

### Original Article

## Cross-Cultural Differences and Similarities in Proneness to Shame: An Adaptationist and Ecological Approach

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**Abstract:** People vary in how easily they feel ashamed, that is, in their shame proneness. According to the information threat theory of shame, variation in shame proneness should, in part, be regulated by features of a person's social ecology. On this view, shame is an emotion program that evolved to mitigate the likelihood or costs of reputation-damaging information spreading to others. In social environments where there are fewer possibilities to form new relationships (i.e., low relational mobility), there are higher costs to damaging or losing existing ones. Therefore, shame proneness toward current relationship partners should increase as perceived relational mobility decreases. In contrast, individuals with whom one has little or no relationship history are easy to replace, and so shame-proneness towards them should not be modulated by relational mobility. We tested these predictions cross-culturally by measuring relational mobility and shame proneness towards friends and strangers in Japan, the United States, and the United Kingdom. Japanese subjects were more shame-prone than their British and American counterparts. Critically, lower relational mobility was associated with greater shame proneness towards friends (but not strangers), and this relationship partially mediated the cultural differences in shame proneness. Shame proneness appears tailored to respond to relevant features of one's social ecology.

**Keywords:** shame, emotion, adaptationism, relational mobility, cross-cultural research

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## **Introduction**

Shame is a universal human emotion, appearing in all known human cultures (Brown, 1991; Darwin, 1872; Fessler, 1999; Tracy and Matsumoto, 2008). Despite this universality, it has a bewildering constellation of causes. People feel ashamed for exhibiting poor skills (Lewis, Alessandri, and Sullivan, 1992; Modigliani, 1971), for being diseased (Bishop, Alva, Cantu, and Rittiman, 1991; Ginsburg and Link, 1993), for having their adultery exposed (Hawthorne, 1994), and for being caught cheating on a social exchange (Sznycer, 2010). Though seemingly diverse, these sources of shame have an underlying commonality: They all reveal information that could reduce a person's value in the minds of others (Gilbert and McGuire, 1998; see Kurzban and Neuberg, 2005). People who are devalued are less likely to receive aid or have others defend their interests and are more likely to have others exploit them. Because humans evolved to be obligately social (Lee and DeVore, 1968), the selection pressures involved in social devaluation are substantial. The prospect or actuality of damaging information spreading to others, we argue, selects for specialized neurocognitive circuitry for orchestrating countermeasures against devaluation—the emotion of shame. Here, we test whether shame is calibrated by a person's local ecology and features of the individual. Specifically, we test whether people are more prone to feeling shame when (1) their local ecology presents fewer opportunities to form new relationships, when (2) highly valued relationship partners are a potential audience for shameful events, and when (3) they (the ashamed) have little social value.

### *Shame: An adaptation for preventing or mitigating social devaluation*

From an adaptationist perspective, an emotion is a superordinate control program (Tooby and Cosmides, 2008). The function of emotions is to orchestrate mechanisms in the brain and body so that they act in a coordinated way to solve particular adaptive problems (Tooby and Cosmides, 1990; Haselton and Ketelaar, 2006; Nesse, 1990). For example, sexual jealousy orchestrates the response to actual or potential infidelity (Buss, 2000); anger to the bargaining required by conflicts of interest (Sell, Tooby, and Cosmides, 2009); disgust to various contamination threats (Tybur, Lieberman, and Griskevicius, 2009); and so on. The design features of each emotion were selected to mesh with the evolutionarily recurrent structure of its corresponding adaptive problem.

Here, we discuss an adaptationist theory of shame, the information threat theory of shame (Sznycer, 2010), and report tests of several of its predictions. By using an adaptationist approach, the information threat theory of shame organizes valuable insights from past theories of shame (Fessler, 1999; Gilbert and McGuire, 1998; Tangney and Dearing, 2003; Tracy and Robins, 2004) and generates novel predictions. On this theory, shame is an evolved neurocognitive program designed by selection to (1) deter courses of action that would cause social devaluation; (2) limit the extent to which others learn about and spread potentially damaging information (see Schlenker and Leary, 1982); (3) limit the degree and the costs of any ensuing social devaluation (Gilbert and McGuire, 1998; Sznycer, 2010); and, if devaluation occurs, (4) mobilize the individual to respond

adaptively to the new social landscape.

