

# Relational Mobility and Cultural Differences in Analytic and Holistic Thinking

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We hypothesized that individuals in cultures typified by lower levels of relational mobility would tend to show more attention to the surrounding social and physical context (i.e., holistic vs. analytic thinking) compared with individuals in higher mobility cultural contexts. Six studies provided support for this idea. Studies 1a and 1b showed that differences in relational mobility in cultures as diverse as the U.S., Spain, Israel, Nigeria, and Morocco predicted patterns of dispositional bias as well as holistic (vs. analytic) attention. Study 2 demonstrated that, for Americans and Japanese, relational mobility offered better predictive validity of these cognitive tendencies than related cultural constructs; moreover, Studies 1b and 2 showed that relational mobility mediated cross-cultural differences in perception and attribution. Studies 3a and 3b showed that lower relational mobility induces a weaker sense of internal locus of control and a stronger sense of external locus of control, which led to more holistic (vs. analytic) cognition. Last, Study 4 replicated these results in an experimental setting and demonstrated the causal effect of relational mobility on analytic/holistic cognition. Overall, we suggest that relational mobility may be an important socioecological factor that can help explain robust cognitive differences observed across cultures.

**Keywords:** socioecological psychology, analytic (vs. holistic) attention, dispositional bias in attribution, relational mobility, locus of control

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Social environments differ in the extent to which they afford opportunities for individuals to form new relationships and terminate existing ones. Whereas living in some environments involves sustaining lifelong relationships with a small number of others, other environments involve brief or temporary social interactions with many people. For instance, the norm of lifetime employment in Japan meant that, for decades following World War II, the typical Japanese businessman expected to be tied to his company

for life. In a similar fashion, individuals in rural or isolated communities often go to great lengths to avoid being expelled from existing social relationships, as alternative interaction partners are relatively scarce in their immediate societies (Yamagishi, Hashimoto, Li, & Schug, 2012). Opportunities to form new relationships in these contexts are fewer, but in return, existing social bonds tend to be more stable and reliable (Brint, 2001; Caporael & Brewer, 1991).

In other social contexts, relationships and group memberships are more easily formed and terminated. These fluid social connections tend to be motivated by mutual convenience (Chiang, 2010) and, thus, are less stable and reliable (Caporael & Brewer, 1991). For instance, working for investment banks or professional services firms like consulting, especially in countries like the United States, is usually understood to be a temporary occupation for the vast majority of new hires, either because of the intense workload or the very high bar for retention and promotion. Likewise, freedom from various forms of social constraints in large metropolitan areas can facilitate the ability for individuals to create new and undo old interpersonal ties without significant social costs (Yamagishi et al., 2012).

This variation in the degree to which individuals in a given social context perceive that they are able to form and terminate relationships is known as *relational mobility* (Schug, Yuki, & Maddux, 2010; Thomson et al., 2018; Yuki & Schug, 2012; Yuki

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et al., 2007). As a theoretical construct, relational mobility is conceptualized at the socioecological level. In other words, it refers to incentives and opportunities present in a particular environment that facilitate or hinder relationship formation and termination. As a result, studies examining the influence of relational mobility typically examine relational mobility by measuring or manipulating participants' perceptions of how easy or difficult it is for *people in their general social context* to voluntarily move in and out of social relationships, rather than one's own personal ability or desire to change relationships (e.g., Thomson et al., 2018).

Previous work has shown that relational mobility may help explain cultural differences in certain psychological and behavioral tendencies, most typically comparisons between North American (i.e., high relational mobility) and East Asian (i.e., low relational mobility) cultures (for a review, see Oishi, Schug, Yuki, & Axt, 2015). Specifically, this work has examined relational processes (Schug et al., 2010; Schug, Yuki, Horikawa, & Takemura, 2009; Yamagishi et al., 2012; Yamagishi, Hashimoto, & Schug, 2008), social exchange strategies (Roos, Gelfand, Nau, & Carr, 2013; Wang & Leung, 2010; Yuki et al., 2007), and various facets of the self-concept (Falk, Heine, Yuki, & Takemura, 2009; Takemura, 2014; Yuki, Sato, Takemura, & Oishi, 2013). Going beyond the usual North America versus East Asia dichotomy, Thomson et al. (2018) recently measured relational mobility in 39 societies and found that individuals in high (vs. low) relationally mobile societies reported more proactive interpersonal behaviors (e.g., self-disclosure and social support) and psychological tendencies conducive to forming and maintaining social relationships (e.g., general trust, intimacy, and self-esteem).

In the current article, we propose that relational mobility may play an important role in one of the most basic ways in which cultures differ—how individuals think about and perceive the world around them. In particular, we expected relational mobility would be an important predictor of analytic and holistic thinking (Nisbett, Peng, Choi, & Norenzayan, 2001). In doing so, we take a socioecological approach to understanding cultural differences, a perspective the scholars in cultural psychology have used to explain how many psychological and behavioral tendencies can be construed as adaptive strategies tailored to the incentive structures common in a given social and/or ecological setting (e.g., Gelfand et al., 2011; Oishi, 2014; Yamagishi et al., 2008).

Environments that differ in the degree of relational mobility present different incentives for how individuals should orient their behavior and cognition. When relational mobility is low, individuals face substantial constraints in their ability to move between relationships or groups. As a result, individuals may be particularly incentivized to pay attention to their social environment so as not to harm key social connections, connections that could not be easily repaired, abandoned, or replaced if damaged (e.g., Sato, Yuki, & Norasakkunkit, 2014; Yamagishi et al., 2008). However, when relational mobility is higher and individuals can exercise relatively higher autonomy in choosing with whom they interact, less strict attention to the surrounding social environment may be necessary because any social sanctioning or threat of relationship termination becomes less punitive if individuals have the ability to opt out of existing social commitments with relative ease.

As a result, we argue that the levels of relational mobility in different social ecologies can impact aggregate cultural differences

in basic psychological orientations. Because individuals in low mobility cultural contexts are incentivized to pay more attention to their surrounding environment compared with individuals in more mobile contexts, these differences in relational mobility may help explain why individuals from different cultural contexts perceive the physical and social world in fundamentally different ways (see Figure 1 for the proposed society-level mediation model).

## Relational Mobility and the Socioecological Perspective on Culture Formation

Modern approaches to cultural variation in psychology increasingly view cultural differences as functional adaptations to social and physical ecologies (Berry, 2000; Cohen, 2001; for a review, see Oishi, 2014). According to this socioecological view, cultural variation in behavior and psychological tendencies originates, at least partially, in the fact that human groups have historically occupied vastly different social and physical environments (Edgerton, 1971), leading to the emergence and perpetuation of values and cultural norms that were at least at one time, functionally adapted to those environments (Berry, 2000; Cohen, 2001; Oishi, 2014; Yamagishi, 2010, 2014; Yamagishi & Suzuki, 2009).

Relational mobility may be one of these key socioecological factors. For example, historical displays of subsistence-orientation or ecological threats predicts modern-day relational mobility in different cultural contexts (Thomson et al., 2018), with relational mobility lower in societies that have practiced settled, interdependent subsistence styles, such as many East Asian countries (Thomson et al., 2018). Indeed, previous scholars (e.g., Nisbett et al., 2001; Nisbett, 2003) have pointed out that the ecology of ancient China, the cultural cradle of many East Asian societies, consisted of fertile plains, navigable rivers, and low mountains, which favored collective large-scale agriculture as the primary economic activity, and rice farming in particular. Because rice farmers needed to carefully coordinate their water use and often needed collective help in tending their fields (Talhelm et al., 2014), they were fairly firmly tied to their own land as well as to the land of those around them (Nisbett, 2003). Thus, they would have expected fairly long-term interactions with the same neighboring rice farmers. In such a relatively low mobility environment, the resulting social incentives to avoid contentious relationships with neighbors meant that individuals had to navigate a relatively fixed world of social constraints, with relationship deterioration potentially causing serious consequences given the inability to opt out of existing relationships or communities if and when problems arose. In such contexts, individuals may perceive themselves to be more firmly embedded within the surrounding social and physical environment, and would be incentivized to understand and fit into

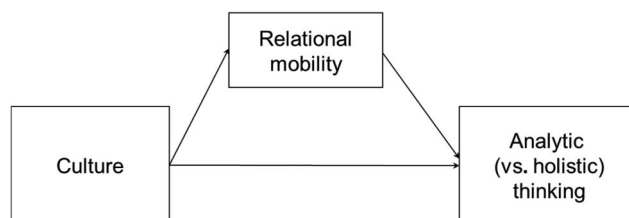


Figure 1. Proposed mediation model at the societal level.

and understand this environment given its perpetual influence on their lives.

By contrast, the socioecological environment of ancient Greece, the origin of many Western cultural practices and thought patterns, was at the crossroads of the (then-known) world, and its mountainous landscape promoted activities that were more dependent on individual (rather than collective) initiative, like herding, hunting, trading, and fishing (Nisbett, 2003). In addition, the rise of democracy as an important political system meant that individual actors were expected to take responsibility for themselves within the society around them, and to understand nature in terms of its constituent parts. These factors gave rise to a more malleable, dynamic social structure, where individuals were free to move across different types of environments and social obligations (i.e., higher levels of relational mobility). With more freedom to move around within their social environments, individuals in ancient Greece should have experienced fewer incentives than those in ancient China to be aware of the interrelationships in the social and physical environment. Instead, it was more likely that individual actors were seen as the primary causal agents (Nisbett et al., 2001).

### Relational Mobility and Cultural Differences in Basic Cognition

We propose that variation in constraints associated with entering and exiting relationships in one's society (i.e., relational mobility) has important implications for basic cultural cognition. In particular, we predicted that relational mobility would predict culturally variable tendencies to attend more or less broadly to individuals' social and physical world, as well as the extent to which individuals explain social behavior in terms of dispositional or situational factors.

As noted above, in environments where relational mobility is low (Yamagishi et al., 2008, 2012) individuals should remain particularly vigilant to their surrounding environment, even the very distal consequences of their actions (Maddux & Yuki, 2006). This is because low relational mobility implicates the expectation of repeated social interactions with no clear ending. Indeed, the literature on social dilemmas (e.g., Axelrod, 2006; Axelrod & Hamilton, 1981; Dawes, 1980; Kollock, 1998; Kopelman, Weber, & Messick, 2002; Weber, Kopelman, & Messick, 2004; Yamagishi, 1986) suggests that repeated-interaction (i.e., low-mobility) environments incentivize individuals to pay close attention to the social consequences of their behavior, because others have a chance to reciprocate both good and bad deeds. Individuals deviating in one interaction are bound to face negative consequences, thus compromising their ability to engage in future interactions with the same exchange partners (Axelrod, 2006; Ben-Yoav & Pruitt, 1984; Henrich et al., 2006). Indeed, social monitoring of information that could potentially damage one's reputation has been shown to deter deviance from social norms in relationally stable contexts, but not in mobile ones (Su, Chiu, Lin, & Oishi, 2016). Individuals in low mobility contexts may also closely monitor the behaviors of others: Roos, Gelfand, Nau, and Carr (2013) showed that third parties in bilateral social exchanges were prone to heightened monitoring of others, as they would eventually benefit themselves from upholding the social order. As a result, there are strong incentives for individuals in low mobility environments to broaden their attention to capture the widest possible

range of cues in their social context. Although social concerns may be especially salient, this constant vigilance may also extend to perceptual tendencies toward the surrounding physical environment as well.

By contrast, individuals embedded in social ecologies with higher levels of relational mobility should have fewer incentives to pay such strict attention to the surrounding social and physical environment. When relational mobility is high, individuals should be less concerned about harming social connections, which could be easily abandoned and replaced, if needed. In environments where relationships can be opted into and out of with relative ease, the power of the larger social system to enforce certain types of behaviors, and the consequences of social sanctioning for transgressions, are reduced accordingly when interactions will not necessarily be repeated over the long term (Axelrod, 1984).

Overall, then, we propose that low levels of relational mobility incentivize individuals to show broad visual attention to the surrounding context compared to individuals in cultures higher in relational mobility, leading to cultural differences in attention. This tendency to attend to different aspects of the physical and social environment is known in the cultural psychology literature as holistic versus analytic attention (Henrich, Heine, & Norenzayan, 2010; Miyamoto, 2013; Nisbett, 2003; Nisbett et al., 2001; Norenzayan, Choi, & Peng, 2007). Individuals displaying holistic attention see objects as overlapping and embedded in a continuous context, allowing them to capture all the important elements of the context, examine the links among objects, and explore the relation between the parts and the whole (Nisbett et al., 2001). Individuals exhibiting analytic attention orient their visual attention to individual focal objects detached from their context, and see objects as isolated from each other in a discrete context (Nisbett et al., 2001).

In addition to visual attention, relational mobility should affect how individuals explain social behavior (Gilbert & Jones, 1986; Gilbert & Malone, 1995; Jones, 1979; Jones & Harris, 1967; Ross, 1977), in particular how people attribute others' behavior to either internal causes (i.e., actors' dispositions) or external causes (i.e., situational factors). When individuals operate in low relationally mobile contexts, they should be particularly aware of situational constraints as their locus of attention is already directed to the broad social and physical context. By contrast, individuals in high mobility contexts should be less attuned to such situational constraints and broader interrelationships in the surrounding physical and social environment. Therefore, individuals in low relational mobility contexts should be less prone to committing the dispositional bias in attribution, that is, judging others' behavior as a product of their dispositions while overlooking important situational factors (for a review, see Gilbert & Malone, 1995). Conversely, high levels of relational mobility should drive individuals to explain others' behavior more as a function of dispositional rather than situational factors, thus increasing dispositional bias in attribution.

### The Mediating Role of Locus of Control

We also sought to uncover the mechanism driving the potential influence of relational mobility on analytic and holistic perception. Given the fact that relational mobility is fundamentally about how much freedom individuals have within their existing social environment, one possibility is locus of control. In highly relationally

mobile contexts, the ability to voluntarily move across a variety of potentially valuable relationships and group memberships logically necessitates individuals to exercise choice in their personal relationships, allowing them to select whom to form new relationships with and when to dissolve current relationships. Maintaining a relatively strong sense of internal locus of control over one's social relationships would be useful in high mobility contexts, by enabling individuals to perform these choices effectively. These chronic perceptions of control over the social environment may eventually permeate perceptions of control in more distal, nonsocial domains as well, leading to a stronger "internal locus of control" (Levenson, 1973; Rotter, 1966).

