

Beliefs About Emotional Residue: The Idea That Emotions Leave a Trace in the Physical Environment

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Drawing upon the literatures on beliefs about magical contagion and property transmission, we examined people's belief in a novel mechanism of human-to-human contagion, *emotional residue*. This is the lay belief that people's emotions leave traces in the physical environment, which can later influence others or be sensed by others. Studies 1–4 demonstrated that Indians are more likely than Americans to endorse a lay theory of emotions as substances that move in and out of the body, and to claim that they can sense emotional residue. However, when the belief in emotional residue is measured implicitly, both Indians and American believe to a similar extent that emotional residue influences the moods and behaviors of those who come into contact with it (Studies 5–7). Both Indians and Americans also believe that closer relationships and a larger number of people yield more detectable residue (Study 8). Finally, Study 9 demonstrated that beliefs about emotional residue can influence people's behaviors. Together, these findings suggest that emotional residue is likely to be an intuitive concept, one that people in different cultures acquire even without explicit instruction.

Keywords: emotion, residue, contagion, contamination, India

Imagine that your partner has spent the day at home on the living-room couch, feeling gloomy after receiving some bad news (which you do not know about yet). When you return home, you open the door and enter the living room. Although your partner has since left the room, would you sense the negative emotion? Might people believe that emotions leave a trace in the physical environment, such that you might sense a waft of sadness as you step inside the living room? In the present research, we explore the

possibility that there exists a belief that emotions leave a residue in the physical environment.

Previous research on the *laws of sympathetic magic* (Frazer, 1890/1959; Mauss, 1902/1972) has found that many people, including formally educated Americans, believe that “things that once have been in contact with each other may influence each other through transfer of some of their properties via an essence” (i.e., the *law of contagion*; Rozin, Millman, & Nemeroff, 1986, p. 703). The contagion occurs when a contaminated object and an uncontaminated object come into physical contact or are in close proximity (e.g., Morales & Fitzsimons, 2007; Nemeroff & Rozin, 1994; Rozin, Markwith, & Nemeroff, 1992; Rozin et al., 1986; Rozin & Nemeroff, 1990; Rozin, Nemeroff, Wane, & Sherrod, 1989). For example, in a seminal experiment, Rozin et al. (1986) showed that American college students found a glass of orange juice substantially more aversive after it was touched by a sterilized cockroach, although the cockroach posed no risk of contamination. The mechanism by which this form of contagion occurs is through the perceived transfer of some essence or property from the contaminated object to the uncontaminated one, an essence that continues to exist in the second object even after the two have ceased to be in contact.

Beliefs about magical contagion can be explained by the general heuristic of *property transmission*, “the idea that causes tend to impose their own properties on effect objects” (White, 2009, p. 775). White (2009) proposed that property transmission is a general heuristic that people apply under conditions of uncertainty, that is, when the causal factors are not entirely known.

Applying the property transmission heuristic to the domain of emotional experience generates hypotheses that have not previ-

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ously been examined. We propose that there exists a belief in emotional residue, a mechanism of contagion between human beings, with traces of emotions accumulated in physical spaces serving as a medium for the transfer of affective states. We propose that the lay theory of emotional residue is composed of the basic beliefs that emotions emanate from a person, that emotional emanations leave a residue in the physical space where the emotion was experienced, that individuals can later detect the presence of emotional residue upon encountering that physical space, and that emotional residue can influence the moods and behaviors of people who are exposed to the space containing the residue.

According to White (2009, pp. 776–777), people tend to apply the property transmission heuristic to infer causal relations when three criteria are met, and the belief in emotional residue appears to meet these criteria: (a) Some kind of activity has occurred (e.g., a person had an emotional experience), (b) there exists an interaction between two or more objects (e.g., the person's emotions emanate from the body into the physical space and then emanate from the physical space to new occupants of the space), and (c) there is a resemblance between some preexisting property of the cause object and a new property of the effect object (e.g., the new occupant is perceived to acquire the affective state of the person who had the initial emotional experience). This process is similar to the idea that causing harm to a model of a person (e.g., a photograph or a doll) will cause harm to the actual person (Rozin et al., 1986), in which case “the doll functions as a causal intermediary between the causal power of the sorcerer and the effect on the victim” (White, 2009, p. 780). In the case of emotional residue, the physical space serves as the intermediary between the cause (the emotional experience of the initial occupant) and the effect (the altered affective state of a subsequent occupant).

If the belief in emotional residue is derived from the general property transmission heuristic, then it might represent an *intuitive concept*, which Shweder (1977, p. 638) defined as concepts that are

acquired even under highly degraded learning conditions, e.g., without explicit instruction, with a minimal amount of practice, and regardless of a desire to learn or the nature of reinforcements. Moreover, intuitive concepts seem to be available for use without conscious effort or reflection.

