Passion, Relational Mobility, and Proof of Commitment: A Comparative Socio–Ecological Analysis of an Adaptive Emotion in a Sexual Market

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Abstract
Although monogamy, the exclusive bonding with a specific partner, is one characteristic of modern human mating, long-term romantic relationships inherently possess the commitment problem, which is the conflict between maintaining a relationship with a certain partner and seeking attractive alternatives. Frank has argued that love and passion help solve this problem because they make individuals commit voluntarily to the relationship, leading the other party to also be committed with less concern over being cheated on or rejected. Combining this idea with the comparative socio-ecological approach, we hypothesize that passion will be more pronounced in social environments in which people have greater freedom to choose and replace their partners (i.e., high relational mobility) than in societies in which relationships tend to be more stable and hard to change (i.e., low relational mobility). To test this hypothesis, we compared Americans (living in a society with high relational mobility) and Japanese (living in a society with low relational mobility). As predicted, Americans were more passionate toward their romantic partners than Japanese, and this cultural difference was partially explained by the levels of perceived relational mobility in participants’ local ecology. Moreover, more intense passion was found to lead to greater commitment behaviors in both societies. The importance of taking socioecological factors into consideration for the theory of the adaptive function of interpersonal emotions is also discussed.

Keywords
passion, commitment, human mating, socioecological approach, relational mobility

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Monogamous marriage, the state of marriage to a single partner, is one characteristic of modern human mating. Researchers demonstrated that socially imposed monogamy evolved as an adaptation to ancient ecological threats, such as sexually transmitted diseases and intergroup competition (e.g., Bauch & McEleath, 2016; Benshoof & Thornhill, 1979; Henrich, Boyd, & Richerson, 2012; Schacht & Bell, 2016). Although some societies or communities permit simultaneous marriage with multiple partners, polygamous marriage imposes great economic costs on individuals, especially in modern society (Thobejane & Flora, 2014). Accordingly, the retention of long-term pair bonding would generally be more beneficial for humans than constantly moving from relationship to relationship (Buss & Schmitt, 1993; Gangestad & Simpson, 2000; Kaplan, Hill, Lancaster, & Hurtado, 2000).

However, exclusive bonding with a single partner inherently possesses the commitment problem, which is the conflict between staying with a specific romantic partner and seeking out more attractive alternatives (Frank, 1988). The issue here is not that individuals may not want to stay but that they cannot be certain whether the other party will also be willing to stay with them if they find a better alternative. Thus, this concern makes continued commitment to the relationship difficult for both parties.

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Frank (1988) proposed that one solution to this problem is the emotion of love or passion. Passion, an interpersonal emotion, prompts individuals to exclusively bond with their partner (Hatfield & Sprecher, 1986; Sternberg, 1986, 1997) and to subjectively derogate the benefits they can gain by seeking alternatives. In fact, passion leads individuals to idealize (Gunaydin & DeLong, 2015), inhibit critical thinking (Bartels & Zeki, 2000), and become mentally preoccupied with the current partner (Gonzaga, Haselton, Smurda, Davies, & Poore, 2008; Marazziti, Akiskal, Rossi, & Cassano, 1999). Thus, when an individual recognizes that their partner is passionate about their relationship, they can also be committed more easily, leading to a greater chance of successfully maintaining the relationship over the long term. Supporting Frank’s argument, passion has been considered to be a prerequisite of marriage in many cultures (Hatfield & Rapson, 2006). Research has found that the intensity of passion is related to various positive relational outcomes, such as personal fulfillment, well-being, and marital satisfaction (Aron & Henkemeyer, 1995; Hatfield & Sprecher, 1986). In particular, this display of commitment to one’s partner would be more effective in monogamous mating markets where individuals need to be more selective in order to identify a reliable long-term relational partner than in polygamous environments (Stewart, Stinnett, & Rosenfeld, 2000).

However, from an adaptationist perspective, one persistent mystery regarding passion as an interpersonal emotion is that it apparently directs individuals to exclusively favor and focus on their current partner (Gonzaga et al., 2008). In other words, individuals with strong passion reduce their opportunities to detect and ultimately mate with attractive alternatives. Why do humans possess this costly psychological mechanism that results in them voluntarily abandoning the search for better alternatives and committing to a single choice?