In contrast, individuals in less mobile contexts are bound to interact for an extended period of time with a relatively fixed set of individuals. Therefore, low relational mobility environments impose long-term connections within a relatively rigid network of individuals, with few opportunities to join new networks if excluded. Individuals' constant need to coordinate their actions and avoid conflict within these networks (which may lead to exclusion) would make salient the influence of external forces (particularly, powerful others in the environment) acting upon one's desired outcomes. As a result, individuals in low mobility contexts might eventually perceive that outcomes are largely contingent upon social forces beyond their control, including chance, fate, or luck. The increased impact of social forces would thus lead to a heightened "external locus of control" (Levenson, 1973; Rotter, 1966).

Indeed, extant research shows that experiences of personal control are related to a preference for analytic (vs. holistic) thinking processes (Kraus, Piff, & Keltner, 2009; Zhou, He, Yang, Lao, & Baumeister, 2012). Specifically, Kraus, Piff, and Keltner (2009) showed that a sense of personal control mediated the effect of subjective socioeconomic status (SES) on situational attributions, while Zhou, He, Yang, Lao, and Baumeister (2012) linked prolonged experiences of control deprivation with holistic thinking processes. We therefore predicted that locus of control would mediate the effects of relational mobility on visual attention and dispositional bias (see Figure 2 for the proposed individual-level mediation model).

### The Current Research

We conducted six studies to test these predictions. Studies 1a and 1b were initial tests of the proposed positive effect of relational mobility on dispositional bias in attribution and analytic (vs. holistic) attention across a number of cultural samples (the U.S., Spain, Morocco, Nigeria, and Israel). Study 2 assessed whether relational mobility in a high (U.S.) versus low (Japan) relationally mobile culture predicts analytic (vs. holistic) attention and dispo-

sitional bias in attribution over and above a number of alternative cultural factors (e.g., self-construal, tightness-looseness, residential mobility). In both Studies 1b and 2, we examined whether relational mobility mediated cultural differences in perception and attribution. Studies 3a and 3b then used a single cultural sample to examine the mediational role of internal and external locus of control. Last, Study 4 used an experimental design to show that relational mobility acts as an explicit causal factor in determining dispositional bias in attribution and analytic (vs. holistic) attention.<sup>1</sup>

### Study 1a: Relational Mobility and Dispositional Bias

The main purpose of Study 1a was to initially establish the association between relational mobility and dispositional bias in attribution within a single cultural context, before subsequently examining cultural differences in relational mobility in later studies.

### Method

**Participants and procedure.** We recruited 201 participants from the United States (100 men and 101 women;  $M_{\text{age}} = 37.50$  years,  $SD = 10.93$ ) using Amazon's Mechanical Turk, an online platform that permits outsourcing tasks including participation in studies (for a study of the validity of Mechanical Turk as source of data, see Buhrmester, Kwang, & Gosling, 2011). One-hundred and 29 participants reported being European American, 13 African American, 10 Hispanic, 28 Asian, three Native American, and 18 other ethnicities. Participants completed a survey ostensibly on social relationships and cognitive style, and received \$6 in compensation. The study protocol (see [online supplemental material](#)) was approved by the R&D Committee at INSEAD. Preliminary analyses indicated no effect of ethnicity, which was excluded from further analyses.

#### Measures.

**Dispositional bias in attributions.** Participants were presented with four social scenarios: two socially desirable (e.g., a soccer player holding free training camps) and two socially undesirable ones (e.g., a surgeon covering up a fatal mistake). Participants were asked to indicate for each scenario the extent to which they agreed that (a) the protagonist caused each event; (b) the features of the situation caused the event; (c) the protagonist would have acted differently if his or her disposition had been different; and (d) the protagonist would have acted differently if the situation had been different (Kitayama, Park, Sevincer, Karasawa, & Uskul, 2009). Scale responses ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). The measure of dispositional inferences was obtained by averaging the scores of items (a) and (c); the measure of situational inferences was obtained by averaging the scores of items (b) and (d). The dispositional bias in attributions was obtained by subtracting the situational inferences measure from the

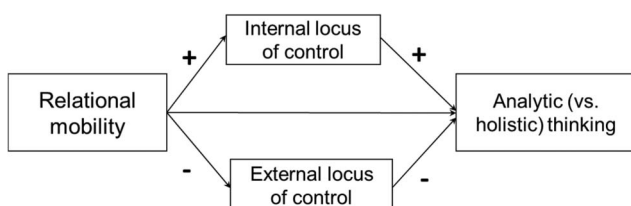


Figure 2. Proposed mediation model at the individual level.

<sup>1</sup> We targeted sample sizes in Studies 1–3 to reach similar levels to those of Kitayama et al. (2009), in which Cohen's  $f$  across dependent measures varied between .24 and .43, with  $N$ s ranging from 94 to 128 across countries (the U.S., Japan, Germany, and the United Kingdom). Given these effect sizes,  $\alpha$ -level of .05, and  $\beta$ -level of .20, we estimated that the required sample sizes should vary between 45 (for a Cohen's  $f = .43$ ) and 139 (for a Cohen's  $f = .24$ ) participants per country (G\*Power, version 3.1; Faul et al., 2009).



dispositional inferences measure (for the same procedure, see Na et al., 2010).

**Relational mobility.** Participants completed the Relational Mobility Scale (Thomson et al., 2018; Yuki et al., 2007). Because the scale seeks to tap participant's perceptions regarding the degree of relational mobility in their society, rather than individual differences in their own degree of mobility, the scale instructions explicitly ask participants to report how much they agree or disagree with statements referring to *other people in their immediate society* (e.g., friends and acquaintances, colleagues in their workplace, or people in their neighborhood), and not about mobility for themselves. Some example items in the scale are "They (people in my immediate society) have many chances to get to know other people;" "Even if these people were not satisfied with their current relationships, they would have no choice but to stay with them" (reversely coded); or "They can choose who they interact with." Thus, shifting the reference point to the surrounding context means the focus of the construct is at the contextual level rather than the individual level.

We instructed participants to report how much they agreed or disagreed with each item using a 6-point scale (from 1 = *strongly disagree* to 6 = *strongly agree*). We computed the average of item scores since the reliability of the scale was acceptable (Cronbach's  $\alpha = .79$ ).

**Control variables.** We controlled for age and gender. Because socioeconomic status may affect cognitive styles (e.g., Grossmann & Varnum, 2011; Kraus et al., 2009), we also included in the linear regressions a self-reported measure of combined annual household income (from 1 to 8; 1 = *less than \$20,000*, 2 = *\$20,000–\$39,999*, 3 = *\$40,000–\$59,999* and so forth until 8 = *more than \$140,000*; see Table 1). Excluding control variables did not change the direction or significance of the results reported below.

## Results and Discussion

As predicted, dispositional bias in attribution was associated with relational mobility,  $\beta = .33$ ,  $SE = .13$ ,  $t(196) = 4.73$ ,  $p < .001$ ,  $\eta_p^2 = .10$ , such that individuals who perceived more relational mobility were more susceptible to dispositional bias. A post hoc statistical power analysis using G\*Power 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009) revealed that this  $t$  test achieved a power of  $(1 - \beta) = .99$ . No other standardized regression coefficients were significant.

We further unpacked dispositional bias in dispositional and situational attributions. An mixed ANCOVA with causal locus (i.e., dispositional vs. situational) as within-subjects factor, controlling for relational mobility, age, gender, and income, showed a significant main effect of causal locus, such that dispositional attributions ( $M = 5.80$ ,  $SD = .86$ ) were higher than situational attributions ( $M = 4.57$ ,  $SD = .96$ ),  $F(1, 196) = 6.69$ ,  $p = .01$ ,  $\eta_p^2 = .03$  (see Table 1). This significant effect was qualified by relational mobility,  $F(1, 196) = 22.34$ ,  $p < .001$ ,  $\eta_p^2 = .10$ . While dispositional attributions increased with relational mobility,  $\beta = .25$ ,  $SE = .09$ ,  $t(196) = 3.63$ ,  $p < .001$ ,  $\eta_p^2 = .06$ , situational attributions decreased with relational mobility,  $\beta = -.21$ ,  $SE = .10$ ,  $t(196) = -2.97$ ,  $p = .003$ ,  $\eta_p^2 = .04$ . Consistent with extant literature indicating that SES elevates dispositional bias in attribution (Grossmann & Varnum, 2011; Kraus et al., 2009), income positively predicted dispositional attributions,  $\beta = .18$ ,  $SE = .02$ ,  $t(196) = 2.59$ ,  $p = .01$ ,  $\eta_p^2 = .03$ . No other effects were significant.

## Study 1b: Relational Mobility, Visual Attention, and Dispositional Bias Across Multiple Cultural Samples

In Study 1b, we tested the proposed effects of relational mobility on analytic (vs. holistic) attention in addition to seeking to replicate the effects of Study 1a on dispositional bias in attribution. To be able to generalize across cultural populations as much as possible, this study was conducted at laboratories in several countries, in regions both well-studied and little-studied by cultural psychologists, which range dramatically in cultural background and geographic location.

## Method

**Participants and procedure.** College students from four different countries participated in this study: 116 undergraduates from the Universidad Autónoma de Madrid, Spain (46 men and 70 women;  $M_{\text{age}} = 20.32$  years,  $SD = 2.44$ ); 139 undergraduates from the Ben-Gurion University of the Negev, Beer-Sheva, Israel (47 men and 92 women;  $M_{\text{age}} = 24.74$  years,  $SD = 2.02$ ); 99 undergraduates at HEM Casablanca, Morocco (71 men and 28 women;  $M_{\text{age}} = 19.43$  years,  $SD = 1.03$ ); and 155 undergraduates at the University of Lagos, Nigeria (85 men and 70 women;  $M_{\text{age}} = 19.18$  years,  $SD = 7.64$ ). All participants were directly recruited at their universities and received the equivalent of 5–10 euros for their participation.

Table 1  
Descriptive Statistics and Correlations Between Variables in Study 1a

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. Relational mobility	3.96	.68	—					
2. Dispositional bias in attribution	1.23	1.28	.32***	—				
3. Dispositional attribution	5.80	.86	.28***	.66***	—			
4. Situational attribution	4.57	.96	-.17*	-.74***	.02	—		
5. Gender (0 = female; 1 = male)	.50	.50	-.16*	-.02	-.09	-.06	—	
6. Age (years)	37.50	10.93	-.07	.06	.01	-.07	-.04	—
7. Annual household income	4.37	2.83	.13*	.06	.20**	.11	.07	.04

Note. Annual household income: 1 = less than \$20,000; 2 = \$20,000–\$40,000; 3 = \$40,000–\$60,000; 4 = \$60,000–\$80,000; etc.

\* $p < .10$ . \*\* $p < .05$ . \*\*\* $p < .01$ . \*\*\*\* $p < .001$ .

Participants completed a survey on “social relationships and cognitive style.” The materials were administered in English in Nigeria,<sup>2</sup> in Spanish in Spain, in French in Morocco, and in Hebrew in Israel. To ensure that all different versions were equivalent in meaning, Spanish-English bilinguals, French-English bilinguals, and Hebrew-English bilinguals translated and back-translated the corresponding version of the materials. The study protocol (see [online supplemental material](#)) was approved by the R&D Committee at INSEAD.

### Measures.

**Dispositional bias in attributions.** To measure dispositional bias in attributions, we used the same four social scenarios as in Study 1a (Kitayama et al., 2009).

**Analytic (vs. holistic) attention.** We used the framed-line test (Kitayama, Duffy, Kawamura, & Larsen, 2003; Kitayama et al., 2009) to measure analytic (vs. holistic) attention. For 5 s, participants were presented with a black line (i.e., the focal object) vertically drawn from the top middle of a gray background square (i.e., the context in which the focal object appeared). On a subsequent page, participants were asked to draw a line within a new blank gray square according to two different criteria: (a) keep the same proportion with the size of the new frame as the original line and frame (i.e., the “relative” version of the task); and (b) keep the same length as that of the original line, regardless of the size of the new frame (i.e., the “absolute” version of the task). The questionnaire package contained six exercises for each of the two versions of the task, relative and absolute, whose order of presentation was counterbalanced across participants. We computed the errors (i.e., difference between the correct length of the line and the length of the line participants drew) in millimeters and then averaged the errors for each type of task. Small error means in the absolute task and/or large error means in the relative task participants suggest ease in separating focal objects from their context (i.e., analytic attention). Conversely, large error means in the absolute task and/or small error means in the relative task suggests difficulty in separating focal objects from their context (i.e., holistic attention). Therefore, the error mean in each task (relative or absolute) measures analytic and holistic attention simultaneously, although each version of the task would do so in opposite directions. For this reason, we did not separate judgments of relative line length from absolute line length in subsequent analyses, but measured analytic (vs. holistic) attention for each participant instead by subtracting their error mean in the relative task from their error mean in the absolute task (for the same procedure, see Na et al., 2010).

**Relational mobility.** As in Study 1a, participants completed the Relational Mobility Scale (Thomson et al., 2018; Yuki et al., 2007). Cronbach’s alpha ranged from .68 in Nigeria to .79 in Spain.

**Control variables.** We again controlled for age, gender, and combined annual household income (see [Tables 2, 3, 4, 5](#)). Dropping any control variable from analyses did not change the direction or significance of the results reported below.

## Results and Discussion

**Relational mobility.** There was a main effect of culture on relational mobility,  $F(3, 500) = 8.12, p < .001, \eta_p^2 = .05$ , such that Israeli undergraduates exhibited the highest levels of relational mo-

bility across our samples, followed by Spanish undergraduates. At the opposite end, we found Nigerian and Moroccan undergraduates to be the least relationally mobile (see [Table 6](#) for country means and pairwise comparisons). We found no other significant effects.

**Dispositional bias in attribution.** We found a main effect of culture on dispositional bias in attribution,  $F(3, 502) = 6.52, p < .001, \eta_p^2 = .04$ . Nigerians and Moroccans demonstrated relatively low dispositional bias in attribution. In contrast, Spanish and Israelis were relatively more prone to dispositional bias in attribution (see [Table 6](#)). We found no other significant effects.

Replicating the findings of Study 1a, dispositional bias in attribution correlated positively with relational mobility, an effect that was observed in all individual countries: in Spain,  $\beta = .28, SE = .17, t(111) = 2.97, p = .004, \eta_p^2 = .07$ ; in Nigeria,  $\beta = .20, SE = .14, t(150) = 2.51, p = .013, \eta_p^2 = .04$ ; in Israel,  $\beta = .19, SE = .13, t(134) = 2.16, p = .03, \eta_p^2 = .03$ ; and, finally, in Morocco,  $\beta = .28, SE = .18, t(92) = 2.76, p = .007, \eta_p^2 = .08$ . No other standardized regression coefficients were significant. Post hoc analyses indicated that statistical power for these  $t$  tests ranged from  $(1 - \beta) = .81$  in Nigeria to  $(1 - \beta) = .90$  in Spain (G\*Power 3.1; Faul et al., 2009).<sup>3</sup>

**Analytic (vs. holistic) attention.** We obtained a main effect of culture on analytic (vs. holistic) attention,  $F(3, 501) = 3.58, p = .014, \eta_p^2 = .02$ . Nigerians, Israelis, and Moroccans were relatively holistic in terms of visual perception. In contrast, Spanish undergraduates were relatively more analytic attention-wise (see [Table 6](#)).