In contrast, *nonintuitive concepts* as those that “require special learning conditions for their acquisition, e.g., massive instructional input, an orderly and explicit organization of learning trials, high motivation, etc.” (Shweder, 1977, p. 638). If the belief in emotional residue is indeed an intuitive concept, possibly derived from the general property transmission heuristic, then one would be likely to find evidence for the belief in different cultures, as is the case with beliefs about magical contagion (Hejmadi, Rozin, & Siegal, 2004; Rozin & Fallon, 1987).

Some indications of a belief in emotional residue can be found in the popular media and everyday conversations. For example, a cursory search on www.books.google.com found 16 books containing the phrase *the air was heavy with sadness*, a term indicating a belief in emotional residue. A recent search on www.google.com found 239,000 webpages containing the term *bad vibes*. An article in *The New York Times*, titled “Before Move-In Day, Evicting the Old Auras” (Haughey, 2011), described how a number of hom-

owners solicit professionals to cleanse their newly purchased homes of accumulated residue.

Interestingly, despite the possibly superstitious basis of a belief in emotional residue, the notion that humans emit nonvisual, nonauditory emotional signals has now been shown to have a scientific basis: Human sweat glands emit distinct chemicals when people experience different emotions, and these chemicals can, in fact, be sensed by others even at a later time (Pause, Ohrt, Prehn, & Ferstl, 2004; Zhou & Chen, 2008, 2009).¹

Cultural Differences in Beliefs About Emotional Residue

One might expect cultural differences in the extent to which people express a belief in emotional residue because of different culturally elaborated conceptions of the person (Markus & Kitayama, 1991; Shweder & Bourne, 1982). The conception of the person prevalent in American cultural contexts is that of a bounded entity defined by core internal attributes. In his classic essay, Geertz (1975, p. 48) articulated this view of the person as “a bounded, unique, more or less integrated motivational and cognitive universe . . . a distinctive whole . . . set contrastively both against other such wholes and against a social and natural background.” According to this view, emotions are likely to be defining characteristics of individuals that are contained within their body.

In contrast, the concept of the person prevalent in many Indian cultural settings is that of a fluid entity existing across time and space, where individuals' thoughts, emotions, and desires are not viewed as just bounded within the body but as emanations that accumulate over the lifetime and transmigrate after death (Marriott, 1976; Shweder & Bourne, 1982). For example, according to Marriott (1989, p. 18), Indians see human beings as “generated by, and constituted of, more or less malleable substance that is continually moving in and out of them.” Daniel (1984, p. 79) suggested that Indian villagers see the “quality of the soil substance” of the village as “ultimately mixed with the bodily substance of” the villagers. Consistent with these ideas, Hejmadi et al. (2004) found that compared to American children, Indian children held stronger beliefs about magical contagion. Therefore, a belief in emotional residue may be more consistent with views of a person prevalent in Indian settings than in Western settings.

The belief in emotional residue thus appears to have both a universal basis (the general property transmission heuristic) and a

¹ For example, Zhou and Chen (2009) found that participants were more likely to judge ambiguous facial expressions as expressions of fear when exposed to sweat collected from individuals experiencing fear (while the sweat donors were watching a horror movie) than when exposed to sweat from the same individuals feeling happy (while the sweat donors were watching a comedy). Similarly, Prehn-Kristensen et al. (2009) found that a number of brain regions, such as the fusiform gyrus and the insula, were more activated when participants were exposed to sweat collected from individuals experiencing anxiety (while the sweat donors were waiting for an exam) than when exposed to sweat collected from the same individuals in a neutral emotional state (while the sweat donors were waiting to participate in an exercise session). These findings, along with others (e.g., Chen & Haviland-Jones, 1999, 2000), indicate that emotions may indeed emanate from individuals in the form of chemosensory signals and that, if preserved in a medium, these signals can be detected by others at a later time.

culturally specific basis (the bounded vs. fluid conceptions of the person). We suggest that whether cultural differences in beliefs about emotional residue are observed depends upon whether the belief is measured explicitly or implicitly. If people are *explicitly* asked whether they believe in emotional residue, we predict that they are likely to respond according to culturally prevalent views of the person, and thus one might observe cultural differences in the extent to which people endorse the belief. In contrast, if the belief in emotional residue is measured *implicitly*, then we predict that people would respond intuitively based upon the general property transmission heuristic, and thus one would not find cultural differences in the extent to which people endorse the belief. Whereas previous research has found stronger beliefs in magical contagion among Indians (Hejmadi et al., 2004), this research assessed the belief explicitly rather than implicitly (see Nemeroff & Rozin, 1989, for an example of an implicit measure of beliefs about magical contagion).

