceptible to misinformation about a particular type of detail, we compared correct central and correct background details selected on the recognition test by participants from the respective cultural groups. On control items, both participants from Ghana [$F(1, 64) = 16.39$, $p < 0.001$, $\eta_p^2 = 0.20$] and United Kingdom [$F(1, 61) = 16.66$, $p < 0.001$, $\eta_p^2 = 0.21$] selected more correct central details than correct background details. For experimental items, participants from Ghana selected more correct central details than correct background details, $F(1, 64) = 19.30$, $p < 0.001$, $\eta_p^2 = 0.23$. Participants from United Kingdom also selected more correct central details than correct background details for experimental items, $F(1, 61) = 17.93$, $p < 0.001$, $\eta_p^2 = 0.23$ (see Table 3).

## 3.4 | Exploratory Analysis

### 3.4.1 | Don't Know Responses

The extent to which participants across the cultural groups selected 'Don't know' responses was also analysed. We conducted a mixed factorial ANOVA, with cultural group as the between-subject factor and 'Don't know' (control items, experimental items) as the within-subject factor. There was no significant main effect of cultural group, $F(1, 125) = 2.56$, $p = 0.112$, $\eta_p^2 = 0.02$ and misinformation, $F(1, 125) = 1.57$, $p = 0.213$, $\eta_p^2 = 0.01$ on 'Don't know' responses for central details. The interaction between cultural group and misinformation on 'Don't know' responses for central details was also not significant, $F(1, 125) = 0.02$, $p = 0.881$, $\eta_p^2 = 0.00$.

There was also no significant effect of cultural group, $F(1, 125) = 0.07$, $p = 0.790$, $\eta_p^2 < 0.01$ and misinformation, $F(1, 125) = 0.52$, $p = 0.472$, $\eta_p^2 < 0.01$ on 'Don't know' responses for background details. The interaction between cultural group

and misinformation was also not significant $F(1, 125) = 0.52$, $p = 0.472$, $\eta_p^2 < 0.01$.

We also found that for control items, both participants from Ghana, $F(1, 64) = 17.39$, $p < 0.001$, $\eta_p^2 = 0.21$ and the United Kingdom, $F(1, 61) = 10.55$, $p = 0.002$, $\eta_p^2 = 0.15$ provided more 'Don't know' responses for background details than central details. For experimental items, participants from both Ghana [$F(1, 64) = 14.37$, $p < 0.001$, $\eta_p^2 = 0.18$] and the United Kingdom, $F(1, 61) = 11.39$, $p = 0.001$, $\eta_p^2 = 0.16$, also significantly provided more 'Don't know' responses for background details than for central details.

### 3.4.2 | Individual-Level Analysis Within Cultures

Individual-level analysis showed that for participants from Ghana, horizontal individualism had a significant positive relationship with memory for original central details ($r = 0.274$, $p = 0.027$). Horizontal individualism also had a significant negative relationship with misinformation acceptance for central details ($r = -0.327$, $p = 0.008$), for this group, such that higher scorers on horizontal individualism also had lower misinformation acceptance scores. There was no significant relationship between horizontal individualism and selection of 'Don't know' for participants from Ghana ($r = 0.107$, $p = 0.396$). However, vertical individualism had a significant positive relationship with selection of 'Don't know' for central details for Ghanaian mock witnesses, ($r = 0.308$, $p = 0.013$). Horizontal collectivism and vertical collectivism did not have any significant relationship with all dependent measures, for mock witnesses from Ghana.

For United Kingdom mock witnesses, vertical individualism had a significant negative relationship with misinformation acceptance for central details ($r = -0.254$, $p = 0.046$). There was also a marginally significant negative relationship between vertical collectivism and selection of 'Don't know' for central details, for United Kingdom mock witnesses ($r = -0.241$, $p = 0.059$). All other sub-dimensions did not have a significant relationship with central details for the respective dependent measures, for mock witnesses from United Kingdom.

None of the sub-dimensions had a significant relationship with any of the respective DVs on background details for mock witnesses from Ghana. For mock witnesses from United Kingdom, horizontal collectivism had a significant negative relationship with misinformation acceptance for background details ($r = -0.310$, $p = 0.014$). All other sub-dimensions did not have a

**TABLE 5** | Correlation between individual-level cultural orientation and outcome variables for central details.

| | Ghana | | | United Kingdom | | |
|---|---|---|---|---|---|---|
| | Memory for original details | Misinformation endorsement | Don't know | Memory for original details | Misinformation endorsement | Don't know |
| Horizontal individualism | 0.274* | −0.327** | 0.107 | −0.136 | 0.095 | 0.061 |
| Vertical individualism | −0.042 | −0.156 | 0.308* | 0.121 | −0.254* | 0.175 |
| Horizontal collectivism | 0.109 | −0.089 | −0.103 | −0.018 | −0.082 | 0.137 |
| Vertical collectivism | 0.071 | −0.159 | 0.102 | 0.037 | 0.140 | −0.241 |

*$p < 0.05$ (two-tailed); **$p < 0.01$ (two-tailed).