To attempt to solve this theoretical puzzle, we incorporate a comparative socio-ecological perspective and aim to propose and test a new hypothesis. We believe that a characteristic of the surrounding social ecology, namely, the ease or difficulty of replacing one’s relational partner or relational mobility (Yuki & Schug, 2012), will affect the intensity of passion that people in a society experience toward their romantic partners.

**Passion, Relational Mobility, and the Need for Voluntary Commitment to Long-Term Relationships**

The socioecological approach has recently been regaining momentum in psychological science. Researchers adopting this perspective have been successful in locating relatively distal socio-ecological factors to explain variations in human behaviors and psychological tendencies across societies (e.g., Henrich et al., 2001; Nisbett & Cohen, 1996; Oishi & Graham, 2010; Talhelm et al., 2014). Here, we propose that Frank’s (1988) theory of love might be compatible with this type of approach and help to understand and predict differences in the intensity of passion that people experience in romantic relationships across different societies. Specifically, we argue that the intensity of passion in romantic relationships should be affected by the degree of relational mobility or the number of opportunities in a given social context for individuals to voluntarily form new relationships and leave old ones (Yuki & Schug, 2012). Relational mobility has been found to be useful in explaining cross-societal variations in diverse domains of human behavioral and psychological phenomena, ranging from intrapersonal to interpersonal and societal processes (see Kito, Yuki, & Thomson, 2017; Oishi, Schug, Yuki, & Axt, 2015; Yuki & Schug, 2012, for reviews).1

Societies that are high in relational mobility are organized in such a way that individuals can take advantage of opportunities to meet and associate with new partners based on an individual’s preferences. In these societies, individuals can relatively easily venture outside an existing relationship they find insufficiently rewarding and search for better relationships (Yamagishi, 2011). We argue that this constitutes exactly the type of sexual marketplace in which passion is particularly functional since individuals are constantly exposed to the risk and associated anxiety of their partner cheating on or breaking up with them. Displays of voluntary commitment to the relationship elicited by passion help to solve this problem, as such displays by one partner will in turn lead to a reciprocal increase in commitment from the other partner (Frank, 1988). This results in a means to maintain and strengthen the relationship, which might otherwise be fragile.

By contrast, in societies with low relational mobility, social group memberships and interpersonal relationships tend to be stable and difficult to change. Individuals are embedded in a web of social networks that are hard to change, and fewer opportunities are presented to find new (and replace current) relationships (Yamagishi, Hashimoto, & Schug, 2008; Yamagishi, Jin, & Miller, 1998). The necessity of passion as a voluntary commitment device should therefore be smaller in this type of society because the commitment problem is already solved by the surrounding social environment (i.e., stability of social network). This means that individuals do not have to worry as much about the risk that their partner will leave them.

Evidence from cross-cultural studies is consistent with this hypothesis. The intensity of passion toward one’s romantic partner has been found to be stronger among individuals in North America than in East Asia (Gao, 2001; Sprecher et al., 1994). North America is a typical high relational mobility society, whereas East Asian societies are typically low in relational mobility (Yuki & Schug, 2012). No study to date, however, has directly examined the connection between levels of relational mobility in a society and passion that people experience in a romantic relationship.

**Predictions**

In sum, we argue that passion is an adaptive psychological device that serves to bond individuals to their current or potential partner, and therefore, it should be more prevalent in social ecologies in which replacing one’s romantic partner is easier. To test our hypothesis, we conducted a cross-societal study...
comparing individuals who live in the United States (a high relational mobility society) and Japan (a low relational mobility society). Our predictions were as follows. First, the intensity of passion would be higher among individuals in the United States than in Japan (Prediction 1). Second, this difference in the intensity of passion would be statistically mediated by the difference in the degree of relational mobility in participants’ surrounding local ecology (Prediction 2). Third, the intensity of passion elicited in high relational mobility environments compared to low ones would lead to increased displays of commitment behaviors to one’s current partner, such as inducing proximity, giving priority to their partner, or voluntarily and explicitly abandoning the search for potential alternatives (Prediction 3).