Consequences of Emotional Residue

Our preceding discussion centered on the extent to which people believe in the concept of emotional residue. Do people also believe that emotional residue has some psychological consequences? We propose that people believe that emotional residue can influence individuals in at least three ways: perceptually, emotionally, and behaviorally. First, when someone enters a physical space that has accumulated emotional residue, people might believe that the person would sense the presence of the emotional residue. Second, people might believe that upon chronic exposure to a space with accumulated emotional residue, a person might develop affective dispositions or moods that are congruent with the residue (e.g., becoming depressed after moving into a house previously occupied by chronically unhappy people). Third, people might believe that upon encountering a space containing strong emotional residue, people might exhibit behavioral patterns that are associated with the accumulated emotional residue (e.g., crying unexpectedly upon entering a space in which someone recently experienced intense sadness). We predict that Indians would be more likely than Americans to report that they believe in the consequences of emotional residue when asked explicitly but that there would be no cultural differences when the measures are implicit.

Sources of Variation in Emotional Residue

After examining whether people believe that emotional residue exists, we investigated whether people also believe that there are systematic sources of variation in emotional residue, as there are in contagion (e.g., Rozin et al., 1989, 1992). Of many possible sources of variation, we selected two factors that we expected to influence the strength of emotional residue: (a) the relationship between the person who experienced the emotion and the person who came into contact with the residue and (b) the number of people who experienced the original emotion.

Just as people might feel more empathy with the emotions experienced by close others compared to the emotions experienced by strangers, people might also believe that they are better able to detect emotional residue from close others than from strangers. For example, people in close relationships sometimes believe that they can sense their partner's feelings even when the partner is not

visibly expressing any feelings (Bloomstein, 2001), and parents sometimes claim to sense their children's emotions despite the absence of external displays (Gottman, Katz, & Hooven, 1997). According to the property transmission heuristic (White, 2009), people might believe that if they share an essence with close others (e.g., with relatives by birth), then emotional properties might be more easily transferred from one person to the other. Therefore, we varied the relationship between the person experiencing the emotion and the person exposed to the emotional residue and tested whether people believe that they would be more likely to detect emotional residue from a close other than from a stranger.

If people conceive of emotional residue as emanations, then according to the property transmission heuristic, a larger amount of emotional activity should be more potent in causing property transmission (White, 2009). Therefore, a greater number of people experiencing the same emotion should leave a greater amount of emotional residue. Various other types of physical outputs from people, such as body heat, also accumulate with more individuals. Therefore, we varied the number of people experiencing the target emotion and tested whether people believe that they are more likely to detect emotional residue from a group of people than from a single individual.

Although we expected Indians to be more likely than Americans to endorse an explicit belief in emotional residue, if these sources of variation are intuitively derived from the property transmission heuristic, then we would expect people in both cultures to endorse these two sources of variation to similar extents.

Behavioral Consequences of Emotional Residue

If emotional residue is a powerful belief, then it is likely that this belief would influence people's behaviors. For instance, all other things being equal, people might prefer to occupy a space where others previously experienced positive emotions rather than negative emotions, under the assumption that exposure to positive residue would have more positive consequences for the person's moods and behaviors than exposure to negative residue. We tested this idea in our final study.

Overview

In the present set of studies, we examined four key questions. First, do people believe in the concept of emotional residue—that emotional residue can be sensed by others and influence the moods and behaviors of those who come into contact with it? Second, when asked explicitly, are Indians more likely than Americans to endorse the belief? Third, do cultural differences disappear when the belief in emotional residue is assessed implicitly? Fourth, do people believe that closer relationships and larger numbers of people yield more detectable residue?

Study 1 tested whether people believe in the general concept of emotional residue by assessing their beliefs about the within-body and extrabody transmission of emotions. We hypothesized that while there would be no cultural differences in people's beliefs about within-body transmission of emotions, Indians would be more likely than Americans to believe in the extrabody transmission of emotions.

Studies 2 and 3 tested for cultural differences in the extent to which people believe that they can *sense* emotional residue. We

provided participants with scenarios in which a protagonist experienced a strong positive or negative emotion in an enclosed physical space. Participants were then asked whether they would sense these emotions at a later time after the person left the space, even without knowledge of the emotion-eliciting event. Study 4 was designed to confirm that participants' responses to our measures were not entirely driven by experimenter demand.

Study 5 used an implicit measure to test whether people believe that emotional residue influences the longer term moods of those who come into contact with it. Using the demand-free impression-formation technique, we manipulated the valence of emotional residue contained in different residential spaces and assessed whether participants used this information to predict future residents' moods after moving into these spaces. With this implicit measure, we hypothesized that both Indians and Americans would provide similar judgments. Study 6 confirmed that the findings of Study 5 were not due to valence priming.