**TABLE 6** | Correlation between individual-level cultural orientation and outcome variables for background details.

| | Ghana | | | United Kingdom | | |
|---|---|---|---|---|---|---|
| | Memory for original details | Misinformation endorsement | Don't know | Memory for original details | Misinformation endorsement | Don't know |
| Horizontal individualism | 0.023 | −0.178 | 0.194 | −0.070 | 0.003 | 0.085 |
| Vertical individualism | −0.025 | −0.102 | 0.133 | 0.003 | −0.050 | 0.013 |
| Horizontal collectivism | 0.080 | 0.082 | −0.128 | 0.188 | −0.310* | 0.123 |
| Vertical collectivism | −0.028 | 0.104 | −0.054 | 0.017 | 0.114 | −0.180 |

*$p < 0.05$ (two-tailed); **$p < 0.01$ (two-tailed).

significant relationship with any of the respective DVs for mock witnesses from United Kingdom (see Tables 5 and 6).

## 4 | Discussion

We examined the misinformation effect in eyewitness memory reports across two cultural groups. We found that misleading PEI impaired memory for original details to the same extent across cultural groups. The results showed the misinformation effect was more pronounced for background details than central details, irrespective of the cultural background of mock witnesses. We also found that mock witnesses from the collectivistic cultural group endorsed misleading details more than mock witnesses from the individualistic cultural group in a recognition task for details of the witnessed event. However, we did not find a difference between our samples in the endorsement of misinformation in the free-recall accounts of the event. The results also showed that within the respective cultures, individual-level cultural orientation is associated with the misinformation effect.

Memory for original details was impaired to the same extent across cultural groups, after exposure to misleading information. Given previous accounts of the misinformation effect (e.g. Frenda, Nichols, and Loftus 2011; Loftus 2005), it is possible that the misleading PEI interfered with the memory for original details, causing a similar degree of impairment in memory across cultural groups. This speculation is consistent with retroactive interference, a phenomenon where new information interferes with the retrieval of previously learned information resulting in decreased memory performance (Sosic-Vasic et al. 2018). Thus, it is also possible that during retrieval, there was a competition between original and misleading details about a common critical item leading to impaired memory performance.

Mock witnesses in both cultural groups resisted misinformation about central details more than they did for background details, suggesting that across cultures, mock witnesses attended more to central details than background details. This finding runs counter to our hypotheses which were based on previous work describing cultural differences in attention to central and contextual details, with people from collectivistic cultures attending more to contextual details, and vice versa (Masuda and Nisbett 2006). However, it is worth bearing in mind that previous work on cross-cultural cognition has typically used neutral and static scenes (Masuda and Nisbett 2006). It might be argued that it makes sense that witnesses, regardless of their cultural background, attend more to central details at a crime scene, due to the arousing, threatening or otherwise attention-capturing nature of the crime event (Anakwah et al. 2020). Thus, the use of forensically relevant stimulus in the current study may have prompted mock witnesses to attend more to the central event. Consequently, stronger memory for central details might have facilitated the detection of details that were inconsistent with what was originally witnessed, leading to resistance to misleading information about central details (Paz-Alonso, Goodman, and Ibabe 2013). Similarly, mock witnesses′ susceptibility to misleading background details could be due to weaker memory for the background details (Heath and Erickson 1998; Wright and Stroud 1998). Thus, the current findings suggests limited applicability of the proposed cultural differences in memory for central and contextual details in eyewitness contexts.

Mock witnesses from the collectivistic cultural group endorsed misleading details more than those from the individualistic cultural group in the recognition test. This finding is consistent with the argument that individuals with collectivistic cultural orientation are sensitive to their social context (Markus and Kitayama 1991, 2010) potentially making them susceptible to social influence. Due to that interdependent construal of the self, they may not depend on their own memory alone in their memory reports. This observation, which clearly warrants further investigation, is in line with the argument that in sub-Saharan African societies, the tendency to rely on social sources could be engrained in the socialisation process, culture, and belief system (Wiafe-Akenten 2020). According to Wiafe-Akenten (2020), reliance on social sources of information in such societies could contribute to misinformation acceptance. In the current study, 61.5% of mock witnesses from the collectivistic cultural group endorsed misinformation in the recognition test, whereas 41.9% of mock witness from the individualistic cultural group endorsed misinformation in the recognition test. Therefore, although misinformation endorsement occurs across cultures, the rate of endorsement seems to be higher in the collectivistic culture than in the individualistic culture in the current research. Future research should explore how misleading influences can be mitigated in different cultural contexts.