Material and Method

Participants

One hundred and fifty-four heterosexual Americans (78 men and 76 women, \( M_{\text{age}} = 34.86, SD_{\text{age}} = 11.99 \)) and 103 heterosexual Japanese (65 men and 38 women, \( M_{\text{age}} = 36.76, SD_{\text{age}} = 8.01 \)) participated in the study in exchange for a monetary reward. Participants were recruited through online crowdsourcing marketplaces: Amazon Mechanical Turk in the United States and Lancers in Japan. The protocol of the current study was reviewed and approved by the Ethics Committee of Center for Experimental Research in Social Sciences at Hokkaido University under the title “Cross-Societal Survey on the Competitive-ness of Romantic Market” and protocol number 26-6. Participants who were not in a relationship were excluded from the analysis. Thus, our final sample consisted of 107 Americans (48 men and 59 women, \( M_{\text{age}} = 35.78, SD_{\text{age}} = 12.2 \)) and 51 Japanese (27 men and 24 women, \( M_{\text{age}} = 38.25, SD_{\text{age}} = 8.38 \)).

Materials

Participants first completed the Romantic Relational Mobility Scale. This scale was a modified version of the original Relational Mobility Scale (Yuki et al., 2007) in order to specifically measure relational mobility in the mating marketplace. Participants rated 6 items addressing their perceptions of the level of romantic relational mobility of people around them. This index served as a proxy for the nature of their immediate social environments and avoids confounds deriving from the participants’ personal characteristics, such as their perceived mate value (e.g., Buss, 1989; Kamble, Shackelford, Pham, & Buss, 2014). They responded to the items using a 6-point scale ranging from 1 (strongly disagree) to 6 (strongly agree). Sample items were “They (the people around you) have many chances to get to know someone who might become a future romantic partner” and “If they were not satisfied with their current romantic relationship, they could easily end it” (see Appendix). The scale displayed high levels of reliability in both American (\( \alpha = .84 \)) and Japanese (\( \alpha = .81 \)) samples.

| Table 1. Commitment Behavior Items and Their Inter-Item Correlations for Each Type of Behavior in Both the United States and Japanese Samples. |
| --- |
| **Subscale Items** | **United States** | **Japan** |
| Proximity inducing | .38*** | .64*** |
| Talk to, e-mail to, or call X more frequently | | |
| Spend more time with X | .42*** | .41*** |
| Give priority to the partner | | |
| Pay special attention to X | | |
| Cancel going out with other men/women if there was a chance to hang out with X | | |
| Cutting off access to other potential mates | .22** | .25* |
| Avoid going out with men/women one-on-one, other than X | | |
| When we’re all hanging out with a group of people, make an effort to only talk with X | | |

**p < .01, ***p < .001.

Participants also completed the 15-item Passionate Love Scale (Hatfield & Sprecher, 1986) to measure the intensity of passion they felt toward their current partner. They responded using a 6-point scale ranging from 1 (strongly disagree) to 6 (strongly agree). Items included the following: “I would rather be with ____ than with anyone else.” and “Sometimes I feel I can’t control my thoughts, they are obsessively on ____.” (In the blank spaces, the web-based survey program (Qualtrics) automatically inserted and showed initials or nicknames of participants’ actual partners, which they had provided earlier in the questionnaire.) For the Japanese version, we revised Hanari and Kawano (2012), since some issues arose with their original translation. Our revision was double-checked by bilingual speakers to confirm accuracy. These scales displayed high levels of reliability in both samples (the United States: \( \alpha = .92 \), Japan: \( \alpha = .88 \)).

We then asked all participants how likely they would be to adopt various commitment behaviors when forming a relationship with a specific mate. Participants read short scenarios in which they desired to establish a long-term romantic relationship with a specific opposite-sex person (named X). We presented participants with six commitment behaviors. These items included the following three types of behaviors: (i) proximity-inducing behaviors, (ii) superior treatment behaviors, and (iii) cutting off access to other potential mates (see Table 1 for the actual item wordings and correlations between the 2 items for each type of behavior). We asked participants to evaluate the likelihood that they would adopt each behavior when trying to establish a romantic relationship with the target person. They responded on a 6-point scale that ranged from 1 (completely unlikely) to 6 (completely likely).