Study 7 tested whether people also believe that emotional residue can influence the behaviors of those who come into contact with it. We described protagonists who engaged in emotionally charged behaviors upon entering a residential space and manipulated whether the protagonists' behaviors were congruent or incongruent with the valence of the emotions previously experienced in the space. We then assessed how surprising participants found the protagonists' behaviors. We hypothesized that both Indians and Americans would find the protagonists' behaviors less surprising when they were congruent rather than incongruent with the valence of the previously experienced emotions.

Study 8 tested whether people believe that there are systematic sources of variation in emotional residue. In some scenarios, we manipulated the relationship between the participant and the person experiencing the emotion, and in other scenarios, we manipulated whether a single individual or multiple individuals experienced the emotion. We hypothesized Indians and Americans would be similarly likely to believe that the emotional residue from close others and groups of people would be more detectable than the residue from distant others and solitary individuals.

Finally, Study 9 tested whether beliefs about emotional residue can influence people's behaviors. Here, we tested whether participants would prefer to complete a questionnaire in a room where previous participants had recalled positive rather than negative emotions.

Study 1

Our first study examined Indians' and Americans' lay theories about the transmission of emotions. We predicted no cultural differences in beliefs about within-body transmission of emotion but significant cultural differences in beliefs about extrabody transmission of emotions.

Method

Participants. A total of 43 students at Columbia University in New York (33 women, 10 men; mean age 20.6 years; eight Asian American, five African American, two Latin American, one Middle-Eastern American, 23 European American, and four multiracial; all U.S. citizens) and 59 students at M. S. Ramaiah Institute of Technology in Bangalore, India (34 women, 23 men,

two unreported; mean age 20.4 years; all Indian citizens), participated in the study. There were no main effects or interactions involving gender or age in this or subsequent studies. As the primary language of education in all of our Indian institutions was English, all materials in this and subsequent studies were administered in English.

Materials. Participants were asked to answer a questionnaire containing four questions. Two questions assessed participants' beliefs about within-body transmission of emotions: "Do you believe that emotions flow from the brain to other parts of the body?" and "Do you believe that emotions flow from parts of the body to the brain?" Two questions assessed beliefs about extrabody transmission of emotions: "Do you believe that emotions can leave the human body and enter the outside world in the form of a physical substance?" and "Do you believe that emotions can enter the human body from the outside world in the form of a physical substance?" Participants made ratings on a 6-point scale ranging from 1 = *No, I don't believe this at all* to 6 = *Yes, I believe in this completely*.

Given that participants might be concerned about the perceptions of the experimenter, we informed participants beforehand that they would have to put the completed questionnaire in an envelope, seal the envelope, and deposit the envelope in a bag containing many other identical envelopes. The questionnaires were not numbered or otherwise marked, so there would be no way of connecting participants' responses to their identity. We also ensured that participants had privacy when completing the questionnaire.

Results

We averaged participants' responses to the two questions measuring within-body transmission of emotions ($r = .37, p < .001$) and the two questions measuring extrabody transmission of emotions ($r = .46, p < .001$). We submitted these two measures to a repeated measures analysis of variance (ANOVA), which revealed a marginally significant main effect of culture, $F(1, 100) = 3.48, p < .07$; a main effect of type of belief, $F(1, 100) = 18.86, p < .001$; and a Culture \times Type of Belief interaction, $F(1, 100) = 4.80, p < .05$. As depicted in Figure 1, there were no cultural differences in participants' beliefs about the within-body transmission of emotions, $t(100) = 0.34, p > .73$, but Indians were significantly more likely than Americans to believe in the extrabody transmission of emotions, $t(100) = 2.74, p < .01$.

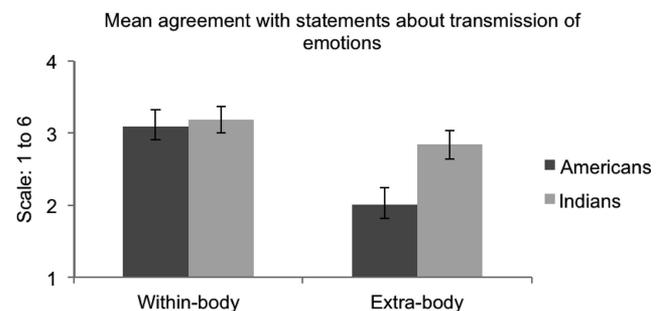


Figure 1. Mean agreement with statements about transmission of emotions (Study 1). Error bars represent standard errors of the means.