Consistent with this, a variety of research shows that shame motivates an avoidance of behaviors that could cause devaluation, the concealment of damaging information (Rockenbach and Milinski, 2011), and, when damaging information is discovered, withdrawal (Tangney, Miller, Flicker, and Barlow, 1996), subordination and tolerance of reduced status (Gilbert, 2000; Wicker, Payne, and Morgan, 1983), a stereotyped nonverbal display (Fessler, 1999; Keltner, Young, and Buswell, 1997; Tracy, Robins, and Schriber, 2009), increased risk taking and aggression (Fessler, 2001; Tangney, Wagner, Hill-Barlow, Marschall, and Gramzow, 1996) to enforce valuation, appeasement behavior (Keltner et al., 1997), increases in cooperativeness (Masclat, Noussair, Tucker, and Villeval, 2003; de Hooge, Breugelmans, and Zeelenberg, 2008), up-regulation of cortisol (Dickerson and Kemeny, 2004; Gruenewald, Kemeny, Aziz, and Fahey, 2004), and up-regulation of proinflammatory cytokines (Dickerson, Gable, Irwin, Aziz, and Kemeny, 2009). In other words, shame functions to prevent the leakage of damaging information, to limit or reverse devaluation, and to cope with the harsher world faced by a devalued person.

*Why does proneness to shame vary?*

Despite shame's universality, not all people (Tangney, Wagner, and Gramzow, 1992)—or even the same person in different contexts—are equally prone to shame. Indeed, much popular and scholarly opinion holds that entire nations differ in shame proneness: Compare putatively shaming Asian societies like Japan versus relatively shameless European-derived societies like the United States (Benedict, 1946; Fessler, 2004). Are such differences—between people or between nations—real? And if so, what might account for these differences? If shame is an emotion that evolved to deal with the risks and consequences of social devaluation, then many cultural differences in shame proneness should be patterned; they should derive in a principled way from how an evolved, species-typical shame system processes variation in social ecology.

On the information threat theory of shame, a critical ecological feature calibrating shame proneness is the likelihood and costs of damaging information spreading. When an individual is devalued they lose access to benefits (such as help in a time of need) and might bear additional costs (such as when others benefit themselves at the devalued person's expense). But there are always tradeoffs: Any time or energy spent feeling shame or engaging in the preventative or remedial behaviors that shame motivates cannot be spent on alternative activities. Thus, the mind should use the likelihood and costs of devaluation to calibrate attention to cues of devaluation, thresholds for activating shame, and the intensity of an active shame response. As the likelihood or costs of devaluation increase, so should shame proneness. Here, we explore three variables that, under the information threat theory, affect this: the ease of forming new relationships, the potential audience of devaluation, and one's current social value.

One way to reduce the costs of being devalued by an existing relationship partner is to form other relationships. Although the help and support from one relationship may be lost, it can be supplemented or replaced with support from others. Not all social ecologies, however, allow for the easy establishment of new relationships; that is, social ecologies differ in their *relational mobility*—the degree to which individuals in a given society have

the option to form new relationships and end old relationships (Schug, Yuki, and Maddux, 2010; Yuki et al., 2007). When an individual perceives their ecology to be low in relational mobility, they perceive it as difficult and costly to leave current relationships and establish new ones. On the information threat theory of shame, shame proneness should be linked to perceptions of relational mobility: Because lower relational mobility hampers the establishment of compensatory relationships, thereby increasing the cost of devaluation, it should lead to greater shame proneness.

Shame proneness should also be calibrated by the audience for potentially damaging information. Imagine the following potentially shame-inducing event: As you walk out of a store with a bag of merchandise, the anti-theft alarm goes off. Which potential audience of this event would elicit the most shame, a friend or a stranger? Friends know each other well, so this is a single event in a larger database. For strangers, this single event is likely all they know of you. Furthermore, friends are invested in each other's welfare and often view each other as irreplaceable (Tooby and Cosmides, 1996), making them less likely to produce uncharitable interpretations and spread damaging information. Indeed, keeping personal information in confidence is a diagnostic feature of close relationships (Collins and Miller, 1994). These considerations predict greater shame for strangers. But although friends might be less *likely* to devalue each other, the *cost* of losing a friend's support, if devaluation occurs, is clearly higher. The cost difference suggests that it is friends, not strangers, who elicit more shame. Although both the likelihood and the cost of devaluation are expected to calibrate shame thresholds, it is unlikely they would be exactly offsetting, and therefore it is unclear which factor would predominate. The information threat theory thus makes a non-directional prediction that audiences should differ in the shame-proneness they elicit.

Relational mobility and audience type might combine to calibrate shame proneness: Because relational mobility indexes the perceived opportunities for replacing social partners, it should differentially impact shame proneness toward benefit-rich, preexisting relationships (such as close friends) and make little difference in new or low benefit relationships (such as a "relationship" with a stranger). Because it is almost always easy to replace them, transient, minimal relationships fall outside the scope of relational mobility. Thus, relational mobility should impact shame proneness involving close others, but not distant others.