<sup>2</sup> English is the official language of Nigeria.

<sup>3</sup> There was a main effect of culture on dispositional attributions,  $F(3, 500) = 24.60, p < .001, \eta_p^2 = .13$ , such that Spanish and Israelis were markedly more prone to drawing dispositional attributions than Nigerians and Moroccans (see [Table 6](#)). We also obtained a main effect of culture on situational attributions,  $F(3, 502) = 3.62, p = .013, \eta_p^2 = .02$ . Again, Spanish and Israelis were relatively more inclined to drawing situational attributions than Nigerians and Moroccans, although this effect was somewhat attenuated compared with that of culture on dispositional attributions (see [Table 6](#)). We found no other significant effects.

We also examined the effect of relational mobility on dispositional and situational attributions in each country separately. In Spain, there was a marginally significant main effect of causal locus, such that dispositional attributions ( $M = 6.11, SD = .57$ ) were higher than situational attributions ( $M = 4.96, SD = .92$ ),  $F(1, 111) = 2.77, p = .09, \eta_p^2 = .02$  (see [Table 2](#)). This significant effect was qualified by relational mobility,  $F(1, 111) = 8.95, p = .004, \eta_p^2 = .07$ . Specifically, although relational mobility did not affect dispositional attributions in Spain,  $B = .09, SE = .10, t(111) = .90, p = .35, \eta_p^2 = .01$ , it did significantly decrease situational attributions,  $B = -.43, SE = .15, t(111) = -2.87, p = .005, \eta_p^2 = .07$ . In Nigeria, dispositional attributions ( $M = 5.28, SD = .98$ ) were significantly higher than situational attributions ( $M = 4.72, SD = 1.10$ ),  $F(1, 148) = 6.66, p = .011, \eta_p^2 = .04$  (see [Table 3](#)). This effect was qualified again by relational mobility,  $F(1, 148) = 16.03, p < .001, \eta_p^2 = .10$ , such that dispositional attributions increased with relational mobility,  $B = .23, SE = .11, t(148) = 2.03, p = .044, \eta_p^2 = .03$ , and situational attributions decreased with relational mobility,  $B = -.35, SE = .13, t(148) = -2.72, p = .007, \eta_p^2 = .05$ . In Israel, we found a marginally significant main effect of causal locus, such that dispositional attributions ( $M = 6.05, SD = .69$ ) were higher than situational attributions ( $M = 4.99, SD = .81$ ),  $F(1, 134) = 3.51, p = .06, \eta_p^2 = .03$  (see [Table 4](#)). Once more, the interaction effect between causal locus and relational mobility was significant,  $F(1, 134) = 13.03, p < .001, \eta_p^2 = .09$ . In particular, relational mobility increased dispositional attributions,  $B = .17, SE = .09, t(134) = 1.89, p = .066, \eta_p^2 = .03$ , and decreased situational attributions,  $B = -.30, SE = .10, t(134) = -2.89, p = .005, \eta_p^2 = .06$ . Lastly, in Morocco, dispositional attributions ( $M = 5.38, SD = .94$ ) did not significantly differ from situational attributions ( $M = 4.65, SD = .99$ ),  $F(1, 92) = .89, p = .35, \eta_p^2 = .01$  (see [Table 5](#)). However, there was a significant interaction effect between causal locus and relational mobility,  $F(1, 92) = 7.61, p = .007, \eta_p^2 = .08$ , such that relational mobility increased dispositional attributions,  $B = .39, SE = .13, t(92) = 2.98, p = .004, \eta_p^2 = .09$ , although it did not influence situational attributions,  $B = -.11, SE = .14, t(92) = -.82, p = .41, \eta_p^2 = .01$ .

Table 2  
Descriptive Statistics and Correlations Between Variables in Study 1b (Spain)

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1. Relational mobility	4.42	.56	—						
2. Dispositional bias in attribution	1.15	1.06	.26**	—					
3. Dispositional attribution	6.11	.57	.10	.50***	—				
4. Situational attribution	4.96	.92	-.24*	-.84***	.05	—			
5. Analytic (vs. holistic) attention	-1.03	6.31	.27**	.10	.11	-.05	—		
6. Gender (0 = female; 1 = male)	.40	.49	-.19*	.02	-.12	-.09	-.19*	—	
7. Age (years)	20.32	2.44	.00	.06	-.17‡	-.17‡	.06	.07	—
8. Annual household income	3.36	2.30	-.08	.09	.14	-.02	-.08	.21*	.07

Note. Annual household income: 1 = less than 20,000 €; 2 = 20,000–40,000 €; 3 = 40,000–60,000 €; 4 = 60,000–80,000 €; etc.

‡  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Extending the findings of Study 1a, and consistent with our prediction, analytic (vs. holistic) attention significantly increased with relational mobility. Once again, this positive effect of relational mobility was obtained in each country separately: in Spain,  $\beta = .19$ ,  $SE = 1.02$ ,  $t(111) = 2.00$ ,  $p = .049$ ,  $\eta_p^2 = .04$ ; in Nigeria,  $\beta = .19$ ,  $SE = 1.21$ ,  $t(149) = 2.29$ ,  $p = .023$ ,  $\eta_p^2 = .04$ ; in Israel,  $\beta = .19$ ,  $SE = .70$ ,  $t(134) = 2.13$ ,  $p = .035$ ,  $\eta_p^2 = .05$ ; and, finally, in Morocco,  $\beta = .29$ ,  $SE = 1.61$ ,  $t(92) = 2.94$ ,  $p = .004$ ,  $\eta_p^2 = .08$ . No other standardized regression coefficients were significant. According to post hoc analyses, statistical power for these  $t$  tests ranged from  $(1 - \beta) = .81$  in Nigeria to  $(1 - \beta) = .92$  in Morocco (G\*Power 3.1; Faul et al., 2009).

**Mediational analyses: Dispositional bias in attribution.** Mediational analyses were conducted to explore the hypothesis that relational mobility mediates cultural differences in dispositional bias in attribution and analytic (vs. holistic) thinking. As noted above, there was a main effect of culture on dispositional bias in attribution,  $F(3, 502) = 6.52$ ,  $p < .001$ ,  $\eta_p^2 = .04$ . In turn, dispositional bias increased with relational mobility,  $F(1, 502) = 32.56$ ,  $p < .001$ ,  $\eta_p^2 = .06$ . When culture and relational mobility were entered simultaneously in the model predicting dispositional bias, the effects of culture and relational mobility remained significant,  $F(3, 499) = 3.97$ ,  $p = .008$ ,  $\eta_p^2 = .02$  and  $F(1, 499) = 24.67$ ,  $p < .001$ ,  $\eta_p^2 = .05$ , respectively.

To run the mediation analyses with a multicategorical independent variable such as culture in our model, we followed the procedure in Hayes and Preacher (2014). This procedure dictates first that one cultural group be selected as reference group, so that

indirect effects are reported relative to it. Out of the four samples in Study 1b, we selected Israel as reference group, because it was the country displaying the highest levels of relational mobility (choosing other cultures as reference group did not alter the results reported below). We then created dummy variables using indicator coding for the three other cultural groups. Finally, we computed the bias-corrected 95% bootstrap confidence intervals for each indirect effect relative to Israel using 10,000 bootstrap samples using the PROCESS macro (Hayes, 2013). In each of these computations, following Hayes and Preacher (2014), we included one dummy at a time as independent variable, while controlling for the other remaining dummies and relational mobility. These confidence intervals indicated a significant indirect effect of culture on dispositional bias in attribution via relational mobility, relative to the Israeli sample, in Nigeria, 95% CI  $[-.30, -.09]$ ; Spain, 95% CI  $[-.14, -.01]$ ; and Morocco, 95% CI  $[-.23, -.05]$ . Therefore, relational mobility mediated the effect of culture on dispositional bias in attributions.

**Mediational analyses: Analytic (vs. holistic) attention.** As noted above, there was a main effect of culture on analytic (vs. holistic) attention,  $F(3, 501) = 3.58$ ,  $p = .014$ ,  $\eta_p^2 = .02$ , and analytic (vs. holistic) attention increased with relational mobility,  $F(1, 501) = 26.52$ ,  $p < .001$ ,  $\eta_p^2 = .05$ . When both predictors (i.e., culture and relational mobility) were entered simultaneously in the model, their effects remained significant,  $F(3, 498) = 2.83$ ,  $p = .038$ ,  $\eta_p^2 = .02$  and  $F(1, 498) = 24.09$ ,  $p < .001$ ,  $\eta_p^2 = .05$ , respectively.

Table 3  
Descriptive Statistics and Correlations Between Variables in Study 1b (Nigeria)

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1. Relational mobility	4.10	.69	—						
2. Dispositional bias in attribution	.55	1.22	.20*	—					
3. Dispositional attribution	5.23	1.02	.17*	.53***	—				
4. Situational attribution	4.60	1.12	-.18*	-.56***	.24**	—			
5. Analytic (vs. holistic) attention	-4.28	10.32	.21*	.01	-.07	-.09	—		
6. Gender (0 = female; 1 = male)	.55	.50	.09	-.03	-.04	.07	.05	—	
7. Age (years)	19.18	7.64	.09	.01	.13	.03	-.04	.19*	—
8. Annual household income	1.90	1.67	.00	-.15*	-.10	.06	.04	.13	.04

Note. Annual household income: 1 = less than 4,000,000 NGN; 2 = 4,000,000–8,000,000 NGN; 3 = 8,000,000–12,000,000 NGN; 4 = 12,000,000–16,000,000 NGN; etc.

‡  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 4

*Descriptive Statistics and Correlations Between Variables in Study 1b (Israel)*

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1. Relational mobility	4.58	.66	—						
2. Dispositional bias in attribution	1.08	1.02	.23*	—					
3. Dispositional attribution	6.05	.69	.18*	.60***	—				
4. Situational attribution	4.99	.81	-.23**	-.70***	.07	—			
5. Analytic (vs. holistic) attention	-3.53	5.39	.21*	.03	.12	.03	—		
6. Gender (0 = female; 1 = male)	.34	.48	-.19*	-.08	-.19*	-.05	.01	—	
7. Age (years)	24.74	2.02	.01	-.02	.03	-.03	.08	.24**	—
8. Annual household income	3.93	2.20	-.13	.05	.08	.02	-.04	.11	-.04

*Note.* Annual household income: 1 = less than ₪7,000; 2 = ₪7,000–10,000; 3 = ₪10,000–12,000; 4 = ₪12,000–14,000; 5 = ₪14,000–17,000; 6 = ₪17,000–20,000; 7 = ₪20,000–25,000; and 8 = more than ₪25,000.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

As in the previous mediational analyses on dispositional bias, we followed the procedure in Hayes and Preacher (2014) and selected Israel again as the reference group. Using other reference groups did not affect our findings. We computed the bias-corrected 95% bootstrap confidence intervals for each indirect effect relative to Israel using 10,000 bootstrap samples (Hayes, 2013). These confidence intervals indicated significant indirect effect of culture on analytic (vs. holistic) attention via relational mobility, relative to Israel, in Nigeria, 95% CI [-2.05, -.55]; Spain, 95% CI [-.96, -.06]; and Morocco, 95% CI [-1.65, -.31]. Overall, these results support the mediational role of relational mobility in the effect of culture on analytic (vs. holistic) attention.

Thus, Study 1b replicated and extended the findings of Study 1a by showing that, in a controlled laboratory environment, relational mobility predicted dispositional bias in attribution in countries as diverse as Spain, Nigeria, Morocco, and Israel. Study 1b also extended the findings of Study 1a to another critical manifestation of analytic (vs. holistic) thinking, namely visual attention. These findings are consistent with our argument that, as relational mobility decreases, it is socially adaptive for individuals to pay broader attention to objects as embedded in the larger social and physical context. Lastly, we found support for the predicted mediational role of relational mobility in the effect of culture on dispositional bias in attribution and analytic (vs. holistic) attention.

## Study 2: Predictive Validity of Relational Mobility Compared With Other Cultural Constructs

Although Studies 1a and 1b showed the predicted positive effects of relational mobility on analytic (vs. holistic) attention and dispositional bias, these studies did not examine whether relational mobility predicts these cognitive tendencies beyond other factors that have been shown to impact cultural differences in behavior. For example, much research has shown that independent versus interdependent self-construals (Markus & Kitayama, 1991), cultural tightness versus looseness (Gelfand et al., 2011) and residential mobility (Oishi, 2010) can impact a number of psychological outcomes that vary systematically across cultures. Thus, it was important to differentiate relational mobility from these related constructs theoretically and empirically.

## Independent Versus Interdependent Self-Construal

A large body of research now suggests that Western cultures define and understand the self as a fundamentally independent entity that is primarily understood to be separated and autonomous from others. In contrast, in Asian cultures, there is a strong emphasis on the interdependence of the self as fundamentally intertwined with others (Kitayama et al., 2009; Markus & Kitayama, 1991; Singelis, 1994; Triandis, 1995). In Asian cultures, accordingly, the group is prioritized over the individual, and indi-

Table 5

*Descriptive Statistics and Correlations Between Variables in Study 1b (Morocco)*

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1. Relational mobility	4.18	.72	—						
2. Dispositional bias in attribution	.73	1.29	.26*	—					
3. Dispositional attribution	5.38	.94	.28**	.65***	—				
4. Situational attribution	4.65	.99	-.07	-.70***	.10	—			
5. Analytic (vs. holistic) attention	-3.65	11.78	.30**	.02	.22*	.19‡	—		
6. Gender (0 = female; 1 = male)	.72	.45	-.12	-.06	.09	.15	.08	—	
7. Age (years)	19.43	1.03	.12	-.10	.11	.24*	.26*	.03	—
8. Annual household income	5.44	2.10	.06	-.06	-.12	-.04	-.04	.13	-.02

*Note.* Annual household income: 1 = less than 225,000 dhs; 2 = 225,000–450,000 dhs; 3 = 450,000–675,000 dhs; 4 = 675,000–900,000 dhs; 5 = 900,000–1,125,000 dhs; 6 = 1,125,000–1,350,000 dhs; 7 = 1,350,000–1,575,000 dhs; 8 = more than 1,575,000 dh.

‡  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .



Table 6  
Means and Standard Deviations of Relational Mobility Across Samples in Studies 1a–3b

Variables	U.S. (Study 1a)	Spain (Study 1b)	Nigeria (Study 1b)	Israel (Study 1b)	Morocco (Study 1b)	U.S. (Study 2)	Japan (Study 2)	U.S. (Study 3a)	U.S. (Study 3b)
Participants	201	116	155	139	99	119	159	86	181
Online sample	yes	no	no	no	no	no	no	yes	no
Relational mobility	3.96 <sub>a</sub> (.68)	4.42 <sub>c</sub> (.56)	4.10 <sub>b</sub> (.69)	4.58 <sub>d</sub> (.66)	4.18 <sub>b</sub> (.72)	4.56 <sub>cd</sub> (.58)	3.91 <sub>a</sub> (.55)	4.12 <sub>ab</sub> (.67)	4.54 <sub>cd</sub> (.62)
Dispositional bias in attribution	1.23 <sub>b</sub> (.68)	1.15 <sub>b</sub> (1.06)	.55 <sub>a</sub> (1.22)	1.08 <sub>b</sub> (1.02)	.73 <sub>a</sub> (1.29)	1.21 <sub>b</sub> (1.02)	.62 <sub>a</sub> (1.01)	1.67 <sub>c</sub> (1.09)	
Dispositional attribution	5.80 <sub>b</sub> (.86)	6.11 <sub>c</sub> (.57)	5.23 <sub>a</sub> (1.02)	6.05 <sub>c</sub> (.69)	5.38 <sub>a</sub> (.94)	6.16 <sub>c</sub> (.62)	5.32 <sub>a</sub> (.82)	6.14 <sub>c</sub> (.69)	
Situational attribution	4.57 <sub>bc</sub> (.96)	4.96 <sub>d</sub> (.92)	4.60 <sub>bc</sub> (1.12)	4.99 <sub>d</sub> (.81)	4.65 <sub>bc</sub> (.99)	4.94 <sub>d</sub> (.85)	4.69 <sub>cd</sub> (.89)	4.41 <sub>ab</sub> (1.00)	
Analytic (vs. holistic) attention		–1.03 <sub>c</sub> (6.31)	–4.28 <sub>a</sub> (10.32)	–3.53 <sub>ab</sub> (5.39)	–3.65 <sub>ab</sub> (11.78)	–.66 <sub>c</sub> (9.08)	–3.91 <sub>ab</sub> (4.32)		–1.37 <sub>c</sub> (10.50)
Gender	.50 <sub>cd</sub> (.50)	.40 <sub>abc</sub> (.49)	.55 <sub>d</sub> (.50)	.34 <sub>ab</sub> (.48)	.72 <sub>c</sub> (.45)	.45 <sub>bcd</sub> (1.38)	.67 <sub>e</sub> (.41)	.51 <sub>cd</sub> (.50)	.32 <sub>a</sub> (.47)
Age	37.50 <sub>a</sub> (10.93)	20.30 <sub>c</sub> (2.42)	19.18 <sub>c</sub> (7.64)	24.74 <sub>b</sub> (2.02)	19.43 <sub>c</sub> (1.05)	18.78 <sub>c</sub> (.99)	20.49 <sub>c</sub> (1.18)	35.07 <sub>a</sub> (10.29)	20.09 <sub>c</sub> (1.39)
Income	4.37 <sub>b</sub> (2.84)	3.36 <sub>cd</sub> (2.30)	1.90 <sub>d</sub> (1.67)	3.93 <sub>bc</sub> (2.20)	5.44 <sub>a</sub> (2.10)	5.97 <sub>a</sub> (1.99)	5.75 <sub>a</sub> (2.59)	2.76 <sub>d</sub> (1.50)	4.45 <sub>b</sub> (2.35)

Note. Means in a row with different subscripts differ at  $p < .05$ . Standard deviations between parentheses.

viduals seek to fit into the group to preserve social harmony. These differing tendencies have been labeled independent and interdependent self-construals (Markus & Kitayama, 1991). Given that relational mobility can impact the extent to which individuals are dependent on others within stable or fluid networks, relational mobility may also determine the degree to which others are salient in one's self-construal. Thus, lower mobility environments are likely to be associated with more interdependent self-construals, and higher mobility environments with independent self-construals. And indeed, Thomson et al. (2018) found relational mobility to be associated with independent self-construals as a predictor of interpersonal outcomes (e.g., self-disclosure, intimacy, and general trust). However, we predicted that relational mobility would be a stronger or more proximate predictor of analytic/holistic tendencies compared with self-construals.

### Residential Mobility

Another related construct that we wished to contrast from relational mobility is residential mobility, which is defined as the percentage of residents who move to or from a region in a given period of time (Oishi, 2010). Even though societal-level residential mobility and relational mobility have been found to be positively correlated on a societal level (Thomson et al., 2018), they are not identical socioecological constructs. In particular, relational mobility is fundamentally about subjective perceptions of social mobility in one's socioecological environment, while residential mobility is a more objective measure of actual physical movements within and across such environments. Indeed, residential mobility is frequently assessed as the number of times an individual has moved residences over the course of their life (e.g., Oishi, Lun, & Sherman, 2007), while relational mobility assesses individuals' perceptions of their opportunities to form new and terminate old relationships. Thus, while individual level residential mobility captures actual movement between residences, relational mobility captures the potential for movement between relationships.

Rural communities are a prime example of how to contrast the two constructs: They may be fairly low in residential mobility, but could still be highly relationally mobile if, for instance, their inhabitants had the potential for meeting new people over the Internet (Oishi et al., 2015). As this example

illustrates, individuals belonging to multiple social networks (e.g., stable offline connections vs. fluid online connections) could experience both types of mobilities very differently. Overall, then, while theoretically and empirically related (particularly on a regional level), we believe perceptions of relational mobility in one's local societies will be a more proximal predictor analytic and holistic thinking (see Oishi et al., 2015, for further discussion of the similarities and differences between residential and relational mobility).

### Cultural Tightness-Looseness

Finally, cultural tightness-looseness is defined as the strength of social norms and the degree of sanctioning within a society (e.g., Gelfand, Nishii, & Raver, 2006; Gelfand et al., 2011). Although cultural tightness-looseness is concerned with the strength of social norms in a given society (and not specifically with relationship formation and dissolution opportunities) we expected higher levels of cultural tightness to be observed more often in lower mobility societies, where group-based monitoring and sanctioning systems are more possible to maintain (e.g., Yamagishi, Cook, & Watabe, 1998), and where increased vigilance to the surrounding environment makes adaptive sense (Roos et al., 2013; Su et al., 2016). Indeed, both cultural tightness (Gelfand et al., 2011) and low relational mobility (Thomson et al., 2018) have been shown to result from exposure to historical and ecological threats. However, whereas tightness-looseness describes the strength of social norm enforcement in a particular culture, we also expected low to moderate correlations with relational mobility given that tight norm need not depend entirely on low mobility. Indeed, some of the most culturally tight countries observed by researchers are those in Western European countries (i.e., Germany, Switzerland; Gelfand et al., 2011) that allow relatively free movement, at least at on a societal level. In addition, because tightness-looseness is conceptualized as norm enforcement, and relational mobility as a fundamental characteristic of the nature of relationship formation and dissolution in a particular culture, we also expected these constructs to be empirically distinct predictors of attention and attribution.

Thus, overall Study 2 was designed to contrast the predictive ability of relational mobility in comparison with that of these other cultural constructs.

## Method

**Participants and procedure.** We recruited college students in the United States and Japan to participate in this study. One hundred and 19 undergraduate students enrolled in an introductory psychology course at a college in the Eastern United States (53 men and 66 women;  $M_{\text{age}} = 18.78$  years,  $SD = .99$ ); 79 European American, 12 African Americans, four Hispanics, 21 Asian Americans, one Pacific Islander, and two of other ethnicities; and 159 undergraduate students at Kansai University, Osaka, Japan (107 men and 52 women;  $M_{\text{age}} = 20.49$  years,  $SD = 1.18$ ). Participants were directly recruited at their universities and received course credits in exchange for their work. Preliminary tests indicated no effect of ethnicity, which was therefore excluded from additional analyses.

Participants completed a paper-and-pencil survey on social relationships and cognitive style. In Japan, all materials were administered in Japanese, which were translated and back-translated by Japanese-English bilinguals. The study protocol (see [online supplemental material](#)) was approved by the R&D Committee at INSEAD and the Protection of Human Subjects Committee at the College of William & Mary.

**Dispositional bias in attribution.** We measured dispositional bias with the same four social scenarios in [Kitayama et al. \(2009\)](#) as in the two previous studies.

**Analytic (vs. holistic) attention.** The type of attention was measured as in Study 1b (framed-line test; [Kitayama et al., 2003, 2009](#)).

**Relational mobility.** Participants completed the Relational Mobility Scale ([Thomson et al., 2018; Yuki et al., 2007](#)). Cronbach's alpha were greater than .75 in both countries.

**Singelis Self-Construal Scale.** The survey included the Singelis Self-Construal Scale ([Singelis, 1994](#)), which is one of the most commonly used, explicit measures of cultural independence and interdependence. The scale is composed of 24 items: one half of them taps into self-beliefs about independence (e.g., “*I am comfortable with being singled out for praise or rewards*”), whereas the other half taps into self-beliefs about interdependence (e.g., “*It is important for me to maintain harmony within my group*”). Participants reported how much they agreed or disagreed with each item using a 7-point Likert scale (from 1 = *strongly disagree* to 7 = *strongly agree*). Reliabilities were adequate for independence and interdependence, with Cronbach's alpha greater than .71 in both countries.

**Independence, rejection avoidance, and harmony seeking.** We also included measures of independence and interdependence proposed by [Hashimoto and Yamagishi \(2013\)](#). Interestingly, these authors introduced an important distinction between two essential aspects of interdependence. On the one hand, these authors identified a “harmony seeking” component of interdependence, defined as the voluntary accommodation of others' needs and wishes. On the other, [Hashimoto and Yamagishi \(2013\)](#) discerned a “rejection avoidance” component of interdependence, characterized by the fear of being disliked and not accepted by relevant others. While eight items composed the measure of independence (e.g., “*I like being unique and different from others in many respects*”), seven items tapped into harmony seeking (e.g., “*I usually sacrifice my self-interest for the benefit of the group*”), and three items assessed rejection avoidance (e.g., “*I find myself concerned about what other people think of me*”). Participants used a 7-point Likert scale to report how much they agreed or disagreed with each item (from 1 = *strongly disagree* to

7 = *strongly agree*). Reliabilities were acceptable in both countries for all three subscales (Cronbach's alpha > .71).

**Cultural tightness-looseness.** We adapted the six items from [Gelfand et al. \(2011\)](#) to measure tightness-looseness (i.e., the overall strength of social norms and tolerance of deviance) in participants' immediate social environment. Example scale items included: “*There are many social norms that people are supposed to abide by in my immediate social environment*” and “*People in my immediate social environment almost always comply with social norms.*” Participants agreed or disagreed with each item on a 6-point Likert scale (from 1 = *strongly disagree* to 6 = *strongly agree*). Reliabilities in both countries were acceptable (Cronbach's alpha > .72).

**Residential mobility.** We asked participants to disclose their history of residential mobility. Specifically, we instructed them to list all locations they have lived and what age they were while living in each location. From this information, we derived the number of residential moves experienced after the age of 5 and before college, which is a commonly used index of residential mobility (e.g., [Oishi et al., 2007](#)).

**Control variables.** We also asked participants to indicate their gender, age, and the annual income of their immediate family (from 1 = *less than \$20,000* to 8 = *more than \$140,000*). In addition, participants reported their personal highest educational attainment, as well as each of their parents', from 1 = *some high school* to 7 = *postgraduate degree (M.D., Ph.D., etc.)*. Following previous studies (e.g., [Adler, Epel, Castellazzo, & Ickovics, 2000; Kraus et al., 2009](#)), we derived a composite measure of objective SES from participants' information about income and education. Reliabilities for both countries were acceptable (Cronbach's alpha > .76). Finally, we controlled for subjective SES as measured by the MacArthur Scale (e.g., [Adler et al., 2000](#)). Descriptive statistics and bivariate correlations between variables can be found in [Table 7](#) for the U.S. and [Table 8](#) for Japan.

## Results and Discussion

**Analyses.** We used hierarchical linear regression models including the measures of independence and interdependence by [Singelis \(1994\)](#) and [Hashimoto and Yamagishi \(2013\)](#), cultural tightness-looseness, and residential mobility. In all regression models, we controlled for gender, age, and objective and subjective SES.

**Cultural differences: Relational mobility.** Replicating extant research on relational mobility (e.g., [Schug et al., 2009, 2010; Thomson et al., 2018; Yuki et al., 2013, 2007](#)), American undergraduates ( $M = 4.56$ ,  $SD = .59$ ) were more relationally mobile than their Japanese counterparts ( $M = 3.91$ ,  $SD = .55$ ),  $F(1, 267) = 39.96$ ,  $p < .001$ ,  $\eta_p^2 = .13$  (see [Table 6](#) for the country means and pairwise comparisons).

**Cultural differences: Dispositional bias in attribution.** We obtained a main effect of culture on dispositional bias in attribution, such that, consistent with abundant research on culture and cognition (e.g., [Kitayama et al., 2009](#)), Americans ( $M = 1.21$ ,  $SD = 1.02$ ) were more prone to displaying dispositional bias in attribution than Japanese ( $M = .62$ ,  $SD = 1.01$ ),  $F(1, 267) = 16.33$ ,  $p < .001$ ,  $\eta_p^2 = .06$  (see [Table 6](#)).<sup>4</sup>

**Cultural differences: Analytic (vs. holistic) attention.** Replicating extant research on cultural differences in cognition be-

<sup>4</sup> When unpacking the measure of dispositional bias in attribution, we obtained a main effect of culture on dispositional attributions, such that Americans ( $M = 6.16$ ,  $SD = .62$ ) were more prone to drawing dispositional attributions than Japanese ( $M = 5.33$ ,  $SD = .82$ ),  $F(1, 269) = 45.76$ ,  $p < .001$ ,  $\eta_p^2 = .15$  (see [Table 6](#)). No other effects were significant.

Table 7  
Descriptive Statistics and Correlations Between Variables in Study 2 (U.S.)