Discussion

Study 1 found cultural differences in people's beliefs about the transmission of emotions in and out of the human body but not about the transmission of emotions within the human body. Whereas both Indians and Americans believed to a similar extent that emotions flow between the brain and other parts of the body, Indians were more likely than Americans to believe that emotions enter and leave the human body in the form of physical substances. These findings suggest that the fluid conception of a person prevalent in Indian contexts (Daniel, 1984; Marriott, 1989) extends to the domain of emotions, resulting in Indians having a lay theory of emotions as substances that move in and out of the human body.

Study 2

Whereas Study 1 examined whether people believe in the general concept of emotional residue, the goal of Study 2 was to test whether people believe that they can sense emotional residue from previous affective experiences that occurred in a given space.

Method

Participants. A total of 89 students at Stanford University in Stanford, California (57 women; mean age 19.4 years; all U.S. citizens; 42 European American, 21 Asian American, 11 Latin American, nine African American, one Middle-eastern American, and five multiracial; 39 Christian, 32 agnostic, 10 Jewish, three Buddhist, two Muslim, two Hindu, and one other; 74 with at least one parent with a bachelor's degree), and 99 students at St. Xavier's College in Mumbai, India (65 women; mean age 17.5 years; all Indian citizens; 51 Christian, 30 Hindu, seven agnostic, four Muslim, two Jain, two Sikh, two Zoroastrian, and one Buddhist; 83 with at least one parent with a bachelor's degree), participated in the study. Both universities were elite colleges primarily drawing students from middle-class and upper-middle-class backgrounds.

Materials. Participants were presented with four scenarios in which a single person or multiple people experienced a strong emotion in an enclosed space. In each scenario, participants were described two different occasions, one in which the protagonists experienced positive emotions and one in which they experienced negative emotions. In two of the scenarios, we asked participants to imagine themselves entering the space after the protagonists had left. In the two other scenarios, we asked participants to imagine themselves being present in the space while the protagonists experienced the emotions but without knowing (i.e., seeing or hearing) that the protagonists were experiencing any emotion. A sample scenario is provided below:

You and your roommate live in a small 2-bedroom house with a living room and kitchen on the ground floor and two bedrooms on the second floor. On Wednesday evening, your roommate is in the living room when she receives a call with the very sad news about her friend's death; she cries in the living room for a few minutes before leaving the apartment to visit a friend. On Thursday evening, your roommate receives a call with the very happy news that she just won a big scholarship; she jumps for joy and spends a few minutes in the living room making plans about how to spend the extra money before leaving the apartment. On both days, you return from class and enter the living room right after your roommate has left.

What emotion will you sense when you enter the living room on Wednesday evening?

What emotion will you sense when you enter the living room on Thursday evening?

After reading the scenario, participants were asked two questions (see examples above) in which they had to indicate the valence and the degree of the emotion that they would sense on each occasion upon entering the living room, on 9-point scales ranging from 1 = *A lot of happiness* to 5 = *Neither happiness or sadness* to 9 = *A lot of sadness*. We inferred that participants believed in emotional residue if they indicated that they would sense *different* emotions on the two occasions consistent with the valence of the emotions experienced.

With the above dependent measure, there are at least two plausible alternative explanations: Participants might say that they would sense different emotions on the two occasions not because the protagonist left different emotional residue but (a) because the protagonist made different physical changes in the space on the two occasions (e.g., leaving soiled tissue in the living room when she was crying) or (b) because participants were susceptible to valence priming and tended to state that they would sense the valence associated with the given occasion. To address these concerns, after participants responded to the four scenarios, we directly asked them whether they believed that the positive and negative emotions that the protagonist in each scenario experienced would linger in the space after the protagonist's departure; for example:

The sad emotions of your roommate when she heard the news about her friend's death could leave a trace in the living room, that is, her sadness could linger in the living room even after she left the apartment.

The happy emotions of your roommate when she heard the news about her scholarship could leave a trace in the living room, that is, her happiness could linger in the living room even after she left the apartment.

Participants responded to these statements on a 9-point scale ranging from 1 = *Strongly agree* to 5 = *Neither agree nor disagree* to 9 = *Strongly disagree*. If participants' responses to the scenarios were significantly predicted by their belief in whether the emotions would linger in the space, then it is less likely that their responses were driven by the presumed presence of physical cues or valence priming.