Finally, participants were asked to provide their demographic information including gender, age, and ethnicity.
Results

We first examined whether perceived relational mobility and the intensity of passion would differ between Americans and Japanese. As expected, the results of a two-tailed $t$ test indicated higher relational mobility in the American sample ($M = 4.57, SD = .81$) than in the Japanese sample ($M = 3.58, SD = .70$), $t(156) = 7.49, p < .001$. In addition, Americans ($M = 4.60, SD = .93$) reported a greater intensity of passion than Japanese ($M = 3.74, SD = 1.01$), $t(156) = 5.30, p < .001$. These results are consistent with expectations that relational mobility is higher in the United States than Japan and that Americans are more passionate in romantic relationships than Japanese, supporting Prediction 1.

In the current study, participants were nested within each country. Therefore, in order to differentiate the group-level and individual-level effects, we conducted a linear mixed model analysis. The effect of perceived relational mobility on the intensity of passion was significant both at the individual ($\beta = .28, t = 2.95, p = .004$) and at the group level ($\beta = .87, t = 5.48, p < .001$). Based on these results, we then examined whether the cultural difference in the intensity of participants’ passion could be accounted for by the differences in relational mobility. To analyze the mediating effect of relational mobility, we used Hayes’s (2012, 2013) PROCESS plugin for SPSS, version 21. Bootstrap intervals were bias corrected and based on 5,000 bootstrap samples. The results indicated a significant indirect effect of country on passion acting through relational mobility ($b = .279, 95\% \mathrm{CI} [0.091, 0.515]$; $K^2 = .117, 95\% \mathrm{CI} [0.040, 0.203]$), though the direct effect of country on passion remained significant (see Figure 1). This finding thus suggests that the cultural difference in passion was partly explained by the difference in the level of relational mobility, supporting Prediction 2.

Finally, we examined the indirect effects of relational mobility on commitment behaviors through the level of intensity of passion. We used the bootstrapping resampling method in AMOS. Bootstrap intervals were bias corrected and based on 5,000 samples. The results indicated significant indirect effects of relational mobility on each commitment behavior through the level of intensity of passion. Specifically, relational mobility had a significant positive indirect effect on proximity-inducing behaviors ($b = .267, 95\% \mathrm{CI} [0.209, 1.847]$). Similarly, significant indirect effects were found for giving priority to their partner ($b = .484, 95\% \mathrm{CI} [0.118, 0.506]$) and cutting off access to other potential mates through the level of intensity of passion ($b = .308, 95\% \mathrm{CI} [0.161, 0.497]$; see Figure 2). Overall, these results indicate that increased levels of relational mobility are predictive of commitment behaviors directed toward an individual’s partner partly through an elevation of the intensity of passion, supporting Prediction 3.

Discussion

The aim of the present study was to test our hypothesis that a characteristic of the surrounding social ecology of societies, specifically relational mobility (Yuki & Schug, 2012), would affect the intensity of passion that people within a society experience in a romantic relationship. Just as predicted, our cross-societal study demonstrated that (1) Americans reported stronger passion than Japanese, (2) this cultural difference in passion was partially explained by differences in the levels of perceived relational mobility in the participant’s local ecology, and (3) the greater intensity of passion was then further associated with greater commitment behaviors directed at the specific targeted partner. Taken together, these results support our hypothesis that passion is an adaptive psychological device that is especially functional in social environments high in relational mobility. In such environments, relationships tend to be more fragile and hence individuals find it more difficult to commit to long-term relationships. Alternatively, in societies in which romantic relationships tend to be stable and difficult to change (low relational mobility), the utility of passion and its resultant commitment behaviors is lower, and thus passion is less intense in relationships. These findings expand Frank’s theory (1988) in that love and passion as a psychological commitment device to a romantic relationship would be especially advantageous in socioecological environments in which there is greater freedom in selecting and replacing one’s relationships.

Implications

Our theory and the reported findings have implications for various areas in human and social sciences, such as evolutionary and cultural psychologies. First, the results are highly relevant to research on the evolutionary science of human interpersonal emotions. A great deal of previous research has successfully identified the kinds of emotions that seem to be functional in human interpersonal markets (such as gratitude, McCullough, Kimeldorf, & Cohen, 2008; Smith, 2014, and guilt, Frank, 1988). However, very few studies have focused on the effects of socio-ecological factors on the intensities of those emotions (see Sato, Yuki, & Norasakkunkit, 2014; Sznyer et al., 2012, for exceptions). Since the types of behaviors that are adaptive in a given social setting should depend on the nature of interdependence with other individuals or the
associated structure of incentives that this affords, the evolution of a particular type of interpersonal emotion and its activation cannot be fully understood without considering the effects of those societal factors.