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Relational mobility	4.56	.58	—														
2. Dispositional bias	1.21	1.02	.27**	—													
3. Disposition attribution	6.16	.62	-.28**	.54***	—												
4. Situational attribution	4.94	.85	-.14	-.77***	.02	—											
5. Analytic (vs. holistic) attention	-.66	9.08	.24*	.06	.01	-.07	—										
6. Singelis independence	3.76	.44	.43**	.07	.04	-.10	.11	—									
7. Singelis interdependence	3.68	.49	-.06	.09	.06	-.07	.01	-.10	—								
8. Independence H&Y (2013)	5.19	.75	.44***	.18*	.09	-.13	.04	.68***	-.18*	—							
9. Harmony seeking	4.84	.82	-.13	.09	.06	-.05	.07	-.10	.83***	-.14	—						
10. Rejection avoidance	4.29	1.51	-.29**	-.03	.05	.10	.00	-.43***	.29**	-.45**	.35***	—					
11. Tightness-looseness	4.88	.66	-.23*	-.01	.16 <sup>‡</sup>	.13	.05	-.22*	.39***	-.17 <sup>‡</sup>	.41***	.24**	—				
12. Residential mobility	.86	.94	-.05	-.15	-.15	.05	-.17 <sup>‡</sup>	-.11	.06	.04	.01	.02	.08	—			
13. Gender (0 = female, 1 = male)	.45	1.38	-.01	.03	.04	-.04	.08	.06	.03	-.01	.00	-.03	.10	-.06	—		
14. Age (years)	18.78	.99	-.06	.06	.04	.01	-.14	-.11	.20*	-.06	.17 <sup>‡</sup>	.14	.10	.01	.03	—	
15. Objective SES	.03	.75	.02	-.05	.08	.11	-.02	.00	.12	-.04	.20*	.15	.10	.12	.00	-.14	—
16. Subjective SES	6.37	1.64	.07	-.01	.03	.01	.03	-.00	.04	.00	.01	-.26**	-.02	.05	.07	-.11	.30**

Note. H&Y (2013) = Hashimoto and Yamagishi (2013).

\*  $p < .10$ . \*\*  $p < .05$ . \*\*\*  $p < .01$ . \*\*\*\*  $p < .001$ .

tween Westerners and East Asians (e.g., Kitayama et al., 2009), we found a significant main effect of culture on analytic (vs. holistic) attention, such that Americans ( $M = -.66$ ,  $SD = 9.08$ ) were significantly more analytic (vs. holistic) in terms of basic perception than Japanese ( $M = -3.91$ ,  $SD = 4.32$ ),  $F(1, 271) = 9.23$ ,  $p = .003$ ,  $\eta_p^2 = .03$  (see Table 6).

**Relationship to other cultural constructs.** Relational mobility was associated with independence as measured by both the Singelis (1994) scale (in the U.S.,  $r = .43$ ,  $p < .001$ ; in Japan,  $r = .13$ ,  $p = .09$ ), and the Hashimoto and Yamagishi (2013) scale (in the U.S.,  $r = .44$ ,  $p < .001$ ; in Japan,  $r = .28$ ,  $p < .001$ ). In terms of convergent validity, these correlations were still moderate in size, suggesting that relational mobility and independence, even if related, remain separate constructs. We also found a significant negative correlation between relational mobility and rejection avoidance in both college samples: in the U.S.,  $r = -.29$ ,  $p = .001$ ; in Japan,  $r = -.18$ ,  $p = .02$ . In addition, there were significant but modest negative correlations between relational mobility and cultural tightness-looseness in both the U.S. and Japan,  $r = -.23$ ,  $p = .01$  and  $r = -.23$ ,  $p = .004$ , respectively, showing the expected relationship between tighter cultural norms and lower mobility. Finally, relational mobility was largely unrelated to either harmony seeking or residential mobility for both Americans and Japanese in our samples.

**Relational mobility and dispositional bias in attribution.** In order to further distinguish the effects of relational mobility from other constructs, we then sought to demonstrate that relational mobility predicted cultural differences in attribution and attention even when controlling for self-construals, tightness-looseness, and residential mobility.

In support of our predictions, and replicating the results of our studies so far, dispositional bias in attribution increased with relational mobility in both American and Japanese college samples (see stan-

dardized regression coefficients in Models 2–6 in Tables 9, 10, 11, 12). As expected, the regression coefficients of relational mobility exhibited a positive sign and remained consistently significant even when controlling for these other cultural factors (in the U.S.,  $p$ 's  $< .011$ ,  $\eta_p^2$ 's  $> .06$ ; in Japan,  $p$ 's  $< .020$ ,  $\eta_p^2$ 's  $> .034$ ). By contrast, self-construals, tightness-looseness, and residential mobility did not separately predict dispositional bias in either sample ( $p$ 's  $> .11$ ). In the U.S., post hoc analyses indicated that statistical power for  $t$  tests ranged from  $(1 - \beta) = .94$  in regression Models 2 and 5 to  $(1 - \beta) = .98$  in regression Model 3 (see Table 9). In Japan, statistical power for  $t$  tests was  $(1 - \beta) = .99$  in all regression models (G\*Power 3.1; Faul et al., 2009; see Table 10).<sup>5</sup>

**Relational mobility and analytic (vs. holistic) attention.** As predicted, analytic (vs. holistic) attention increased with relational mobility, an effect that was observed in both American and Japanese samples (see standardized regression coefficients in Models 2–6 in Tables 11 and 12). Moreover, this positive effect of relational mobility

<sup>5</sup> The results from Study 2 also revealed that dispositional attributions in the U.S. ( $M = 6.16$ ,  $SD = .62$ ) or Japan ( $M = 5.32$ ,  $SD = .82$ ) did not significantly differ from situational attributions ( $M = 4.94$ ,  $SD = .85$ ) and ( $M = 4.69$ ,  $SD = .89$ ), respectively ( $p$ 's  $> .14$ ; see Tables 7 and 8). However, in both countries, there was a significant interaction effect between causal locus and relational mobility,  $F(1, 114) = 10.07$ ,  $p = .002$ ,  $\eta_p^2 = .08$  and  $F(1, 154) = 4.12$ ,  $p = .044$ ,  $\eta_p^2 = .03$ , respectively, such that dispositional attributions increased with relational mobility in both countries ( $p$ 's  $< .003$ ), although relational mobility did not influence situational attributions in either country ( $p$ 's  $> .14$ ). We also found a significant effect of cultural tightness (vs. looseness) on dispositional attributions for Americans,  $\beta = .22$ ,  $SE = .09$ ,  $t(109) = 2.38$ ,  $p = .019$ ,  $\eta_p^2 = .05$ , but not for Japanese,  $\beta = .01$ ,  $SE = .09$ ,  $t(151) = .12$ ,  $p = .90$ ,  $\eta_p^2 = .00$ . In Japan, by contrast, situational attributions decreased with subjective SES across regression models (all  $p$ 's  $< .016$ ). Also, Japanese females (vs. males) made relatively more situational attributions (all  $p$ 's  $< .038$ ).

Table 8

*Descriptive Statistics and Correlations Between Variables in Study 2 (Japan)*

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Relational mobility	3.91	.55	—														
2. Dispositional bias	.62	1.01	.19*	—													
3. Dispositional attribution	5.32	.82	.24**	.56***	—												
4. Situational attribution	4.69	.89	.01	-.68***	.12	—											
5. Analytic (vs. holistic) attention	-3.91	4.32	.20*	.03	.07	.04	—										
6. Singelis independence	3.35	.43	.13‡	.07	.05	-.13	-.10	—									
7. Singelis interdependence	3.22	.51	-.12	-.09	-.09	.02	-.15‡	.05	—								
8. Independence H&Y (2013)	4.42	.97	.28***	.05	.13‡	.03	.08	.51***	-.23**	—							
9. Harmony seeking	4.81	.82	-.01	-.00	.07	.06	-.07	-.01	.68***	-.16*	—						
10. Rejection avoidance	5.01	1.23	-.18*	-.05	.04	.08	.02	-.46***	.31**	-.35**	.39***	—					
11. Tightness-looseness	3.94	.44	-.23*	-.04	-.09	-.03	-.07	-.10	-.23**	-.17*	-.17*	-.02	—				
12. Residential mobility	.88	1.11	-.05	-.09	-.10	.04	.05	-.02	.04	-.03	.03	.13	-.03	—			
13. Gender (0 = female, 1 = male)	.67	.47	-.04	.16‡	-.06	-.21*	.09	.13	-.06	.05	-.06	-.11	.01	.07	—		
14. Age (years)	20.49	1.18	.04	.08	-.04	-.09	.07	.15‡	-.05	.17*	-.04	-.16*	.05	.08	.27**	—	
15. Objective SES	.00	1.00	-.09	.04	-.01	-.05	-.01	-.06	-.01	.14‡	.02	-.07	-.08	.15‡	-.12	.05	—
16. Subjective SES	5.10	1.33	.10	.19*	.01	-.21**	-.07	.16*	-.06	.13	-.10	-.15‡	-.09	.06	.08	.03	.05

Note. H&Y (2013) = Hashimoto and Yamagishi (2013).

‡  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

remained significant even when controlling for other related cultural constructs (in the U.S.,  $p$ 's  $< .023$ ,  $\eta_p^2$ 's  $> .05$ ; in Japan,  $p$ 's  $< .046$ ,  $\eta_p^2$ 's  $> .03$ ). Self-construals, tightness-looseness, and residential mobility did not separately predict analytic (vs. holistic) attention in either sample ( $p$ 's  $> .07$ ). In the U.S., post hoc analyses indicated that statistical power for  $t$  tests ranged from  $(1 - \beta) = .94$  in regression Models 2 and 3 to  $(1 - \beta) = .98$  in regression Models 4 and 5 (see Table 11). In Japan, statistical power for  $t$  tests varied from  $(1 - \beta) = .89$  in regression Models 2 and 5 to  $(1 - \beta) = .98$  in regression Model 3 (G\*Power 3.1; Faul et al., 2009; see Table 12).

#### Mediational analyses: Dispositional bias in attribution.

Replicating the mediational results of Study 1b, relational mobility explained the cultural differences in dispositional bias in attribution. As mentioned above, we obtained a main effect of culture on dispositional bias in attribution,  $F(1, 269) = 15.61$ ,  $p < .001$ ,  $\eta_p^2 = .06$ . In addition, dispositional bias increased with relational mobility,  $F(1, 269) = 26.49$ ,  $p < .001$ ,  $\eta_p^2 = .09$ . When culture and relational mobility were included together in the model predicting dispositional bias, the coefficients of both culture and relational mobility remained significant,  $F(1, 268) = 4.03$ ,  $p = .046$ ,  $\eta_p^2 = .02$  and  $F(1, 268) =$

Table 9

*Predictors of Dispositional Bias in Attribution in Study 2 (U.S.)*

Variables	Dispositional bias in attribution					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Relational mobility		.28**	.31**	.27*	.29**	.28**
Gender	.03	.05	.04	.05	.04	.04
Age	.03	.05	.03	.03	.05	.06
Subjective SES	-.04	-.05	-.06	-.02	-.05	-.06
Objective SES	-.03	-.03	-.04	-.07	-.03	-.03
Singelis independence			-.05			
Singelis interdependence			.08			
Independence H&Y (2013)				.11		
Harmony seeking				.10		
Rejection avoidance				.08		
Tightness-looseness					.04	
Residential mobility						-.15
$R^2$	.01	.08	.09	.11	.09	.11
$F$	.16	2.03‡	1.57	1.57	1.70	2.13‡
$\Delta R^2$	.01	.08	.01	.02	.00	.02
$\Delta F$	.16	9.45**	.47	.81	.14	3.34

Note. Regression coefficients are standardized. H&Y (2013) = Hashimoto and Yamagishi (2013).

‡  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ .



Table 10  
*Predictors of Dispositional Bias in Attribution in Study 2 (Japan)*

Variables	Dispositional bias in attribution					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Relational mobility		.19*	.18*	.20*	.21*	.19*
Gender	.13	.15‡	.14	.15‡	.15‡	.15‡
Age	.04	.03	.02	.03	.02	.03
Subjective SES	.18*	.16*	.16‡	.17*	.16*	.16*
Objective SES	.05	.07	.07	.07	.07	.08
Singelis independence			.02			
Singelis interdependence			-.04			
Independence H&Y (2013)				-.05		
Harmony seeking				.03		
Rejection avoidance				-.01		
Tightness-looseness					.05	
Residential mobility						-.11
$R^2$	.06	.10	.10	.10	.10	.10
$F$	2.41‡	3.19**	2.30*	2.02*	2.72*	2.87*
$\Delta R^2$	.06	.04	.00	.00	.00	.01
$\Delta F$	2.41‡	5.99*	.16	.16	.43	1.83

Note. Regression coefficients are standardized. H&Y (2013) = Hashimoto and Yamagishi (2013).

‡  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ .

14.44,  $p < .001$ ,  $\eta_p^2 = .05$ , respectively. Finally, the bias-corrected 95% bootstrap confidence interval for the indirect effects using 10,000 bootstrap samples (Hayes, 2013) indicated a significant indirect effect of culture on dispositional bias in attribution through relational mobility, 95% CI [.14, .41].

**Mediational analyses: Analytic (vs. holistic) attention.** As noted above, there was a main effect of culture on analytic (vs. holistic) attention,  $F(1, 271) = 9.23$ ,  $p = .003$ ,  $\eta_p^2 = .03$ . In turn, relational mobility positively predicted analytic (vs. holistic) attention,  $F(1, 271) = 17.76$ ,  $p < .001$ ,  $\eta_p^2 = .06$ . When culture and relational mobility were included together in the model predicting analytic (vs. holistic) attention, the coefficient of relational mobility remained significant,  $F(1, 270) = 11.52$ ,  $p = .001$ ,  $\eta_p^2 = .04$ ,

but that of culture was only marginally significant,  $F(1, 270) = 3.21$ ,  $p = .08$ ,  $\eta_p^2 = .01$ . Lastly, we used 10,000 bootstrap samples (Hayes, 2013) to compute the bias-corrected 95% bootstrap confidence intervals for the indirect effect. These analyses revealed a significant indirect effect of culture on analytic (vs. holistic) attention through relational mobility, 95% CI [.74, 2.74].

### Study 3a: Locus of Control as a Mediator

Our studies so far have been consistent with our main hypothesis that relational mobility can help explain cultural differences in cognition and perception. However, it is still unclear what mechanism(s) might be responsible for relational mobility driving different ways of fundamentally perceiving the social and physical world. As noted

Table 11  
*Predictors of Analytic (vs. Holistic) Attention in Study 2 (U.S.)*

Variables	Analytic (vs. holistic) attention					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Relational mobility		.23*	.24*	.29**	.26**	.23*
Gender	.10	.11	.11	.11	.10	.11
Age	-.15	-.14	-.15	-.17‡	-.15	-.12
Subjective SES	.02	.00	.00	.03	.01	.00
Objective SES	-.04	-.04	-.05	-.09	-.06	-.04
Singelis independence			-.01			
Singelis interdependence			.05			
Independence H&Y (2013)				-.05		
Harmony seeking				.12		
Rejection avoidance				.07		
Tightness-looseness					.13	
Residential mobility						-.14
$R^2$	.03	.09	.09	.11	.10	.11
$F$	.91	2.05‡	1.49	1.66	2.02‡	2.15‡
$\Delta R^2$	.03	.05	.00	.03	.02	.02
$\Delta F$	.91	6.42*	.16	1.02	1.79	2.48

Note. Regression coefficients are standardized. H&Y (2013) = Hashimoto and Yamagishi (2013).