Results

The primary dependent measure was the extent to which participants indicated that they would sense different emotions when the protagonists experienced positive versus negative emotions in each scenario. Because there was a large spike at the midpoint, indicating no difference in emotions sensed across the two occasions, we computed a dummy variable for each scenario that equaled 0 if the participant indicated that he or she would sense the same emotion on the two occasions (comprising 38% of the scenario trials) and 1 if the participant's ratings differed across the two occasions *consistently* with the protagonists' experienced emotion (e.g., the participant would sense more happiness on the

occasion where the protagonists experienced positive emotions; comprising 56% of the scenario trials). We excluded trials in which the participant’s ratings differed across the two occasions inconsistently with the protagonists’ experienced emotion (comprising 6% of the scenario trials).

We analyzed the data using logistic hierarchical linear modeling (HLM), treating scenarios as nested within participants. The scenario-level dependent measure was a dummy variable that equaled 1 if participants sensed a difference in emotions across the two occasions consistent with the protagonists’ experiences and 0 if they sensed the same emotion on both occasions. The sole independent variable was the participant’s culture (Americans = 0, Indians = 1). The full HLM model is presented below²:

$$\ln[\text{SenseEmotion}_{ij}/(1 - \text{SenseEmotion}_{ij})] = B_{0j} + R_{ij}$$

$$B_{0j} = G_{00} + G_{01}\text{Culture} + U_{0j}$$

The proportion of trials on which American participants’ indicated that they would sense emotional residue did not significantly differ from 50%, $G_{00} = 0.02$, odds ratio = 1.02, $t(185) = 0.14$, $p > .88$. The effect of culture was significant, $G_{01} = 0.80$, odds ratio = 2.22, $t(185) = 3.91$, $p < .001$, indicating that Indian participants were significantly more likely than Americans to report that they would sense different emotions on the two occasions (see Figure 2).³

Next, for each scenario, we reverse-scored and averaged participants’ responses to the two questions explicitly asking whether the protagonist’s emotions would linger in the physical space after the protagonist’s departure, such that higher numbers now indicated greater agreement with the statements. Upon submitting this measure to a linear HLM, we found a main effect of culture, $G_{01} = 0.90$, $t(185) = 3.55$, $p < .001$, $M_s = 6.09$ versus 5.29, indicating that Indian participants were significantly more likely than Americans to agree that emotions lingered in the space.

To test whether participants’ responses to the scenarios were based upon their belief that the protagonists’ emotions would linger in the space, we ran a logistic HLM with the dummy variable indicating whether participants would sense different emotions across the two occasions as the scenario-level dependent variable, participants’ average agreement with the two statements claiming that emotions linger in the physical space as a scenario-level predictor, and participants’ culture as a participant-level predictor:

$$\ln[\text{SenseEmotion}_{ij}/(1 - \text{SenseEmotion}_{ij})]$$

$$= B_{0j} + B_{1j}\text{EmotionsLinger}_{ij} + R_{ij}$$

$$B_{0j} = G_{00} + G_{01}\text{Culture} + U_{0j}$$

$$B_{1j} = G_{10} + U_{1j}$$

We found that participants’ belief in whether emotions lingered in the space significantly predicted their likelihood of claiming that they would sense different emotions across the two occasions, $G_{10} = 0.63$, odds ratio = 1.88, $t(186) = 10.61$, $p < .001$, but the main effect of culture dropped to nonsignificance, $G_{01} = 0.24$, odds ratio = 1.28, $t(185) = 1.10$, $p > .28$. Therefore, this analysis demonstrates that our findings were not primarily due to the expected presence of physical cues or valence priming.

Discussion

The results demonstrate that a belief in emotional residue is common among lay populations across different cultures—a significant proportion of Indian and American participants indicated that they would sense the residue from previous emotional experiences that occurred in a space. Participants indicated that they would sense emotions in a physical space even without explicit knowledge of the emotion-eliciting event, and their responses were significantly predicted by their agreement with statements claiming that emotions linger in the physical space. We found further support for the hypothesis that Indians would be more likely than Americans to indicate that they can sense emotional residue, consistent with the predictions derived from the fluid versus bounded conceptions of the person prevalent in these cultural settings (Daniel, 1984; Geertz, 1975).

Study 3

Study 3 attempted to replicate the findings of Study 2 using a different manipulation. In this study, we gave participants a series of scenarios in which the protagonist experienced either positive emotions or negative emotions, not both. The valence of the

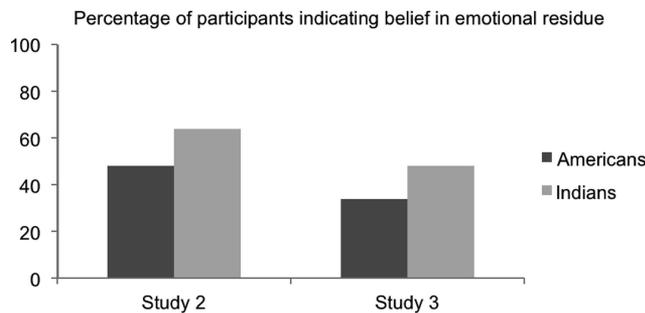


Figure 2. Proportion of participants indicating belief in emotional residue (Studies 2 and 3).