The second significant implication applies to research in the field of the cultural psychology of interpersonal relationships. Previous studies have revealed differences in interpersonal emotions in different parts of the world (e.g., Gao, 2001; Sprecher et al., 1994). These differences have traditionally been explained by differences in predominant values and beliefs (such as individualism and collectivism, Hofstede, 1980, and independent vs. interdependent self-construals, Markus & Kitayama, 1991) that are culturally shared in the respective societies. Although we do not wish to argue that such cultural psychological explanations are wrong, we do contend that these explanations overlook a deeper theoretical question in terms of the societal-level mechanisms, which underpin such variations in values and belief systems (Schug, Yuki, & Maddux, 2010). Recent work by scholars who adopted the socioecological perspective (e.g., Henrich et al., 2001; Nisbett & Cohen, 1996; Oishi, 2010; Uskul, Kitayama, & Nisbett, 2008; Yamagishi et al., 2008; Yuki & Schug, 2012) has effectively demonstrated that socio-ecological factors, including interpersonal, collective, and economic, have pervasive effects on human behavior and psychological tendencies. The comparative socioecological approach can thus serve as a theoretical bridge between evolutionary and cultural psychological sciences. Relational mobility seems to offer one such useful bridge that would benefit from further exploration.

**Limitations and Future Directions**

There are a few limitations in this study, which need to be addressed in future research. First, this was a questionnaire study and did not directly observe or measure the actual behaviors of individuals in romantic relationships. That is, even if the participants reported that they tend to adopt the commitment behaviors, they were reporting a hypothetical act and not their actual behavior. Thus, to test the validity of the current findings, measurements of actual behaviors collected in a laboratory setting or in the field will be essential. Second, there were only 2 items for each of our three subtypes of commitment behaviors, and while inter-item correlations were significant, the correlations proved to not be very strong. Thus, future attempts need to be made to develop more reliable measures of these kinds of behaviors. Third, we did not explore or compare the actual fitness implications or long-term costs and benefits for those who have intense versus weak passion toward their partner. To discuss the adaptive function of passion and commitment behaviors, we need to explore the social consequences of intense passion and voluntary proof of commitment. If our theory is correct, the difference between those who are more versus less passionate in terms of reproductive success, or at least in relative success in maintaining long-term sexual relationships, should be greater in high relational mobility societies than in low ones. Finally, there are a number of potentially confounding variables that need to be addressed in future research. Although we obtained results just as we predicted, that is, that cultural differences in the intensity of passion was mediated by perceived romantic relational mobility, the mediation effect of relational mobility was only partially significant. This leaves the possibility that factors other than relational mobility could play important roles in bringing about cross-societal differences in passion. For instance, sociosexually unrestricted people are known to have reduced motivations for becoming involved in long-term committed relationships (e.g., Jonason & Buss, 2012), and thus, they likely tend not to engage in demonstrations of commitment to a relationship. If the prevalence of this orientation differs between societies, say between Japan and the United States, it could account for some of the residual variance in passion not accounted for by differences in relational mobility. In future studies, the effects of this and other potentially confounding variables should be examined and more thoroughly controlled for.

**Appendix**

The items of the Romantic Relational Mobility Scale. Starred items were reverse scored.

1. They (the people around you) have many chances to get to know someone who might become a future romantic partner. /彼ら（あなたの周囲にいる人々）には、将来
1. The differences in relational mobility have been found to explain a
was supported by JSPS KAKENHI, Grant Number JP15H03445.
2. Their current or potential romantic partners match their
own preferences./彼らは、自分の好みにぴったりな
3. There are few opportunities for them to find new
romantic partners./彼らには、新しい恋人を見つけ
する機会がありません。
4. If they were not satisfied with their current romantic
relationship, they could easily end it./もし現在の恋
愛関係に満足していなければ、彼らはその関係を
簡単に解消することができる。
5. It is often the case that they cannot freely choose their
romantic partners./彼らには、恋人として付き合う
異性を自由に選べないことがよくある。
6. Even if they were not satisfied with their current romantic
relationship, they would often have no choice but to
stay in it./たとえ現在の恋愛関係に満足していないく
ても、彼らはそこに留まり続けるしかないので
よくある。