‡  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ .

Table 12  
*Predictors of Analytic (vs. Holistic) Attention in Study 2 (Japan)*

Variables	Analytic (vs. holistic) attention					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Relational mobility		.18*	.18*	.19*	.17*	.18*
Gender	.08	.09	.10	.10	.09	.10
Age	.05	.04	.05	.05	.04	.04
Subjective SES	.06	.04	.06	.04	.04	.10
Objective SES	-.01	.01	.01	.02	.01	.03
Singelis independence			-.15 <sup>‡</sup>			
Singelis interdependence			-.10			
Independence H&Y (2013)				.03		
Harmony seeking				-.11		
Rejection avoidance				-.13		
Tightness-looseness					-.04	
Residential mobility						.04
$R^2$	.02	.05	.08	.06	.05	.06
$F$	.56	1.43	1.83 <sup>‡</sup>	1.22	1.23	1.60
$\Delta R^2$	.02	.03	.03	.02	.00	.00
$\Delta F$	.56	4.86*	2.74 <sup>‡</sup>	.88	.28	.22

Note. Regression coefficients are standardized. H&Y (2013) = Hashimoto and Yamagishi (2013).

<sup>‡</sup>  $p < .10$ . \*  $p < .05$ .

above, however, more relationally mobile contexts might imbue individuals with a strong sense of internal control over their environment, while less relationally mobile contexts may lead individuals to better see the constraints on their behavior, leading to a stronger external sense of control. Thus, we wanted to further test the possible mediating role of locus of control explaining relational mobility's effect on perception, but we did so within a single cultural environment in order to hold culture constant. While Study 3a focused on dispositional bias in attribution as main dependent variable, Study 3b focused on analytic (vs. holistic) attention.

## Method

**Participants and procedure.** Eighty-six online participants from the United States (44 men and 42 women;  $M_{\text{age}} = 35.07$  years,  $SD = 10.29$ ) were recruited using Amazon's Mechanical Turk. There were 73 European Americans, three African Americans, five Hispanics, three Asian Americans, one Pacific Islander, and one of other ethnicities. Participants received U.S. \$5 for completing a survey on social relationships and cognitive style. The study protocol (see [online supplemental material](#)) was approved by the R&D Committee at INSEAD. Preliminary analyses indicated no effect of ethnicity, which was thus dropped from further analyses.

### Measures.

**Dispositional bias in attribution.** As in previous studies in this article, we measured dispositional bias with the four social scenarios from Kitayama et al. (2009).

**Locus of control.** We measured locus of control with the Multidimensional Locus of Control Scale (Levenson, 1974, 1981; Welton, Adkins, Ingle, & Dixon, 1996). Some of the 24 items in the scale tap into external locus of control (i.e., the generalized expectancy that one's outcomes or reinforcements are the result of forces beyond one's control, such as powerful others, fate, luck, or chance). Some example items in this subscale are "I feel like what happens in my life is mostly determined by powerful people," "When I get what I want, it's usually because I am lucky," or "I have often found that what is

going to happen will happen." The remaining items in the scale tap into internal locus of control (i.e., the generalized expectancy that one's outcomes or reinforcements are contingent on one's own behaviors). Some example items are "I can pretty much determine what will happen in my life," "When I get what I want, it's usually because I worked hard for it," or "My life is determined by my own actions." Participants reported how much they agreed or disagreed with each statement (from 1 = *strongly disagree* to 7 = *strongly agree*). Because reliabilities for both external and internal locus of control subscales were acceptable (Cronbach's alpha = .92 and .80, respectively), we computed their average item scores.

**Relational mobility.** Participants completed the Relational Mobility Scale (Thomson et al., 2018; Yuki et al., 2007). We computed the average of item scores given the scale's acceptable reliability (Cronbach's alpha = .86).

**Control variables.** We controlled for participants' gender, age, and family income. See Table 13 for descriptive statistics and bivariate correlations between variables.

## Results and Discussion

Replicating the findings of our studies so far, dispositional bias in attribution increased with relational mobility,  $\beta = .36$ ,  $SE = .17$ ,  $t(81) = 3.45$ ,  $p = .001$ ,  $\eta_p^2 = .13$ .<sup>6</sup> In addition, internal locus of control increased with relational mobility,  $\beta = .31$ ,  $SE = .12$ ,  $t(81) = 2.92$ ,  $p = .005$ ,  $\eta_p^2 = .10$ , whereas external locus of control decreased with relational mobility,  $\beta = -.46$ ,  $SE = .15$ ,

<sup>6</sup> Results with the unpacked measure of dispositional bias in Study 3a revealed that, although dispositional attributions ( $M = 6.14$ ,  $SD = .69$ ) and situational attributions ( $M = 4.42$ ,  $SD = 1.00$ ) did not significantly differ from each other,  $F(1, 81) = 1.08$ ,  $p = .30$ ,  $\eta_p^2 = .01$  (see Table 13), there was a significant interaction effect between causal locus and relational mobility,  $F(1, 81) = 10.55$ ,  $p = .002$ ,  $\eta_p^2 = .11$ . Dispositional attributions increased with relational mobility,  $\beta = .25$ ,  $SE = .11$ ,  $t(81) = 2.29$ ,  $p = .025$ ,  $\eta_p^2 = .06$ , and situational attributions decreased with relational mobility,  $\beta = -.23$ ,  $SE = .16$ ,  $t(81) = -2.16$ ,  $p = .034$ ,  $\eta_p^2 = .06$ .

Table 13  
Descriptive Statistics and Correlations Between Variables in Study 3a

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Relational mobility	4.12	.67	—							
2. Dispositional bias	1.67	1.09	.37**	—						
3. Dispositional attribution	6.14	.69	.25*	.52***	—					
4. Situational attribution	4.41	1.00	-.24*	-.78***	-.04	—				
5. Internal locus of control	5.15	.78	.30**	.39***	.22*	-.20‡	—			
6. External locus of control	3.84	.99	-.47***	-.45***	-.15	.32**	-.46***	—		
7. Gender (0 = female)	.51	.50	-.02	.04	-.01	-.08	-.02	-.03	—	
8. Age (years)	35.07	10.28	.10	.12	.01	-.10	-.04	-.14	-.11	—
9. Household income	2.76	1.50	.08	.02	-.00	-.07	-.07	-.05	.09	.10

Note. Annual household income: 1 = less than \$20,000; 2 = \$20,000–\$40,000; 3 = \$40,000–\$60,000; 4 = \$60,000–\$80,000; etc.

‡  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

$t(81) = -4.64, p < .001, \eta_p^2 = .21$ . Dispositional bias in attribution, in turn, significantly increased with internal locus of control,  $\beta = .39, SE = .14, t(81) = 3.87, p < .001, \eta_p^2 = .16$ . Likewise, dispositional bias in attribution significantly decreased with external locus of control,  $\beta = -.49, SE = .11, t(81) = -4.39, p < .001, \eta_p^2 = .19$ . Post hoc power analyses revealed that  $(1 - \beta_s) > .89$  for these  $t$  tests (G\*Power 3.1; Faul et al., 2009). When internal locus of control, external locus of control, relational mobility, and controls were entered simultaneously in the linear regression model predicting dispositional bias, the coefficients of internal and external locus of control remained significant,  $\beta = .22, SE = .15, t(79) = 2.02, p = .047, \eta_p^2 = .05$  and  $\beta = -.26, SE = .13, t(79) = -2.16, p = .034, \eta_p^2 = .06$ , respectively, but that of relational mobility did not,  $\beta = .17, SE = .18, t(79) = 1.58, p = .12, \eta_p^2 = .03$ . We computed the bias-corrected 95% bootstrap confidence intervals for the specific indirect effects by using 10,000 bootstrap samples (Hayes, 2013). The analyses showed significant specific indirect effects of relational mobility on dispositional bias in attribution through both internal locus of control, 95% CI [.02, .30], and external locus of control, 95% CI [.03, .41].<sup>7</sup>

### Study 3b

Study 3b examined whether internal and external locus of control simultaneously explain the effect of relational mobility on analytic (vs. holistic) attention.

### Method

**Participants and procedure.** One hundred and 81 American undergraduate students from the University of Pennsylvania (58 men and 123 women;  $M_{\text{age}} = 20.09$  years,  $SD = 1.39$ ) participated in this study, 131 of which were European Americans, six African Americans, 10 Hispanics, 25 Asian Americans, one Native American, and one Pacific Islander. Seven participants did not report their ethnicity. Participants were recruited directly at their university and received \$10 for completing a survey on social relationships and cognitive style. The study protocol (see online supplemental material) was approved by the R&D Committee at

INSEAD. Ethnicity had no effect, according to preliminary tests. It was thus excluded from further analyses.

### Measures.

**Analytic (vs. holistic) attention.** The type of attention was measured as in our previous studies (framed-line test; Kitayama et al., 2003, 2009).

**Locus of control.** Participants reported how much they agreed or disagreed with each statement in the Multidimensional Locus of Control Scale (Levenson, 1974, 1981; Welton et al., 1996), from 1 = *strongly disagree* to 7 = *strongly agree*. Because reliabilities for both external and internal locus of control subscales were acceptable (Cronbach's alpha = .82 and .76, respectively), we computed their average item scores.

**Relational mobility.** As in previous studies, we asked participants to complete the Relational Mobility Scale (Thomson et al., 2018; Yuki et al., 2007). Given that Cronbach's alpha for this scale was .82, we computed its average item scores.

**Control variables.** We controlled for participants' gender, age, and family income. See Table 14 for descriptive statistics and bivariate correlations between variables.

### Results and Discussion

Supporting our predictions, internal locus of control and external locus of control functioned as parallel mediators of the effect of relational mobility on analytic (vs. holistic) attention. As in our previous studies, analytic (vs. holistic) attention increased with relational mobility,  $\beta = .29, SE = 1.27, t(176) = 3.87, p < .001, \eta_p^2 = .08$ . Once again, internal locus of control increased with relational mobility,  $\beta = .28, SE = .07, t(176) = 3.90, p < .001, \eta_p^2 = .08$ , whereas external locus of control decreased with relational mobility,  $\beta = -.38, SE = .08, t(176) = -5.44, p < .001, \eta_p^2 = .15$ . Internal locus of control, in turn, positively predicted analytic (vs. holistic) attention,  $\beta = .27, SE = 1.28, t(176) = 3.60, p < .001, \eta_p^2 = .07$ . Similarly, external locus of control negatively predicted analytic (vs. holistic) attention,  $\beta = -.27, SE = 1.01,$

<sup>7</sup> We ruled out an alternative mediation model in which relational mobility explained the joint effect of internal and external locus of control on dispositional bias. According to mediation analyses based on 10,000 bootstrap samples (Preacher & Hayes, 2008), relational mobility did not mediate the effect of locus of control on dispositional bias, as no indirect effects were significant: internal locus of control, 95% CI [-.02, .15], external locus of control, 95% CI [-.20, .02].

Table 14  
Descriptive Statistics and Correlations Between Variables in Study 3b

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. Relational mobility	4.54	.62	—					
2. Analytic (vs. holistic) attention	−1.37	10.50	.28***	—				
3. Internal locus of control	5.09	.62	.32***	.26***	—			
4. External locus of control	3.76	.72	−.38***	−.27***	−.34***	—		
5. Gender (0 = female)	.32	.47	−.10	.02	−.04	−.00	—	
6. Age (years)	20.09	1.39	−.14‡	−.05	−.13‡	.03	.01	—
7. Household income	4.45	2.35	.06	−.03	.18*	−.22**	.08	.03

Note. Annual household income: 1 = less than \$20,000; 2 = \$20,000–\$40,000; 3 = \$40,000–\$60,000; 4 = \$60,000–\$80,000; etc.

‡  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

$t(176) = -3.69, p < .001, \eta_p^2 = .07$ . Post hoc power analyses revealed that  $(1 - \beta_s) > .98$  for these  $t$  tests (G\*Power 3.1; Faul et al., 2009). When internal locus of control, external locus of control, relational mobility, and controls were entered simultaneously in the linear regression model predicting analytic (vs. holistic) attention, the coefficients of internal and external locus of control remained significant,  $\beta = .17, SE = 1.33, t(174) = 2.15, p = .033, \eta_p^2 = .03$  and  $\beta = -.17, SE = 1.18, t(174) = -2.09, p = .038, \eta_p^2 = .03$ , respectively, and so did relational mobility's,  $\beta = .18, SE = 1.36, t(174) = 2.21, p = .028, \eta_p^2 = .03$ . By using 10,000 bootstrap samples (Hayes, 2013), we computed the bias-corrected 95% bootstrap confidence intervals for the indirect effects. These analyses revealed simultaneous significant specific indirect effects of relational mobility on analytic (vs. holistic) attention through internal locus of control, 95% CI [.12, 1.95], and external locus of control, 95% CI [.15, 2.41].<sup>8</sup>

#### Study 4

Even though we found consistent and robust effects of relational mobility on cognitive processes across five studies, these designs were fundamentally correlational in nature, which raises concerns about causality. Furthermore, although we controlled for a number of variables in our studies, we did not measure other constructs that prior work has shown to predict analytic (vs. holistic) cognition (e.g., liberal vs. conservative political orientation, Talhelm et al., 2015). Consequently, because of the possible existence of omitted variables in the model influencing both relational mobility and holistic thinking processes, it was important to replicate these findings in an experimental setting.

In Study 4, therefore, we used a priming procedure to examine the causal effects of relational mobility on dispositional bias in attribution and analytic (vs. holistic) attention, which would support the existence of a causal link from relational mobility to these two critical demonstrations of analytic (vs. holistic) thinking. We also sought to replicate the mediational role of internal and external locus of control in these effects.

#### Method

**Participants and procedure.** A statistical power analysis was performed for sample size estimation, based on an expected effect size  $\eta_p^2 = .06$ , which is roughly the average effect size obtained across previous correlational studies on either measure of analytic

(vs. holistic) thinking,  $\alpha = .05, 1 - \beta = .80$ , and three planned experimental conditions. We obtained a required total sample size  $N = 154$  participants (G\*Power, Version 3.1; Faul et al., 2009). We therefore set the target  $N = 50$  per condition.