² HLM analyzes data separately at the level of trials and at the level of participants. The first equation listed represents the trial-level regression (where each trial is the unit of observation), and the subsequent equations represent participant-level regressions (where each participant is the unit of observation). HLM first runs the trial-level regression separately for each participant, obtaining one set of beta coefficients for each participant. The beta coefficients estimated in the first regression become the dependent variables for the subsequent regressions. Since we estimated one beta in the first equation, we have one subsequent equation at the level of participants. HLM runs this regression with the specified participant-level predictors. The *G* coefficients represent fixed effects, while the *U* coefficients represent random effects, both at the level of participants. HLM uses an iterative estimation procedure to approach the maximum-likelihood estimates for the fixed effects and variance components, using the estimated participant-level fixed and random effects to reestimate the trial-level beta coefficients, and so on, until convergence (see Raudenbush & Bryk, 2002, for more details). We report results with robust standard errors.

³ The cultural difference was statistically significant for three of the four scenarios, as well as trending in the predicted direction for the fourth scenario.

emotion experienced was thus manipulated between subjects within a given scenario and within subjects across different scenarios. As in the previous study, participants were explicitly asked to indicate the emotion that they would sense upon entering the vacated space.

Method

Participants. A total of 95 students at Stanford University in Stanford, California, and 100 students at St. Xavier's College in Mumbai, India, participated in the study. Due to a copy-editing error, participants' demographic information was not collected.

Materials. Participants responded to six scenarios in which a protagonist experienced or was experiencing (without the participant's knowledge) either a positive emotion or a negative emotion. The order of the six scenarios was held constant across participants, but the valence of each scenario was manipulated between participants. Each participant alternatively read scenarios in which the protagonist experienced positive emotions or negative emotions. A sample positive-valence scenario is provided below, with information in the negative-valence condition included in parentheses:

You and your close friend live together in an apartment. One evening, you are attending class and your roommate is in the living room when she receives a phone call with the news about winning (*not winning*) an important scholarship that she really wanted. She rejoices (*cries*) in the living room for some time before leaving the apartment to visit a friend. Right after she leaves, you return from class and enter the living room. What emotion will you sense when you enter the living room?

After reading the scenario, participants were asked to rate whether they would sense any emotion upon entering the physical space on a 9-point scale ranging from 1 = *A lot of sadness* to 5 = *Neither happiness nor sadness* to 9 = *A lot of happiness*.

As in the previous study, after going through all six scenarios, participants were asked to rate their agreement with statements claiming that the emotion experienced by the protagonist would linger in the physical space; for example:

The happy (*sad*) emotions of your close friend upon hearing that she won (*did not win*) the scholarship could leave a trace in the apartment. That is, her happiness (*sadness*) could linger in the apartment even after she has left.

They responded on a 9-point scale ranging from 1 = *Strongly agree* to 5 = *Neither agree nor disagree* to 9 = *Strongly disagree*.

Results

We created a dummy variable that equaled 1 if participants indicated that they would sense the emotion experienced by the protagonist (41% of the scenario trials), and 0 if they would sense neither emotion (51% of the scenario trials). We dropped trials in which participants indicated that they would sense the opposite emotion (8% of the scenario trials). We analyzed the data using a logistic HLM with this dummy variable as the scenario-level dependent measure, valence as a scenario-level predictor, and culture as a participant-level predictor:

$$\begin{aligned} \ln[\text{SenseEmotion}_{ij}/(1 - \text{SenseEmotion}_{ij})] \\ = B_{0j} + B_{1j}\text{Valence}_{ij} + R_{ij}. \end{aligned}$$

$$B_{0j} = G_{00} + G_{01}\text{Culture} + U_{0j}.$$

$$B_{1j} = G_{10}.$$

We found a main effect of culture, $G_{01} = 0.99$, odds ratio = 2.69, $t(193) = 4.40$, $p < .001$,⁴ indicating that Indian participants reported that they would detect the previously experienced emotion significantly more often than American participants (see Figure 2). The valence of the emotion did not influence participants' likelihood of detecting the emotion, $G_{10} = 0.06$, odds ratio = 1.06, $t(193) = 0.45$, $p > .65$.

We next tested whether there were cultural differences in participants' agreement with the statements claiming that the protagonists' emotions would linger in the physical space. First, we reverse-scored the measure such that higher values now indicated greater agreement. We ran a linear HLM with participants' responses to this measure as the scenario-level dependent measure and culture as a participant-level predictor. As predicted, we found that Indian participants were more likely to endorse these statements than American participants, $G_{01} = 1.93$, $t(193) = 7.84$, $p < .001$, $M_s = 6.61$ versus 4.69.