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Notes
1. The differences in relational mobility have been found to explain a
host of “inter-ecological” differences in behavioral and psycholo-
gical tendencies, such as social anxiety (Sato et al., 2014), general
trust (Yuki et al., 2007), social risk propensity (Li, Hamamura, &
Adams, 2015), reward and punishment behaviors (Wang & Leung,
2010; Wang, Leung, See, & Gao, 2011), interpersonal similarity
(Bahns, Pickett, & Crandall, 2011; Schug, Yuki, Horikawa, &
Takemura, 2009), intimacy between friends (Yamada, Kito, &
Yuki, 2015), self-enhancement (Falk, Heine, Takemura, & Yuki,
2009), determinants of happiness (Sato & Yuki, 2014; Yuki, Sato,
Takemura, & Oishi, 2013), the acculturation process (Zhang & Li,
2014), and privacy concerns on the internet (Thomson, Yuki, & Ito,
2015).

References
Aron, A., & Henkemeyer, L. (1995). Marital satisfaction and passion-
ate love. Journal of Social and Personal Relationships, 12,
139–146.
Bahns, A. J., Pickett, K. M., & Crandall, C. (2011). Social ecology of
similarity: Big schools, small schools and social relationships.
Group Processes and Intergroup Relations, 15, 119–131.
Bartels, A., & Zeki, S. (2000). The neural basis of romantic love.
Neuroreport, 11, 3829–3834.
Bauch, C. T., & McElreath, R. (2016). Disease dynamics and costly
punishment can foster socially imposed monogamy. Nature Com-
munications, 7, 11219.
Benshoof, L., & Thornhill, R. (1979). The evolution of monogamy
and concealed ovulation in humans. Journal of Social and Biolo-
gical Structures, 2, 95–106.
Buss, D. (1989). Sex differences in human mate preferences: Evolu-
tionary hypotheses tested in 37 cultures. Behavioral and Brain
Sciences, 12, 1–14.
Buss, D., & Schmitt, D. P. (1993). Sexual strategies theory: An evolu-
tionary perspective on human mating. Psychological Review, 100,
204–232.
Falk, C. F., Heine, S. J., Yuki, M., & Takemura, K. (2009). Why do
Westerners self-enhance more than East Asians? European Journal
of Personality, 23, 183–203.
Frank, R. H. (1988). Passions within reason: The strategic role of the
emotions. New York, NY: WW Norton & Company.
Gangestad, S. W., & Simpson, J. A. (2000). The evolution of human
mating: Trade-offs and strategic pluralism. Behavioral and Brain
Sciences, 23, 573–587.
Gao, G. (2001). Intimacy, passion, and commitment in Chinese and
US American romantic relationships. International Journal of
Intercultural Relations, 25, 329–342.
Gonzaga, G. C., Haselton, M. G., Smurda, J., Davies, M., & Poore, J.
(2008). Love, desire, and the suppression of thoughts of roman-
tic alternatives. Evolution and Human Behavior, 29, 119–126.
Gunaydin, G., & DeLong, J. E. (2015). Reverse correlating love:
Highly passionate women idealize their partner’s facial appear-
ance. PLoS One, 10, e0121094.
Hanari, T., & Kawano, K. (2012). Rennai taisyousya heno netuaido to
koutei oyo bi hiteiti kanjou [The passionate love, positive, and
negative feelings toward romantic interest: By use of Japanese
Passionate Love Scale]. The Departmental Bulletin Paper of
Sugiyama Jogakuen University, 12, 65–69.
Hatfield, E., & Rapson, R. L. (2006). Passionate love, sexual desire, and
mate selection: Cross-cultural and historical perspectives. In P.
Noller & J. A. Feeney (Eds.), Close relationships: Functions, forms
and processes (pp. 227–243). Hove, England: Psychology Press.
Hatfield, E., & Sprecher, S. (1986). Measuring passionate love in
intimate relationships. Journal of Adolescence, 9, 383–410.
Hayes, A. F. (2012). PROCESS: A versatile computational tool for
observed variable mediation, moderation, and conditional process
modeling [White paper]. Retrieved from http://www.afhayes.com/
public/process2012.pdf
Hayes, A. F. (2013). Introduction to mediation, moderation, and con-
ditional process analysis a regression-based approach. New York,
NY: The Guilford Press.
Henrich, J., Boyd, R., Bowles, S., Camerer, C., Fehr, E., Gintis, H., &
McElreath, R. (2001). In search of homo economicus: Behavioral
experiments in 15 small-scale societies. The American Economic
Review, 91, 73–78.
Henrich, J., Boyd, R., & Richerson, P. J. (2012). The puzzle of mono-
gamous marriage. Philosophical Transactions of the Royal Society
B: Biological Sciences, 367, 657–669. doi:10.1098/rstb.2011.0290
Hofstede, G. (1980). *Culture's consequences: International differences in work-related values*. Beverly Hills, CA: Sage.