Finally, a person's current social value should also calibrate their shame proneness: Individuals with higher social value should be less prone to shame. Highly valued individuals likely have more relationships, so losing one is less costly. They also have enhanced leverage against those who might devalue them. This enhanced leverage can derive from, for example, a superior ability to deliver (and withhold) benefits or to a higher capacity to aggressively impose costs. Greater leverage allows a person to (1) impose more costs on others before being devalued by them and (2) more effectively counter devaluation when it happens (see Gilbert, 2000), lessening the benefits of shame.

### *The present research*

To test these ideas, we collected data on shame proneness and relational mobility from three nations thought to differ in these variables: the East Asian society of Japan

versus the European-derived societies of the United States (US) and the United Kingdom (UK). Despite the popular and scholarly views that shame proneness varies between these societies (Benedict, 1946; Fessler, 2004; Levy, 1984; Shaver, Wu, and Schwartz, 1992), there has been surprisingly little standardized empirical work on this (but see Stipek, 1998). There is abundant evidence however that relational mobility is higher in the West (Falk, Heine, Yuki, and Takemura, 2009; Schug et al., 2010; Schug, Yuki, Horikawa, and Takemura, 2009). Because the link between shame proneness and relational mobility is predicted to depend on the audience, we measured shame proneness toward an existing close relationship partner—a friend—and toward a distant other—a stranger. Finally, we collected three measures of socially valued characteristics: resourcefulness, social connections, and physical attractiveness. (The larger class of benefit-based social value, from which these are drawn, is sometimes called *social attention holding power*; Gilbert, 1997).

Our data allow us to answer two questions about the geographic patterning of shame and relational mobility and to test six predictions of the information threat theory of shame.

Question 1: Is shame proneness higher in Japan than in the US and UK?

Question 2: Is relational mobility lower in Japan than in the US and UK?

Test 1: Is lower relational mobility associated with greater shame proneness toward a close friend?

Test 2: Is lower relational mobility associated with greater shame proneness toward a stranger?

Test 3: Is relational mobility more strongly related to shame proneness toward a friend than toward a stranger?

Test 4: Do differences in relational mobility account for differences between cultures in shame proneness toward a friend?

Test 5: Do mean levels of shame proneness toward friends and strangers differ?

Test 6: Are individuals with more socially valued characteristics less prone to shame?

## **Materials and Methods**

### *Participants*

Participants were university students from Japan (from Hokkaido and Kinki), the United Kingdom (UK; from London), and the United States (US; from California). The size and sex composition of the samples (males / females / did not report sex) were: Japan: 88 students (45/37/6); UK: 161 students (60/68/33); US: 87 students (19/63/5). Participants were recruited on the campuses of their respective schools to participate in a web-based questionnaire for a 1 in 50 chance to obtain 100 USD or its equivalent in GBP or JPY. Payment was delivered in person or via PayPal.

### *Procedures*

The study consisted of a web-based questionnaire asking participants to respond to a series of scales. One set of questions asked about the participants' "closest same-sex

friend” and the other set asked about a stranger. The questionnaire referred to the stranger as “Person A” and described them as follows:

Imagine that you are traveling in a different city than the city you are currently living in. In this new city, you meet a person on a bus whom you have never met before. This person, Person A, is your age, in college, and the same sex as you. You chat with this person briefly, and then you get off the bus alone, to go about your business.

The *Shame Proneness Scale* was adapted from the Personal Feelings Questionnaire 2, an instrument whose shame subscale has adequate construct validity, internal consistency, and test-retest reliability (Harder and Zalma, 1990; Harder, Rockart, and Cutler, 1993). Modifications of the original scale included removing the Guilt items, making the items target-specific and more easily translatable to Japanese, and modifying the anchors. Participants were instructed to “use the rating scale below to describe how strongly you experience (you would experience) the following feelings when in the company of your closest same-sex friend (when in the company of Person A)”. The scale included 10 shame items (e.g. “embarrassment”, “feeling humiliated”, “feeling that your closest same-sex friend (Person A) is disgusted by you”) and 6 filler items (e.g. “enjoyment”), each with a 5-point scale anchored at 1 (far less than usual) and 5 (far more than usual). Target (friend, stranger) was a within-subject variable. For each subject and each target, a shame proneness score was constructed by averaging the responses to the 10 shame items. Across the three samples, Cronbach’s  $\alpha$  ranged from .80 to .86 (friend) and from .87 to .93 (stranger).