The cultural differences in misinformation endorsement observed in the current study could be also be attributed to cultural differences in the extent at which the self is viewed as possessing unique dispositions. Previous research shows that individuals from individualistic cultures view the self more as possessing unique dispositions than individuals from collectivistic cultures (Coşkan et al. 2016). Broadly, individuals who view themselves as not possessing sufficient internal attributes are less likely to rely on their own memories in the recount of events (Frenda, Nichols, and Loftus 2011). It is likely that because individuals from cultures with an independent self-construal view the self as more unique, they are more likely to rely more on their own memory and discount information from other sources in their memory accounts. Consistent with this, previous work has shown the role of the independent self-construal in resisting memory conformity in a co-witness paradigm (Petterson and Paterson 2012).

Relatedly, cultural differences in self-presentation may play a role in the extent of misinformation endorsement. As individuals from individualistic cultures may be inclined to view the self as more unique (Coşkan et al. 2016), this may result in self-enhancement, the tendency to become less-restrained and see oneself in a more positive light (Yamagishi et al. 2012). Individuals from collectivistic cultures, on the other hand, may engage more in self-effacement, the tendency to be modest and more restrained (Takata 2003; Yamagishi et al. 2012). This cultural difference in self-presentation has been argued to play a role in low-confidence memory reports among mock witnesses from collectivistic cultures (Anakwah et al. 2020). It may be that individuals from the collectivistic culture incorporated the suggested details in their eyewitness memory reports because they were uncertain about their memory for the witnessed event.

This possibility is consistent with previous findings showing that witnesses with low confidence about their memories are more susceptible to misinformation (Van Bergen et al. 2010). Future research should explore the role of low-confidence memory reports in susceptibility to PEI across cultures.

Although cross-cultural differences in misinformation endorsement were observed in the recognition test, such differences were not present in the free-recall report. Overall, 18% of the sample reported at least one item of misinformation in the free recall (Ghana = 20%; United Kingdom = 16%). It is important to note that even though the proportion of individualistic culture mock witnesses who reported at least one misinformation item in free recall were slightly fewer than that of collectivistic culture mock witnesses, the two cultural groups did not differ in aggregate misinformation items reported in free recall. Given the difference between the cultural groups in misinformation endorsement in the recognition test, it is possible that mock witnesses from the collectivistic culture group engaged in more stringent memory regulation than the individualistic culture mock witnesses during the free recall. Consistent with this notion is the observation that mock witnesses from collectivistic culture report fewer inaccurate details in free recall than mock witnesses from individualistic cultures (Anakwah et al. 2020). Future research should examine memory regulation strategies across cultures and the implications of different strategies for misinformation endorsement.

Individual-level cultural orientation in the respective cultures played a role in the misinformation effect. Horizontal individualism was negatively associated with the acceptance of misleading PEI about central details for mock witnesses from the collectivistic cultural group. Horizontal individualism was also positively associated with memory for original central details for mock witnesses from the collectivistic cultural group. It is possible because individuals high on horizontal individualism sees the self as unique and are self-reliant (Triandis and Gelfand 1998), they may be prone to discount misleading information from other sources and rely on their own memories in the recall of events. It is, therefore, possible that participants high on horizontal individualism might have relied on their own memories instead of the misleading information.

We also found vertical dimension of individualism may play a role in eyewitness memory for mock witnesses in the respective cultures. Specifically, for mock witnesses from the collectivistic culture group, vertical individualism was positively associated with the selection of 'Don't know' for central details. Vertical individualism was also negatively associated with the endorsement of misleading PEI about central details, for mock witnesses from the individualistic cultural group. Vertical individualism emphasises competition, with individuals high on this dimension more inclined to distinguish themselves from others through competition and seeking to impress, and thus tends to be high in effort (Triandis and Gelfand 1998). In fact, previous research shows high vertical individualism is associated with greater intentions to impress others (Torelli and Shavitt 2011). Hence, in a memory test, it is possible that individuals high on vertical individualism would put in more effort to enhance their performance, by seeking to perform better than others. One of the ways individuals high on vertical individualism may seek to perform better

than others could be refraining from reporting details they are unsure of, by selecting a 'Don't know' response on the memory test. Hence, it is possible mock witnesses from the collectivistic culture high on this dimension might have prioritised accuracy and hence, opted to enhance their accuracy by selecting 'Don't know' responses for central details when they were uncertain. Mock witnesses from the individualistic culture high on vertical individualism might have also enhanced their performance by rejecting the misleading PEI about central details.