Jonason, P. K., & Buss, D. M. (2012). Avoiding entangling commitments: Tactics for implementing a short-term mating strategy. *Personality and Individual Differences, 52*, 606–610. doi:10.1016/j.paid.2011.12.015

Kamble, S., Shackelford, T. K., Pham, M., & Buss, D. M. (2014). Indian mate preferences: Continuity, sex differences, and cultural change across a quarter of a century. *Personality and Individual Differences, 70*, 150–155. doi:10.1016/j.paid.2014.06.024

Kaplan, H., Hill, K., Lancaster, J., & Hurtado, A. M. (2000). A theory of human life history evolution: Diet, intelligence, and longevity. *Evolutionary Anthropology, 9*, 156–185. doi:10.1002/1520-6505(2000)9:4<156::AID-EVAN3>3.0.CO;2-7

Kito, M., Yuki, M., & Thomson, R. (2017). Relational mobility and close relationships: A socio-ecological approach to explain cross-cultural differences. *Personal Relationships, 24*, 114–130. doi:10.1111/pere.12174

Li, L. M. W., Hamamura, T., & Adams, G. (2015). Relational mobility increases social (but not other) risk propensity. *Journal of Behavioral Decision Making, 29*, 481–488. doi:10.1002/bdm.1894

Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review, 98*, 224–253.

Marazziti, D., Akiskal, H. S., Rossi, A., & Cassano, G. B. (1999). Alteration of the platelet serotonin transporter in romantic love. *Psychological Medicine, 29*, 741–745.

McCullough, M. E., Kimelkof, M. B., & Cohen, A. D. (2008). An adaptation for altruism? The social causes, social effects, and social evolution of gratitude. *Current Directions in Psychological Science, 17*, 281–285.

Nisbett, R. E., & Cohen, D. (1996). *Culture of honor: The psychology of violence in the South*. Boulder, CO: Westview Press.

Oishi, S. (2010). The psychology of residential mobility: Implications for the self, social relationships, and well-being. *Perspectives on Psychological Science, 55*, 21.

Oishi, S., & Graham, J. (2010). Social ecology: Lost and found in psychological science. *Perspectives on Psychological Science, 3*, 356–377.

Oishi, S., Schug, J., Yuki, M., & Axt, J. (2015). The psychology of residential and relational mobilities. In M. J. Gelfand, C. Chiu, & Y. Hong (Eds.), *Handbook of advances in culture and psychology* (Vol. 5, pp. 221–272). New York, NY: Oxford University Press.

Sato, K., & Yuki, M. (2014). The association between self-esteem and happiness differs in relationally mobile vs. stable interpersonal contexts. *Frontiers in Psychology, 5*, 1113.

Sato, K., Yuki, M., & Norasakkunkit, V. (2014). A socio-ecological approach to cross-cultural differences in the sensitivity to social rejection: The partially mediating role of relational mobility. *Journal of Cross-Cultural Psychology, 45*, 1549–1560.

Schacht, R., & Bell, A. V. (2016). The evolution of monogamy in response to partner scarcity. *Scientific Reports, 6*, 32472.

Schug, J., Yuki, M., Horikawa, H., & Takemura, K. (2009). Similarity attraction and actually selecting similar others: How cross-societal differences in relational mobility affect interpersonal similarity in Japan and the USA. *Asian Journal of Social Psychology, 12*, 95–103.