The *Relational Mobility Scale* (Yuki et al., 2007) is a measure of perceived opportunities to form new relationships in one’s local environments (e.g. school, neighborhood). The scale includes 12 items (e.g. “They [the people around you] have many chances to get to know other people”, “It is often the case that they cannot freely choose who they associate with” [reversed]), each with a 7-point scale anchored at 1 (strongly disagree) and 7 (strongly agree). Across the samples, Cronbach’s  $\alpha$  ranged from .74 to .87.

We also measured three indices of the subject’s social value: resourcefulness, social connections, and physical attractiveness. The *Resourcefulness Scale* is the 10-item IPIP Resourcefulness scale (6FPQ: IT2; Goldberg, 1999; e.g. “Can manage many things at the same time”, “Can handle a lot of information”). Each item has a 5-point scale anchored at 1 (not at all descriptive) and 5 (very descriptive). Across the samples, Cronbach’s  $\alpha$  ranged from .85 to .88. The *Social Connections Scale* is a 6-item scale we created to measure the extent to which the subject thinks he or she is well connected socially (e.g. “I am very well connected”, “I don’t have social connections that I could benefit from” [reversed]). Each item has a 5-point scale anchored at 1 (not at all descriptive) and 5 (very descriptive). Across the samples, Cronbach’s  $\alpha$  ranged from .77 to .83. The *Physical Attractiveness Scale* is a 3-item scale we created to measure subjects’ perceptions of their own physical attractiveness (e.g. “People of the opposite sex find me very attractive”, “All my life, people have admired my good looks”). Each item has a 7-point scale anchored at 1 (not at all descriptive) and 7 (very descriptive). Across the samples, Cronbach’s  $\alpha$  ranged from .62

to .72. See scales in Supplementary Information.

## Results

A previous study found differences in psychological tendencies between Hokkaido and Japan's main island, where Kinki is located (Kitayama, Ishii, Imada, Takemura, and Ramaswamy, 2006). The current study, however, failed to find any significant differences between Hokkaido and Kinki,  $F_{S1,80} < 3.09$ ,  $ps > .16$ . Therefore, the Hokkaido and Kinki data were treated as a single sample.

All tests use two-tailed  $p$ -values. Means and standard deviations are reported in Table 1. Degrees of freedom vary slightly across tests because not all participants completed every scale.

**Table 1.** Relational mobility and shame proneness ( $M$  and  $SD$ ) by country and target

Measure	Japan ( $N = 88$ )	UK ( $N = 161$ )	US ( $N = 87$ )
Relational mobility	4.36 (0.72)	4.66 (0.90)	5.07 (0.70)
Shame proneness			
Friend	2.15 (0.60)	1.94 (0.62)	1.76 (0.60)
Stranger	2.93 (0.65)	3.04 (0.71)	2.98 (0.69)

*Question 1: Was shame proneness higher in Japan than in the US and UK?*

Yes, for friends, but no for strangers (see Table 1). Consistent with previous thinking, shame proneness toward a friend was higher in Japan than in the US/UK, as revealed by a planned contrast (coefficients: 1,  $-\frac{1}{2}$ ,  $-\frac{1}{2}$ ),  $t_{314} = 3.87$ ,  $p < .001$ ,  $d = 0.49$ . Shame proneness toward a stranger, however, did not vary: Using the same contrast, there was no effect for a stranger,  $t_{308} = -0.92$ ,  $p = .36$ . Thus, shame-proneness cannot be characterized in a unitary way at the level of culture, but depends on both the culture and the audience.

*Question 2: Was relational mobility lower in Japan than in the US and UK?*

Yes, relational mobility was lower in Japan (see Table 1): Levene's test revealed different variances across samples,  $F_{2,303} = 5.47$ ,  $p = .005$ , so the degrees of freedom were adjusted. The planned contrast (coefficients:  $-1$ ,  $\frac{1}{2}$ ,  $\frac{1}{2}$ ) revealed that relational mobility was lower in Japan than in the US/UK ( $t_{165.26} = 5.33$ ,  $p < .001$ ,  $d = 0.83$ ).

*Test 1: Was lower relational mobility associated with greater shame proneness toward a close friend?*

Yes: When people perceive more difficulty in forming new relationships, they are more shame prone toward their friends. Across countries, relational mobility was negatively correlated with shame proneness toward a friend,  $r_{304} = -.22$ ,  $p < .001$ . This is consistent with the greater cost of replacing relationships, and the higher benefits of shame, when relational mobility is low. Analyzing each country separately showed this pattern in two of the three cases: UK:  $r_{137} = -.25$ ,  $p < .01$ ; US:  $r_{81} = -.18$ ,  $p = .099$  (given the prior

directional prediction, this test is significant with a one-tailed  $p = .05$ ). In Japan, the relationship was not significant and essentially zero:  $r_{82} = .08, p = .48$ .