One hundred and 27 American undergraduate students enrolled in an introductory psychology course at a college in the Eastern United States (33 men and 94 women;  $M_{\text{age}} = 18.91$  years,  $SD = 1.51$ ) were recruited to participate in this study in exchange for course credit. There were 68 European Americans, 18 African Americans, 20 Hispanics, 18 Asian Americans, and three from other ethnicities. The study protocol (see online supplemental material) was approved by the R&D Committee at INSEAD and the Protection of Human Subjects Committee at the College of William & Mary. Preliminary tests revealed no effects of ethnicity. Therefore, we disregarded it in our analyses.

**Design.** Given constraints in the number of participants who were available to take part in the study, we sought to maximize participants in the experimental conditions versus the control condition. There were 50 participants in the “high mobility” condition, 47 in the “low mobility” condition, and 30 in the control condition. Packets for each condition were printed, shuffled, and distributed to students. Experimenters were blind to participant condition.

**Manipulation.** To manipulate relational mobility, we used the same materials that have been used in prior work to experimentally manipulate relational mobility (Li, Adams, Kurtis, & Hamamura, 2015; Li, Hamamura, & Adams, 2016), which have been shown to be effective in producing similar effects to those of chronic relational mobility. Specifically, we instructed participants to read a passage about an organizational environment that was either high or low in relational mobility (see the Appendix for the exact wording.) We asked participants to imagine themselves working for that firm and to write for 5 min about the relationships they could have with coworkers. Participants in the control condition

<sup>8</sup> We ruled out an alternative mediation model in which relational mobility explained the joint effect of internal and external locus of control on analytic (vs. holistic) attention. Relational mobility did not mediate the effect of locus of control on analytic (vs. holistic) attention, because no indirect effects were significant: internal locus of control, 95% CI [−.14, 1.52], external locus of control, 95% CI [−1.69, .21].



were told to imagine and write about a scenario in which they were offered a job that they had always wanted.

### Measures.

**Dispositional bias in attribution.** We measured dispositional bias with the four social scenarios in Kitayama et al. (2009), as we did in previous studies in this paper.

**Analytic (vs. holistic) attention.** Consistent with our previous studies, we measured the type of attention with the framed-line test (Kitayama et al., 2003, 2009).

**Locus of control.** Participants reported the extent to which they agreed or disagreed with the 24 items in the Multidimensional Locus of Control Scale (Levenson, 1974, 1981; Welton et al., 1996), from 1 = *strongly disagree* to 7 = *strongly agree*. Reliabilities for both external and internal locus of control subscales were acceptable (Cronbach's alpha = .85 and .81, respectively) and we thus proceeded to compute their average item scores.

**Manipulation check.** Participants filled in the Relational Mobility Scale (Thomson et al., 2018; Yuki et al., 2007), which we used as our priming manipulation check. The reliability of the scale was acceptable (Cronbach's alpha = .87) and, hence, item scores were averaged.

We administered the tasks in a fixed order (FLT → causal attribution task → manipulation check → locus of control). This order was not counterbalanced across conditions.

## Results and Discussion

**Analyses.** We performed a single factor (priming: high relational mobility vs. low relational mobility vs. control) between-subjects ANCOVA controlling for participants' gender, age, and subjective SES (MacArthur Scale; e.g., Adler et al., 2000) to test the effect of our primes on dispositional bias in attribution, analytic (vs. holistic) attention, and internal/external locus of control. Descriptive statistics and bivariate correlations between variables can be found in Table 15.

**Relational mobility.** The manipulation check was successful. There was a main effect of priming on participants' perceptions of relational mobility in their immediate social context,  $F(2, 121) = 4.74, p = .01, \eta_p^2 = .07$ . Specifically, participants in the high mobility condition reported higher levels of relational mobility ( $M = 4.00, SD = .19$ ) than participants in the low mobility condition ( $M = 3.84, SD = .27$ ),  $F(1, 121) = 9.41, p = .003, \eta_p^2 = .07$ . Participants in the control condition exhibited levels of relational mobility ( $M = 3.94, SD = .26$ ) that did not significantly differ from those of either condition ( $p$ 's  $> .11$ ). We also found that relational mobility decreased with age,  $B = -.031, SE = .014, t(123) = -2.18, p = .032, \eta_p^2 = .04$ . No other effects were significant. See Table 16 for descriptive statistics and post hoc comparisons.<sup>9</sup>

**Dispositional bias in attribution.** An ANCOVA revealed a main effect of priming on dispositional bias in attribution,  $F(2, 121) = 4.06, p = .03, \eta_p^2 = .06$ . Replicating the findings in our prior studies, high relational mobility corresponded with increased dispositional bias in attribution. Participants in the high mobility condition reported higher levels of dispositional bias in attribution ( $M = 1.53, SD = 1.11$ ) than participants in the low mobility condition ( $M = .94, SD = 1.02$ ),  $F(1, 121) = 5.66, p = .019, \eta_p^2 = .05$ . Also, participants in the control condition displayed higher levels of dispositional bias in attribution ( $M = 1.54, SD = 1.19$ )

than participants in the low mobility condition ( $M = .94, SD = 1.01$ ),  $F(1, 121) = 4.47, p = .037, \eta_p^2 = .04$ . Participants in the high mobility and control conditions did not differ from each other,  $F(1, 121) = .001, p = .97, \eta_p^2 = .00$  (see Table 16). Lastly, we found that dispositional bias in attribution decreased with age,  $B = -.14, SE = .07, t(123) = -2.12, p = .036, \eta_p^2 = .04$ . There were no other significant effects.<sup>10</sup>

**Analytic (vs. holistic) attention.** An ANCOVA indicated a marginally significant main effect of priming on analytic (vs. holistic) attention,  $F(2, 121) = 2.61, p = .07, \eta_p^2 = .04$ . As predicted, relational mobility increased analytic (vs. holistic) attention. Participants in the high mobility condition displayed higher levels of analytic (vs. holistic) attention ( $M = 3.53, SD = 11.32$ ) than participants in the low mobility condition ( $M = -1.57, SD = 9.74$ ),  $F(1, 121) = 5.22, p = .024, \eta_p^2 = .04$ . Participants in the control condition ( $M = 1.43, SD = 7.28$ ) did not significantly differ from those of either high or low conditions (all  $p$ 's  $> .26$ ; see Table 16).<sup>11</sup>

**Internal locus of control.** We found a main effect of priming on internal locus of control,  $F(2, 121) = 3.96, p = .02, \eta_p^2 = .06$ . Consistent with our hypotheses, relational mobility elevated internal locus of control. Participants in the high mobility condition reported higher levels of internal locus of control ( $M = 5.37, SD = .88$ ) than participants in the low mobility condition ( $M = 4.89, SD = .96$ ),  $F(1, 121) = 7.08, p = .009, \eta_p^2 = .06$ . In addition, participants in the control condition displayed higher internal locus of control ( $M = 5.31, SD = .62$ ) than participants in the low mobility condition ( $M = 4.89, SD = .96$ ),  $F(1, 121) = 4.07, p = .046, \eta_p^2 = .03$  (see Table 16).

**External locus of control.** There was a main effect of priming on external locus of control,  $F(2, 121) = 5.44, p = .005, \eta_p^2 = .08$ . Supporting our predictions, relational mobility depressed external locus of control. Participants in the high mobility condition reported lower levels of external locus of control ( $M = 3.15, SD = .86$ ) than participants in the low mobility condition ( $M = 3.67, SD = .92$ ),  $F(1, 121) = 10.76, p = .001, \eta_p^2 = .08$ . Participants in the control condition ( $M = 3.46, SD = .52$ ) did not significantly differ from those of the other conditions (all  $p$ 's  $> .10$ ; see Table 16).

<sup>9</sup> We speculate that the lower standard deviation of relational mobility in the control condition in Study 4, compared with those of our correlational studies, could be an artifact of the priming manipulation which directed participants' attention to the same social scenario.

<sup>10</sup> When examining the two components of dispositional bias separately, we found that high relational mobility corresponded with increased dispositional attributions. Participants in the high mobility condition reported higher levels of dispositional attributions ( $M = 6.10, SD = .52$ ) than participants in the low mobility condition ( $M = 5.80, SD = .75$ ),  $F(1, 92) = 4.32, p = .041, \eta_p^2 = .05$ . Furthermore, high relational mobility corresponded with attenuated situational attributions. Participants in the high mobility condition reported lower levels of situational attributions ( $M = 4.57, SD = .94$ ) than participants in the low mobility condition ( $M = 5.09, SD = .83$ ),  $F(1, 92) = 7.58, p = .007, \eta_p^2 = .08$ .

<sup>11</sup> According to these results, there were no significant differences in terms of cognitive styles between participants in the high mobility condition and the control condition. One plausible explanation is that the U.S. is usually typified as a high mobility society in extant literature (e.g., Thomson et al., 2018), and all participants in this experiment were national Americans, so there is a possible ceiling effect or constrained variance at play.

Table 15  
Descriptive Statistics and Correlations Between Variables in Study 4

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Dispositional bias in attribution	1.31	1.12	—							
2. Dispositional attribution	6.03	.63	.45***	—						
3. Situational attribution	4.81	.96	-.84***	-.02	—					
4. Analytic (vs. holistic) attention	1.14	10.08	.28**	.11	-.28**	—				
5. Internal locus of control	5.18	.88	.36***	.17‡	-.28**	.35***	—			
6. External locus of control	3.41	.85	-.31***	-.018*	.27**	-.28**	-.37***	—		
7. Gender (0 = female)	.26	.44	-.10	-.17‡	.05	.03	.04	.03	—	
8. Age (years)	18.91	1.51	-.24**	-.33***	.08	-.17‡	-.05	-.05	.12	—
9. Subjective SES	6.24	1.86	.09	.16‡	.04	.03	.02	-.10	.22*	-.19*

‡  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

**Mediation analyses.** As mentioned, participants in the high mobility (vs. low mobility) condition displayed higher levels of internal locus of control,  $B = .47$ ,  $SE = .19$ ,  $t(92) = 2.48$ ,  $p = .015$ . At the same time, participants in the high mobility (vs. low mobility) condition displayed lower levels of external locus of control,  $B = -.55$ ,  $SE = .18$ ,  $t(92) = -2.99$ ,  $p = .004$ . When priming condition, internal locus of control, and external locus of control, together with controls, were entered in the regression model predicting dispositional bias in attribution, the coefficients corresponding to external locus of control and internal locus of control remained significant,  $B = -.28$ ,  $SE = .12$ ,  $t(90) = -2.37$ ,  $p = .02$ , and  $B = .29$ ,  $SE = .11$ ,  $t(90) = 2.54$ ,  $p = .013$ , respectively, but the coefficient corresponding to priming condition did not,  $B = .23$ ,  $SE = .21$ ,  $t(90) = 1.08$ ,  $p = .28$ . We then computed the bias-corrected 95% bootstrap confidence intervals for the specific indirect effects by using 10,000 bootstrap samples (Hayes, 2013). The analyses showed significant specific indirect effects of the priming of relational mobility on dispositional bias in attribution through external locus of control, 95% CI [.06, .41], and internal locus of control, 95% CI [.0015, .33]. These results support our prediction that external and internal locus of control mediated in parallel the effect of relational mobility on dispositional bias in attribution.

With regard to holistic versus analytic attention, when priming condition, internal locus of control, external locus of control, and controls were included in the regression model with analytic (vs. holistic) attention as the predicted outcome, the coefficient of external locus of control remained significant,  $B = -2.61$ ,  $SE = 1.24$ ,  $t(90) = -2.10$ ,  $p = .038$ , the coefficient of internal locus of control was marginally significant,  $B = 2.29$ ,  $SE = 1.19$ ,  $t(90) = 1.92$ ,  $p = .058$ , and the coefficient of

priming condition became not significant,  $B = 2.01$ ,  $SE = 2.18$ ,  $t(90) = .93$ ,  $p = .36$ . The bias-corrected 95% bootstrap confidence intervals for the specific indirect effects by using 10,000 bootstrap samples (Hayes, 2013) showed significant specific indirect effects of the priming of relational mobility on analytic (vs. holistic) attention through external locus of control, 95% CI [.13, 3.93], and internal locus of control, 95% CI [.07, 3.14]. These results support our hypothesis that external and internal locus of control simultaneously mediated the effect of relational mobility on analytic (vs. holistic) attention.

## General Discussion

This article focused on the basic psychological ramifications of relational mobility, a feature of the social context that reflects the ease with which individuals can form new relationships and abandon existing ones. Across six studies, involving both correlational and experimental designs, we found that (a) individuals in cultures higher in relational mobility showed narrower attention to the surrounding context and increased dispositional bias; (b) relational mobility mediated these cultural differences; (c) locus of control acted as a further mechanism explaining these within-culture effects; and (d) relational mobility held some unique predictive power to explain why some cultures are analytically oriented and others holistically oriented compared with other cultural constructs. Importantly, we demonstrated robust effects of relational mobility on cognitive tendencies both within and across multiple cultures, some of which are commonly studied (U.S., Japan), but also looking at other countries that are less frequently studied in the

Table 16  
Means and Standard Deviations in Study 4

Variables	High relational mobility	Low relational mobility	Control
Relational mobility	4.00 <sub>a</sub> (.19)	3.84 <sub>b</sub> (.27)	3.94 <sub>ab</sub> (.26)
Dispositional bias in attribution	1.53 <sub>a</sub> (1.11)	.94 <sub>b</sub> (1.02)	1.54 <sub>a</sub> (1.19)
Dispositional attribution	6.10 <sub>b</sub> (.52)	5.80 <sub>b</sub> (.75)	6.26 <sub>a</sub> (.51)
Situational attribution	4.57 <sub>a</sub> (.84)	5.09 <sub>b</sub> (.83)	4.72 <sub>a</sub> (1.12)
Analytic (vs. holistic) attention	3.53 <sub>a</sub> (11.32)	-1.57 <sub>b</sub> (9.74)	1.43 <sub>ab</sub> (7.28)
Internal locus of control	5.37 <sub>a</sub> (.88)	4.89 <sub>b</sub> (.96)	5.31 <sub>a</sub> (.62)
External locus of control	3.15 <sub>a</sub> (.86)	3.67 <sub>b</sub> (.92)	3.46 <sub>ab</sub> (.52)

Note. Means in a row with different subscripts differ at  $p < .05$ . Standard deviations between parentheses.

cultural psychological literature (Spain, Nigeria, Morocco, Israel).