Horizontal collectivism was negatively associated with the acceptance of misleading PEI about background details, for individualistic culture mock witnesses. Previous work suggests collectivism is related with holistic cognition, the tendency to spread attention to both focal and background details at a visual field (Masuda and Nisbett 2001). Because individuals low on collectivism may be less attentive to background details at a visual field, they may be less sensitive to changes to background details (Boduroglu, Priti, and Nisbett 2009; Masuda and Nisbett 2006). Consequently, individuals low in horizontal collectivism may become more susceptible to misleading PEI about background details of an event.

## 4.1 | Limitations and Future Directions

A possible limitation associated with the current study is that the presence of the experimenter might have played a role in misinformation acceptance, especially for mock witnesses from the collectivistic cultural group. That is because individuals from collectivistic cultures are more sensitive to power differentials (Anakwah et al. 2020; Ghosh 2011; Sharma 2010). Hence, the acceptance of the misinformation could be due to the mere presence of the experimenter. Future research should explore whether, in a situation where the experimenter is not present during testing, misinformation acceptance would still be observed at similar rates. It would also be interesting for future research to examine the role of authority in the acceptance of misinformation across cultures. Specifically, future research should examine the extent to which mock witnesses across cultures accept misinformation in the course of social interactions, particularly when those social interactions involve an authority figure (e.g., investigator or other person of status).

Another limitation of the study is that because misinformation endorsement was measured using both recall and recognition tests, there is the possibility that the likelihood of observing misinformation effects has been over-estimated (i.e. false positives). For this reason, we deliberately did not collapse our analyses across the test types and provide details of performance for both recall and recognition tests separately. We also note that our approach in measuring both free recall and recognition memory is consistent with previous research where both recall and recognition test were used to examine the misinformation effect (e.g. Blank et al. 2021). It is also worth noting that previous work indicates that free recall is associated with the spontaneous reporting of fewer misinformation details than closed questions/recognition tests (Greene et al. 2022). Using free recall in addition to recognition test in our study enabled us to explore whether similar or different patterns of misinformation endorsement would be observed in both tests across cultures.

## 4.2 | Conclusion

Our findings suggest that misleading PEI reduces memory for original details to the same extent across cultures. Mock witnesses, regardless of their cultural background, were more susceptible to misleading information about peripheral details than central details. We also found that mock witnesses with collectivistic cultural background endorsed misleading information more in a recognition test than those with individualistic background. However, this difference in misinformation endorsement was not apparent in free-recall accounts. Finally, our findings showed individual-level cultural orientation within cultures may play a role in the misinformation effect. In addition to extending mock witness research to examine reporting in different cultures, these findings further highlight the importance of eliminating leading or suggestive questioning from investigative interviewing practices.

**Conflicts of Interest**

The authors declare no conflicts of interest.

**Data Availability Statement**

The data that support the findings of this study are openly available in Open Science Framework at https://osf.io/2z5yv/?view_only=127ac5ad91154d86a757af001d0a30de.

**Endnotes**

[1] Centrality in the current study is defined both in terms of visual centrality and importance to the plot. This operationalisation is consistent with previous work on cross-cultural cognition (Boduroglu, Priti, and Nisbett 2009).

[2] Collectivistic cultures include cultures located in East Asia, Latin America, and sub-Saharan Africa, while individualistic cultures include cultures located in North America, Australia, and Northern Europe (Hofstede, Hofstede, and Minkov 2010; Minkov et al. 2017).

[3] Indicatively, post hoc power analysis (mixed measures ANOVA) showed the sample size (127) achieved more than 0.95 likelihood of detecting a true difference with medium effect size.

[4] On Hofstede's Index, higher scores reflects greater individualism (see https://www.hofstede-insights.com/product/compare-countries/ for comparison of country scores).

[5] Data on the self-construal scale in the current study showed that participants from Ghana and the United Kingdom did not differ on both individualism, $t(125) = 1.17$, $p = 0.25$, $d = 0.21$, and collectivism, $t(125) = 0.06$, $p = 0.95$, $d = 0.01$. Other inconsistent observations have been made in similar samples where the self-construal scale was used (e.g., Anakwah et al. 2020; Hope et al. 2023).

[6] Hofstede's classification of national cultures was based on research on attitudinal surveys in 111 countries across the world (Hofstede 1983; Hofstede, Hofstede, and Minkov 2010).

[7] The study was conducted in English in both countries. The official language and medium of instruction, from basic to tertiary education level in both countries, is English.

[8] Horizontal individualism refers to where individuals view the self as unique, self-reliant, and 'wants to do their own thing'; Vertical individualism is where people view the self as unique, competitive, and 'wants to be the best'; Horizontal collectivism refers to where individuals emphasis equality in social relationships and merge themselves with their in-group; and vertical collectivism refers to where individuals are sensitive to power differentials and inclined to sub-sume their personal goals to in-group goals (Triandis and Gelfand 1998).

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## Supporting Information

Additional supporting information can be found online in the Supporting Information section.