*Test 2: Was lower relational mobility associated with greater shame proneness toward a stranger?*

As predicted, it was not. Although there was a negative correlation between relational mobility and shame proneness toward a friend (see Test 1), the correlation between relational mobility and shame proneness toward a stranger was not statistically significant,  $r_{304} = -.08, p = .182$ . This is consistent with the idea that such relationships are easy to replace regardless of mobility.

*Test 3: Is relational mobility more strongly related to shame proneness toward a friend than toward a stranger?*

Yes. Preliminary analyses revealed that this relationship was not moderated by culture; thus, we report results collapsed across cultures. As predicted by the information threat theory, the correlation between relational mobility and shame proneness toward a friend was significantly greater than the same correlation involving a stranger,  $t_{303} = 2.01, p = .045$ .

*Test 4: Did differences in relational mobility account for differences between cultures in shame proneness toward a friend?*

Yes, relational mobility partially mediated the difference between Japan and the US/UK in shame proneness toward a friend. This is shown by a bootstrapping mediation analysis using the method described by Preacher and Hayes (2008). The advantage of using this method is that it does not rely on the assumption of a normal sampling distribution. Shame proneness toward a friend was entered as the dependent variable. Culture was dummy-coded (0 = UK/US, 1 = Japan) and entered as the predictor variable. Relational mobility was entered as the mediator. Results are shown in Figure 1 and revealed a significant indirect path from culture through relational mobility to shame proneness, with a point estimate of .06 and a 95% BCa (bias-corrected and accelerated) bootstrap confidence interval that did not include zero (the interval ranged from .02 to .11). (Re-running this analysis with shame proneness toward a stranger as a covariate left the results essentially unchanged.) As predicted, relational mobility mediates cultural differences in shame proneness toward the friend. Note, however, that even with the mediator in the model, there is still a strong direct path between culture and shame proneness (.23).

*Test 5. Do mean levels of shame proneness toward friends and strangers differ?*

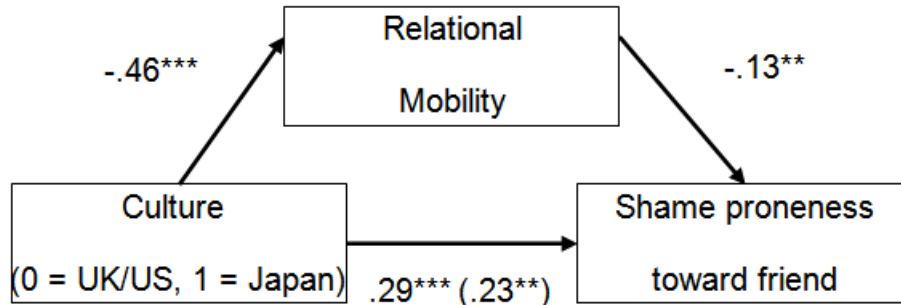
Yes. Across countries, shame proneness was greater toward strangers than friends (based on a mixed-model ANOVA with friend/stranger and country as factors,  $F_{1,308} = 486.11, p < .001, \eta_p^2 = .61$ ). The difference between stranger and friend in shame proneness varied by country (from the same ANOVA, there was a significant interaction,  $F_{2,308} = 7.33, p < .001, \eta_p^2 = .05$ ), with the difference being largest in the US and similar in the UK and Japan. Shame proneness toward strangers was significantly greater than toward friends within each country (US:  $t_{84} = 14.34, p < .001, d = 2.20$ ; UK:  $t_{140} = 15.61, p < .001, d =$



1.86; Japan:  $t_{84} = 9.47, p < .001, d = 1.45$ ). This is consistent with the hypothesis that friends and strangers vary in the likelihood of devaluation (see also the Discussion).

For completeness, we also note that, across all subjects, shame proneness toward a friend and a stranger were positively correlated,  $r_{309} = .22, p < .001$ . Further, consistent with the more focused analysis presented in Question 1, overall shame proneness marginally differed by country ( $F_{2,308} = 2.61, p = .075, \eta_p^2 = .02$ ), with Japan highest and the US lowest.

**Figure 1.** The mediating effect of relational mobility between culture and shame proneness toward the friend



*Note:* Unstandardized regression coefficients are presented. On the bottom path, the value outside the parentheses represents the unstandardized regression coefficient before including the mediating variable (i.e., the total effect), whereas the value between parentheses indicates the unstandardized regression coefficient in the final model (i.e., the direct effect). Asterisks indicate the significance of the coefficients (\*\* $p < .01$ , \*\*\* $p < .001$ ).