Schug, J., Yuki, M., & Maddux, W. (2010). Relational mobility explains between- and within-culture differences in self-disclosure to close friends. *Psychological Science, 21*, 1471–1478.

Smith, A. R. (2014). *Gratitude: A basic human emotion for initiating and strengthening interpersonal relationships*. (Doctoral dissertation, University of Miami). Retrieved from http://scholarlyrepository.miami.edu/oa_dissertations/1251/

Sternberg, R. J. (1986). A triangular theory of love. *Psychological Review, 93*, 119–135.

Sternberg, R. J. (1997). Construct validation of a triangular love scale. *European Journal of Social Psychology, 27*, 313–335.

Stewart, S., Stinnett, H., & Rosenfeld, L. B. (2000). Sex differences in desired characteristics of short-term and long-term relationship partners. *Journal of Social and Personal Relationships, 17*, 843–853. doi:10.1177/0265407500176008

Sznyder, C., Takemura, K., Delton, A. W., Sato, K., Robertson, T., Cosmides, L., & Tooby, J. (2012). Cross-cultural differences and similarities in proneness to shame: An adaptationist and ecological approach. *Evolutionary Psychology, 10*, 352–370.

Sprecher, S., Aron, A., Hatfield, E., Cortese, A., Potapova, E., & LeVitzkaya, A. (1994). Love: American style, Russian style, and Japanese style. *Personal Relationships, 1*, 349–369.

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

Thobejane, T. D., & Flora, T. (2014). An exploration of polygamous marriages: A worldview. *Mediterranean Journal of Social Sciences, 5*, 1058–1066.

Thomson, R., Yuki, M., & Ito, N. (2015). A socio-ecological approach to national differences in online privacy concern: The role of relational mobility and trust. *Computers in Human Behavior, 51*, 285–292.

Uskul, A. K., Kitayama, S., & Nisbett, R. E. (2008). Ecocultural basis of cognition: Farmers and fisherman are more holistic than herders. *Proceedings of the National Academy of Science, 105*, 8552–8556.

Wang, C. S., & Leung, A. K. (2010). The cultural dynamics of rewarding honesty and punishing deception. *Personality and Social Psychology Bulletin, 36*, 1529–1542.

Wang, C. S., Leung, A. K., See, Y. H. M., & Gao, X. Y. (2011). The effects of culture and friendship on rewarding honesty and punishing deception. *Journal of Experimental Social Psychology, 47*, 1295–1299.

Yamada, J., Kito, M., & Yuki, M. (2015). Yuujin renai kankei ni okeru kankei ryudousei ni simitsusete: Nichika hikaku ni yoru Kentou [Relational mobility and intimacy in friendships and romantic relationships: A cross-societal study between Canada and Japan]. *The Japanese Journal of Experimental Social Psychology, 55*, 18–27.

Yamagishi, T. (2011). *Trust: The evolutionary game of mind and society*. Tokyo, Japan: Springer.

Yamagishi, T., Hashimoto, H., & Schug, J. (2008). Preferences versus strategies as explanations for culture-specific behavior. *Psychological Science, 19*, 579–584.
Yamagishi, T., Jin, N., & Miller, A. S. (1998). In-group bias and culture of collectivism. Asian Journal of Social Psychology, 1, 315–328.

Yuki, M., Sato, K., Takemura, K., & Oishi, S. (2013). Social ecology moderates the association between self-esteem and happiness. Journal of Experimental Social Psychology, 49, 741–746.

Yuki, M., & Schug, J. (2012). Relational mobility: A socioecological approach to personal relationships. In O. Gillath, G. Adams, & A. Kunkel (Eds.), Relationship science: Integrating evolutionary, neuroscience, and sociocultural approaches (pp. 137–151). Washington, DC: American Psychological Association.

Yuki, M., Schug, J., Horikawa, H., Takemura, K., Sato, K., Yokota, K., & Kamaya, K. (2007). Development of a scale to measure perceptions of relational mobility in society (CERSS Working Paper 75). Hokkaido, Japan: Center for Experimental Research in Social Sciences, Hokkaido University.

Zhang, R., & Li, L. M. W. (2014). The acculturation of relational mobility: An investigation of Asian Canadians. Journal of Cross-Cultural Psychology, 45, 1390–1410.