### Relational Mobility and Other Socioecological Theories of Cultural Variation in Cognition

Several extant theories of cultural differences in cognition have attempted to connect distal- and proximal-level factors. Miyamoto (2013), for instance, proposed a comprehensive analysis integrating a host of predictors of cognitive styles at multiple levels to understand cultural influences on cognitive processes. In her multilevel model, she connected distal-level situational factors (e.g., primary economic activity, sociopolitical systems, patterns of voluntary settlement) with proximal-level situational factors (e.g., communication practices, patterns of social interactions) as well as psychological factors (e.g., analytic vs. holistic cognition, emotion, motivation). Nisbett (2003) proposed a similar model in which general ecology helped shape primary economic activities and social structure, which would in turn influence adaptive psychological tendencies and prevailing cultural orientations.

We build on these models connecting distal- and proximal-level predictors of cultural differences in cognition (e.g., Miyamoto, 2013; Nisbett, 2003) to argue that distal socioecological features (e.g., subsistence styles, or ecological and historical threats) may have helped determine the degree of relational mobility in a certain environment, whereby individuals are then presented with different types of proximal incentives to which they should orient their everyday behavior and cognition if they want to survive and thrive in that environment. Our theory and results are consistent with several extant socioecological theories on determinants of cognitive tendencies based on social, ecological, political, or historical factors (for a review, see Miyamoto, 2013), such as: rice farming (Nisbett, 2003; Talhelm et al., 2014), voluntary settlement patterns (Kitayama, Ishii, Imada, Takemura, & Ramaswamy, 2006; Kitayama, Varnum, & Sevincer, 2014), sedentary versus nomadic communities (Berry, 1966; Uskul, Kitayama, & Nisbett, 2008; Vandellos & Cohen, 1999; Witkin & Berry, 1975), political systems (Grossmann & Varnum, 2011; Varnum, Grossmann, Katunar, Nisbett, & Kitayama, 2008), or religious practices (Colzato, Hommel et al., 2010; Colzato, van Beest et al., 2010; Li et al., 2012).

We argue that a very similar mechanism would apply in each of the distal-level factors mentioned above. For example, such disparate environments such as those typified by farming, communist sociopolitical systems, or Roman Catholic groups would be expected to be relatively low in relational mobility. To the extent that individuals are firmly embedded in those stable environments, they would expect repeated interactions with no clear ending, resulting in their increased interdependence and, thus, the need to enforce tight coordination norms deterring opportunistic behaviors (Axelrod, 1984). In contrast, for individuals weakly connected in more nomadic communities, liberal sociopolitical systems, or Protestant groups (i.e., relatively high in relational mobility), exit from the groups containing free-riders would be a viable solution (Yamagishi, 1988), hence their tendency toward independence and cultural looseness. As a result, in low (vs. high) mobility contexts, collective, interdependent goals are more likely to be enforced and prevail over individual goals, and individuals may be particularly motivated to avoid violating social norms that would invite punishment or exclusion (Yamagishi et al., 2012). To the extent that

individuals deeply committed to collective goals are incentivized to allocate attention broadly to the social and physical environments, low (vs. high) relational mobility would lead to higher levels of holistic (vs. analytic) cognition.

Given these considerations, one could argue that a complete specification of the mechanism connecting relational mobility and cognition should implicate other cultural factors like self-construal and cultural tightness, in addition to locus of control. Supporting the first step in this causal chain, the results of Study 2 demonstrated that relational mobility in both the American and Japanese samples was associated positively with independence and negatively with rejection avoidance and cultural tightness (see Tables 7 and 8). Interestingly, relational mobility seemed to be unrelated to varying levels of harmony seeking, that is, the voluntary accommodation of others' needs and wishes (Hashimoto & Yamagishi, 2013). This suggests that varying contextual levels of relational mobility may alter incentives for mere compliance with social norms (as suggested by results with the "rejection avoidance" portion of collectivism), but not necessarily for the voluntary accommodation of those social norms.

However, neither self-construal nor tightness predicted holistic (vs. analytic) attention or dispositional bias in our data, which does not support their purported mediational role. Regarding cultural tightness, although there has been some theoretical speculation that it might influence cognitive styles (see Gelfand & Lun, 2013), to our knowledge, no empirical work has found support for this assertion. The lack of predictive power is somewhat more surprising in the case of self-construal, given that a wealth of research has closely linked independent (vs. interdependent) self-construal with analytic (vs. holistic) cognition (e.g., Kühnen & Oyserman, 2002; Masuda & Nisbett, 2001; Miyamoto, 2013; Na et al., 2010; Nisbett et al., 2001, 2003; Norenzayan et al., 2007).

These disconnects could be at least partly explained by the fact that we used implicit measures of analytic (vs. holistic) attention (framed-line test, Kitayama et al., 2003, 2009) and dispositional bias in attribution (social judgment task, Kitayama et al., 2009) as our dependent measures, which might complicate finding relationships with more explicit measures of other constructs. We did so because implicit measures are free from various known biases inherent to explicit self-report scales (see Heine, Lehman, Peng, & Greenholtz, 2002; Kitayama, 2002; Oyserman, Coon, & Kimmelmeier, 2002). Also, we chose implicit measures because they are closer to psychological habits or automatic tendencies that are not necessarily accessible to conscious appraisal, which allows them to capture behavior better than explicit beliefs about the self. As a result, cross-cultural variation in implicit cognitive tendencies is more systematic and reliable than is cross-cultural variation in self-reports (Kitayama et al., 2009; Na et al., 2010). In addition, well-documented issues with measuring cultural constructs like self-construals via existing self-report measures (e.g., Oyserman et al., 2002) may have also precluded us from finding this relationship empirically.

However, our findings are quite consistent with previous work using implicit tests of analytic (vs. holistic) cognition (Kitayama et al., 2009; Na et al., 2010), in which implicit measures were largely unrelated to explicit measures of self-construal. Also, replicating this previous work (Kitayama et al., 2009; Na et al., 2010), within-culture correlations among the two implicit cognitive tasks



were negligible throughout our studies. This is because, according to Kitayama et al. (2009), even if features of independent versus interdependent social orientation cohere at the level of culture, each individual has access to these features selectively to yield a unique, idiosyncratic profile of social orientation. This access will depend on each individual and, thus, may practically be nearly completely random across individuals (Na et al., 2010), thereby resulting in weak near-zero within-culture correlations (a) between explicit measures of self-construal and implicit tasks and (b) between implicit tasks. This might explain why we did not find support for the mediational role of self-construal. However, these results do not preclude that self-construals could have played that mediational role had we used a different type of dependent measures of cognitive styles.

### Relational Mobility and Locus of Control

In addition, we also uncovered a mechanism responsible for the within-culture effects of relational mobility on cognition, in particular locus of control. These within-culture effects are, in fact, consistent with extant theories of cultural determinants of perceptions of control (e.g., Cheng, Cheung, Chio, & Chan, 2013; Yamaguchi, 2001). These theories propose that people in collectivistic cultures tend to reduce the emphasis on achievement-related goals to preserve the harmonious pursuit of communal goals, which means that individuals are encouraged to accommodate themselves to their environment, not the other way around (Hsu, 1981; Morling, Kitayama, & Miyamoto, 2002; Weisz, Rothbaum, & Blackburn, 1984). Consistent with these cultural determinants of locus of control, we demonstrated that individuals in high (vs. low) relational mobility contexts might perceive the environment as accommodating themselves, not vice versa, as expressed in higher locus of internal (vs. external) locus of control.

A critical reader might argue that relational mobility could be interpreted as just one part of locus of control, because relational mobility appears to be a sense of control that is specific to the social domain. In response to this argument, however, it is important to keep in mind that relational mobility is conceived as a socioecological factor, whereas locus of control is an individual trait. At the same time, we argued above that our measure of locus of control not only tapped into perceptions of control in the social domain (e.g., the influence of powerful others) but also perceptions of control in more distal, nonsocial domains, such as perceptions of chance, fate, or luck. In this sense, correlations in Studies 3a and 3b between relational mobility and locus of control were always significant and ranged from  $r = -.47, p < .001$  to  $r = .32, p < .001$  (see Tables 13 and 14), which are moderate in size. When perceptions of control in social versus nonsocial domains were considered separately, the correlations between relational mobility and the social subscales of locus of control varied from  $r = -.48, p < .001$  to  $r = .15, p = .05$ , whereas the correlations between relational mobility and the nonsocial subscales of locus of control varied from  $r = -.46, p < .001$  to  $r = .30, p < .001$ , all of which are still moderate in size. Overall, these results seem to indicate that relational mobility and locus of control are related, but remain separate constructs, conceptually and empirically.

### Limitations and More Directions for Future Research

One methodological limitation with regard to the construct of relational mobility is that the relational mobility scale is measured at the individual level, even though it asks participants to judge the mobility of their surrounding environment. Thus, one question is the extent to which this is truly a socioecological variable rather than an individual difference one. For instance, differences in previously experienced contextual levels of relational mobility may lead to contrast effects whereby individuals diverge in their perceptions of the same contextual level of relational mobility.

Supporting the socioecological nature of relational mobility, however, individuals in our studies tended to agree on their perceptions of relational mobility in their respective societies. Specifically, the results of an unconditional model with individuals nested in countries indicated an intraclass correlation  $ICC = .14$  and within-group agreement  $r_{wg} = .86$ , which were well beyond the recommended cutoffs of .1 and .7 (Klein & Kozlowski, 2000), respectively (see also Thomson et al., 2018). Furthermore, the study by Thomson and colleagues showed that society-level relational mobility scores were associated with measures of actual relational movement (e.g., job mobility, divorce, residential mobility, and new friends made in the last month), which provided convergent validity for the relational mobility scale.

The findings of Study 2 lent support to the unique predictive power of relational mobility versus related cultural constructs in explaining why some cultures are analytically oriented and others holistically oriented. However, these results should be interpreted with caution. For one, we based our findings in two relatively small college samples. Furthermore, for instance, our measures of residential mobility were highly left skewed (83.1% of Americans in our sample reported zero or one residential moves; this percentage was 75.6% for Japanese), a distribution that would not lend itself to high correlations with any other variable. Given these caveats, we acknowledge that the findings of Study 2 are preliminary and that more research is needed to definitively ascertain this predictive power of relational mobility versus related cultural constructs. Relatedly, future research should further examine whether the effects of relational mobility on the various psychological tendencies are attenuated in cultures typified by high (vs. low) levels of interdependence and/or tightness, because individuals in these cultures would be incentivized to remain vigilant to their surrounding social and physical context.

Also, even though we controlled for a number of variables in our correlational studies, we did not measure other known predictors of analytic (vs. holistic) cognition in extant literature, such as liberal versus conservative political orientation (Talhelm et al., 2015). Future research should examine political orientation in conjunction with relational mobility more explicitly.

Although locus of control worked well as a mediator in the present research, prior work found that cultural differences in attributional styles could be explained by perceived consensual belief in dispositionism (Zou et al., 2009). We acknowledge that we could have examined consensual perceptions of locus of control as an alternative possible mechanism, and future research should examine this mechanism more explicitly. At the same time, we highlight the effects we did observe with locus of control are quite consistent across studies and theoretically meaningful given our main independent construct of interest is inherently tied to



perceptions of how much people can control their surrounding social environment.

More generally, we suspect that relational mobility is a socioecological construct that taps into very basic, fundamental features of human social interactions, one which could offer an interesting explanatory framework for a host of different psychological tendencies through its effects on social structure and the resulting proximal incentives for adaptive behavior. For example, individuals embedded in low mobile contexts might refrain from expressing socially disengaging (vs. engaging) emotions or be less likely to demonstrate an implicit inflation of the self (Kitayama et al., 2006, 2009). Similarly, it might be worthwhile to explore whether there is a positive association between relational mobility and other types of psychological tendencies associated with independence and interdependence.

In addition, because our studies show that relational mobility is negatively associated with cultural tightness-looseness, relational mobility could also have a role in a number of psychological tendencies known to follow from cultural tightness (for a review, see Gelfand, 2012). For instance, levels of self-monitoring (Gelfand et al., 2011), cognitive accessibility of normative requirements (Aarts & Dijksterhuis, 2003), regulatory focus (Higgins, 1996), need for structure (Neuberg & Newsom, 1993), or impulse control (Baumeister & Heatherton, 1996). Future research should address whether relational mobility affects these other psychological tendencies associated with cultural tightness-looseness.<sup>12</sup>

## Conclusion

Overall, the current research found consistent evidence that relational mobility may be an important socioecological factor that can help explain robust cognitive differences observed across cultures. This work further elucidates the complex nature of the manifestations of how basic psychological processes differ across cultures, and highlights the important role of the emerging socioecological perspective in helping scholars understand the origin and perpetuation of cultural differences.

<sup>12</sup> Even though we have examined how cognitive styles can be seen as adaptations to varying levels of relational mobility, the other causal direction could still be possible, such that those who are analytical might perceive their social environments to be more mobile. In order to try to address this empirically, we re-ran our mediational models in Study 3a and 3b and showed that locus of control did not mediate the effect of dispositional bias on relational mobility: internal locus of control, 95% CI [- .04, .08], and external locus of control, 95% CI [- .04, .18]. In Study 3b, locus of control did not mediate the effect of analytic (vs. holistic) attention on relational mobility: internal locus of control, 95% CI [- .01, .01], and external locus of control, 95% CI [- .01, .02]. Therefore, this direction was not empirically validated in our data at least. Future research should test this opposite causal direction in further detail.

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## Appendix

### Materials for Manipulation in Study 4

#### High Relational Mobility (Taken From Li, Adams, Kurtis, & Hamamura, 2015)

Imagine that you are offered a job that you have always wanted. The job is with a large multidepartment company. The company has a fluid, project-based organizational structure in which employees come together on temporary teams to work on particular projects. The teams dissolve once the project is complete and recombine in different configurations for the next set of projects. In other words, employees work on non-overlapping teams that change membership frequently, and they have frequent opportunities to meet and work with different members of the organization.

#### Low Relational Mobility (Taken From Li, Adams, Kurtis, & Hamamura, 2015)

Imagine that you are offered a job that you have always wanted. The job is with a large multidepartment company. The company has a stable workforce and organizational structure in which em-

ployees work together as an interconnected unit for an extended period of time across a number of different projects. Turnover is low, and employees work with the same, small set of people in slightly different configurations depending on the project. In other words, employees are linked to each other in a dense network with overlapping ties, and they have frequent opportunities to interact with the same set of coworkers.

#### Control

Imagine that you are offered a job that you have always wanted. What kind of job would this be? Please describe the ideal job that you would hope to get after you graduate from college, including what type of industry the job would be in, the type of company you would work at, and the projects that you might work on.

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