*Test 6: Were individuals with more socially valued characteristics less prone to shame?*

Yes. As predicted by the information threat theory of shame, shame proneness toward a friend was lower in people with greater social value (resourcefulness:  $r_{291} = -.28, p < .001$ ; physical attractiveness:  $r_{295} = -.21, p < .001$ ; social connections:  $r_{291} = -.23, p < .001$ ). Also, just as with relational mobility, there was little association between social value and shame proneness toward strangers (resourcefulness:  $r_{291} = -.10, p = .090$ ; physical attractiveness:  $r_{295} = -.04, p = .47$ ; social connections:  $r_{291} = -.15, p < .05$ ).

*Ancillary test. Was the negative correlation between relational mobility and shame proneness toward the friend spurious and actually caused by social value?*

What if relational mobility is also influenced by social value? Then perhaps the correlation between relational mobility and shame proneness toward friends is not due to perceptions of relational mobility calibrating shame proneness, but to social value calibrating both. Seemingly consistent with this, relational mobility is correlated with social value (resourcefulness:  $r_{291} = .29, p < .001$ ; physical attractiveness:  $r_{297} = .17, p < .01$ ; social connections:  $r_{291} = .15, p < .01$ ). To test this alternative hypothesis, we regressed shame proneness toward a friend on relational mobility, controlling for the various measures of social value. In all cases, significant associations remained ( $\beta$ s: controlling for resourcefulness =  $-0.15, p < 0.01$ ; controlling for physical attractiveness =  $-0.18, p < 0.01$ ; controlling for social connections =  $-0.19, p < 0.01$ ; controlling for all three indices of social value =  $-0.13, p < 0.05$ ). This provides further evidence that perceptions of relational

mobility calibrate shame proneness toward friends.

A related possibility (suggested by an anonymous reviewer) is that only when relational mobility is high will greater social value yield less shame proneness toward a friend. Statistically, this would be an interaction between social value and relational mobility in predicting shame proneness; however, none of the three interactions were significant ( $ps > .20$ ).

For the most part, relational mobility and social value seem to be functioning as individual difference variables, each having independent effects on shame proneness. (The one exception is the null correlation in Japan between relational mobility and shame proneness toward a friend; see Test 1.) We suggest that these variables are tapping people's perception of different features of the world: Relational mobility is measuring their perception of the ease of forming new relationships, whereas social value is measuring their perception of whether others would prefer to have them as social partners, relative to other potential social partners.

*Ancillary test. Were there sex differences?*

Sex differences were absent across countries and targets, the sole exception being greater shame proneness among males toward friends in the US sample. Sex differences for shame proneness toward the friend were absent in the UK and Japan, ( $ps = .28$  and  $.90$ , respectively), but present in the US ( $t_{22.28} = 2.33$ ,  $p = .029$ ,  $d = 0.61$ ). In the US, males ( $M = 2.13$ ,  $SD = 0.80$ ) reported more shame proneness toward friends than females did ( $M = 1.67$ ,  $SD = 0.49$ ). For shame proneness toward the stranger, independent samples t-tests failed to provide evidence of sex differences in the US, the UK, or Japan ( $ps$  ranged  $.31$  to  $.71$ ). For relational mobility, independent samples t-tests failed to provide evidence of sex differences in the US, the UK, or Japan ( $ps$  ranged  $.21$  to  $.81$ ).

## **Discussion**

*Relational mobility and shame proneness*

Our results revealed cultural differences in shame proneness toward friends and in relational mobility, with Japanese subjects reporting more shame and less relational mobility than their American and British counterparts. Consistent with the information threat theory of shame, our results showed that: (1) less relational mobility was associated with greater shame proneness, (2) this was only true for shame proneness toward valued partners, and (3) cultural differences in shame proneness toward a friend were partially mediated by relational mobility. The calibration of shame proneness appears to track a variable—relational mobility—that predicts the cost of social devaluation. To our knowledge, this is the first demonstration with standardized measures that shame proneness varies lawfully with a socio-ecological variable and with audience.

We note that shame proneness toward the friend was higher in the UK than in the US ( $t_{229} = 2.16$ ,  $p = .031$ ,  $d = 0.29$ ) and lower in the UK than in Japan ( $t_{226} = -2.65$ ,  $p = .009$ ,  $d = 0.36$ ). Relational mobility, moreover, was lower in the UK than in the US ( $t_{204.6} = -3.79$ ,  $p = .0002$ ,  $d = 0.51$ ) and higher in the UK than in Japan ( $t_{198.7} = 2.63$ ,  $p = .009$ ,  $d = 0.36$ ). Although these differences were not predicted by a simple East–West distinction, it

is nonetheless consistent with the information threat theory. This theory is not a theory of East–West differences per se, but is a theory of shame and the ecological factors that calibrate shame. In the context of the present measures, it predicts that shame proneness should be negatively correlated with relational mobility. Thus, that both shame and relational mobility in the UK are between the US and Japan tracks the theory's predictions: Nations with greater average relational mobility also have less shame proneness.

The mobility-shame association held not only between countries, but also within 2 of the 3 countries studied, lending further support to the hypothesis that individual-level assessments of relevant socio-ecological parameters calibrate shame thresholds. The absence of a correlation in Japan is puzzling, however. In this country, neither variable had extreme mean values or insufficient variation around the mean, so the lack of correlation cannot be due to ceiling effects or lack of variation. It remains for future research to see if our data underestimated a true, existing effect or if shame proneness actually does not track relational mobility at an individual level in Japan.

To be clear, our claim is not that shame has no utility in a high-mobility ecology. After all, even if new relationships can be formed, there is an opportunity cost to leaving potentially valuable current relationships and starting new ones—and shame may be one aspect of human social psychology that prevents a person from paying these opportunity costs. If the adaptive value of shame never disappears even in high mobility societies, then research could test this by showing that, as relational mobility increases, shame proneness never entirely disappears but eventually asymptotes at a low level. Similarly, how does shame function at very low levels of relational mobility? Ongoing, essentially permanent relationship may still require maintenance—and hence shame. On the other hand, perhaps in permanent relationships that yield few benefits, shame may be calibrated to very low levels. Future research could profitably examine these issues.<sup>1</sup>

While the current data support a causal link from mobility to shame proneness, as predicted by the information threat theory, they cannot rule out several alternative hypotheses. One possibility is that shame proneness calibrates perceptions of mobility rather than the reverse. But it is not clear what the functional logic and associated payoffs of this causal structure would be. Another possibility is that the mobility–shame correlation is spurious and caused by other motivations like self-promotion. If this was true, however, it would also predict that relational mobility should correlate with shame proneness toward strangers, but it did not. This lack of correlation is consistent with the information threat theory. Nonetheless, these results would benefit from complementary studies in which opportunities to form new relationships are experimentally manipulated.

We note that the relational mobility – shame link may be specific to the realm of cooperation-based relationships such as friendship, the focus of this paper. Those kinds of relationships do not exhaust the domain of shame, however (see Fessler, 1999): Social devaluation and shame also take place in the context of dominance-based relationships. For instance, both rape (Burgess, 1983; Frank, Turner, and Duffy, 1979) and torture (Shapiro,

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<sup>1</sup> We thank an anonymous reviewer for bringing these issues to our attention.

2003) reliably elicit shame. Although it may seem puzzling that coercion triggers shame, especially when it is gratuitous, a formidability differential in favor of the victimizer, and exercise of that differential, is required for coercion. This, by the information threat theory, meets the input conditions of shame—even when other elements of the social devaluation syndrome of the sphere of cooperation are absent (e.g. the victim's associates are also victimized, they do not intrinsically value the victimizer). The point here is that in dominance-based relationships the establishment of alternative cooperative relationships may not be as effective a countermeasure against devaluation as it is in cooperative relationships, and so the mobility – shame link may be weaker or absent in dominance-based relationships.

*Social value and shame proneness*

Our results also revealed that people with higher levels of socially valued characteristics were less prone to shame. Resourcefulness, physical attractiveness, and social connections were all negatively correlated with shame proneness toward friends (although not toward strangers). Because physical attractiveness, resourcefulness, and social connections confer higher interpersonal bargaining power (Gurven and von Rueden, 2006; Sell et al., 2009; von Rueden, Gurven, and Kaplan, 2008), they lessen the likelihood, degree, or costs of devaluation and, by hypothesis, thereby reduce shame proneness.

These data also bear on other issues about shame. The literature often identifies dysfunctional correlates of shame, such as anxiety and depression (Allan, Gilbert, and Goss, 1994; Harder, Cutler, Rockart, 1992; Kendler et al. 2003; Tangney, Wagner, Gramzow, 1992). The causality of this nexus has not been established yet, and often it is not discussed. Some theorists argue these conditions are *caused* by shame—while also acknowledging that shame and those conditions might have common etiological roots (Tangney, Wagner, Gramzow, 1992). The information threat theory suggests that the latter is the more accurate view. Further, on both functional and parsimony grounds, the fact that the indices of social value that negatively correlated with shame proneness in this study are also found to correlate with the conditions with which shame is comorbid (e.g. depression, social anxiety; Cole, 1991; Kaplan, Roberts, Camacho, and Coyne, 1987; Gilbert, 2000) suggests that 1) prior variables regulate both shame and the covarying conditions, and 2) the core architecture of shame, and perhaps also of the so-called psychopathological covarying conditions (see Cosmides and Tooby, 2000), is an adaptively organized response to those prior variables.

We also note that the factors underlying features like physical attractiveness and resourcefulness may be causal first movers (for instance, because they involve buffering perturbations during development; Gangestad and Scheyd, 2005). If that is the case, then these factors may calibrate both shame proneness and affective processes such as anxiety or depression. The empirical argument for this is somewhat weakened, however, because our measures of social value were measured by self-report, not objectively. Further research may profitably address these issues.

*Audience effects in proneness to shame*

Shame proneness was higher toward strangers than toward friends in all samples. On the other hand, relational mobility seems to calibrate shame toward friends but not toward strangers. Is this a contradiction? What looks like a contradiction may in fact be the principled output of a system that distinguishes functionally different inputs. The *likelihood* that a particular audience devalues you is different from the *cost* of being devalued, should the devaluation take place. A well-engineered shame system would incorporate both of these variables. Because they have little information about you, a stranger is more likely to devalue you after exposure to damaging information. This would explain the greater shame towards strangers. In contrast, the *cost* of being devalued, if devaluation takes place, would be higher for an enduring friendship. This may account for the fact that relational mobility correlates with shame toward friends but not strangers.

Although this study was not designed to address this question, another study has tested this adaptationist hypothesis. Empirical evidence indicates that shame tracks both the expected likelihood and the expected cost of devaluation independently, and that these variables can behave differently in different situations (D. Sznycer, unpublished data). For instance, when asked to assume that the other will devalue them, people deem the *cost* of devaluation by a friend greater than the cost of devaluation by an acquaintance. The expected *likelihood* that they will be devalued if detected, however, yields a different pattern. For a wide array of shame-inducing events, in particular those *not* directly impacting the audience, people think their friends are significantly less likely to devalue them than their acquaintances are. Jointly, these variables can account for systematic reversals in the magnitude of the shame elicited by different targets.

Thus, shame proneness appears to be adaptively calibrated by a number of variables. Other variables such as expected likelihood of detection (Scarnier, Schmader, and Lickel, 2009; Smith, Webster, and Eyre, 2002; Sznycer, 2010), expected degree of devaluation (Sznycer, Tooby, and Cosmides, 2011), estimated baseline valuation from the audience, audience size (Latané and Harkins, 1976; Seta, Crismon, Seta, and Wang, 1989; Shearn, Bergman, Hill, Abel, and Hinds, 1992), and audience status (Beatty, 1988; Seta et al., 1989) are similarly expected to modulate shame. Many of these predictions have empirical support, although in some older cases the outcome variable that was measured was not shame but allied states like embarrassment and social anxiety.

The information threat theory states that shame is designed to respond to actual or potential social devaluation. Given this, one limitation of this study was that the shame measure was context-free: It did not ask subjects about real or imagined instances of social devaluation. Despite this limitation, we chose the present measure for several reasons. First, it is a standard measure of shame widely used in the literature (e.g. Gilbert, 2000; Harder, Cutler, and Rockart, 1992; Rüscher et al., 2007; Wei, Shaffer, Young, and Zakalik, 2005), albeit with some minor changes made for the current study. Second, there are no target-specific, scenario-based shame scales available. Third, we reasoned that shame includes an anticipatory mode of activation, active prior to any socially devaluing event, with the degree of anticipatory activation following shame proneness thresholds. Thus, even a context-free measure could still usefully explore levels of shame proneness. Nonetheless, it will be important for future work to use more ecologically valid measures of shame that

explicitly incorporate social devaluation.

*Concluding remarks*

It is important to note that there are other theories of shame in addition to the information threat theory (e.g. Fessler, 1999; Gilbert and McGuire, 1998; Tangney and Dearing, 2003; Tracy and Robins, 2004). We believe some of the predictions herein are either unique to the information threat theory or more directly derived from this theory than others, although this study was not designed to test competing accounts; further studies are needed for this.

The information threat theory of shame fits tightly together with other, related evolutionary theories of the social emotions—such as anger, pride, guilt, and gratitude—unifying them within a common theoretical framework (Tooby, Cosmides, Sell, Lieberman, and Sznycer, 2008). At their core, all of these emotions deal with estimating, calibrating, and re-calibrating variables relating to social value within one's own mind and the minds of others—variables that then play widespread roles in decision-making, physiology, and behavior.

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