Finally, we tested whether participants' responses to the statements claiming that the protagonists' emotions would linger in the physical space predicted their responses to the scenarios. We ran a logistic HLM with the dummy variable coding whether participants would sense the protagonist's emotion in the room as the scenario-level dependent measure, participants' agreement with the statements claiming that emotions linger in the physical space as a scenario-level predictor, and culture as a participant-level predictor:

$$\begin{aligned} \ln[\text{SenseEmotion}_{ij}/(1 - \text{SenseEmotion}_{ij})] \\ = B_{0j} + B_{1j}\text{EmotionsLinger}_{ij} + R_{ij}. \end{aligned}$$

$$B_{0j} = G_{00} + G_{01}\text{Culture} + U_{0j}.$$

$$B_{1j} = G_{10}.$$

We replicated the finding of Study 1: Beliefs about whether emotions would linger predicted participants' responses to the scenarios, $G_{10} = 0.46$, odds ratio = 1.58, $t(193) = 10.46$, $p < .001$, whereas the main effect of culture became nonsignificant, $G_{01} = 0.23$, odds ratio = 1.26, $t(193) = 1.22$, $p > .22$. Again, this analysis suggests that our findings were not entirely due to the expected presence of physical cues or valence priming.

Discussion

Study 3 replicated the findings of Study 2 by demonstrating that a significant proportion of both American and Indian participants exhibited a belief in emotional residue and that this belief was more prevalent among Indians than among Americans. Partici-

⁴ The cultural difference was statistically significant for five of the six scenarios, as well as trending in the predicted direction for the sixth scenario.

pants' responses were once again significantly predicted by their belief that emotions linger in physical spaces, indicating that our findings cannot simply be explained by valence priming or by the argument that participants expected to see different physical cues left in the space. Furthermore, we found that participants' beliefs about whether they could detect previously experienced emotions were unaffected by the valence of the emotion, a finding that is somewhat inconsistent with the negativity dominance that is typically observed in the domain of contagion (Rozin & Royzman, 2001).

Study 4

Whereas Studies 2 and 3 assessed whether people believe that they can sense emotional residue, Study 4, with Indian participants, assessed whether they also believe that emotional residue can influence others' feelings and behaviors.

Another major goal of Study 4 was to address an important limitation of Studies 2 and 3, namely, that the observed findings could be due to experimenter demand. It is possible that participants did not believe in emotional residue but guessed that the experimenters wanted them to indicate that they would sense emotional residue. We addressed the demand effects question in the present study by assessing participants' tendency to be socially desirable and their perceptions of the experimenter's desired results. We tested whether there was evidence for a belief in emotional residue even in the absence of perceived demand effects.

Method

Participants. A total of 60 participants at M. S. Ramaiah Institute of Technology in Bangalore, India (24 women, 36 men; mean age 20.3 years), participated in the study. Participants were randomly assigned to one of two conditions.

Materials. Participants responded to two scenarios very similar to the ones in Study 3. Those in one condition received a negative-valence version of the first scenario and a positive-valence version of the second, and vice versa for those in the other condition. Both scenarios described a person entering a physical space that had been previously occupied by someone who experienced either positive or negative emotions. We took care to specify the cause of the other person's emotions so that participants did not infer that features of the physical space itself were responsible for the emotions. A sample scenario is provided below:

Nandita lived alone in her apartment. She had to go abroad for two weeks for a company assignment, so she allowed a new employee in her office named Kirti to stay in her apartment while Kirti searched for a permanent place to live. The day Nandita left, Kirti moved into Nandita's home. Kirti was feeling lonely in Nandita's apartment, and just then her boyfriend told her that he wanted to break up. She liked him very much, so she was very sad throughout. At the end of the two weeks, she managed to find an apartment of her own. The day Nandita was supposed to return, Kirti moved into her own apartment. Nandita returned from her trip abroad and took a taxi to her home. She entered her living room and sat down on the sofa.

After reading the scenario, participants were presented with two questions: (a) "Do you believe that the negative/positive emotions experienced by Kirti in the apartment will influence *Nandita's feelings* after she returns to her home?" and (b) "Do you believe

that the negative/positive emotions experienced by Kirti in the apartment will influence *Nandita's behaviors* after she returns to her home?" Participants responded on a 7-point scale ranging from 0 = *Not at all* to 6 = *Extremely*.

After participants responded to the two scenarios (featuring protagonists Monica and Nandita), we administered a measure of social desirability specific to the study. We asked participants six questions to assess whether they were responding according to their personal beliefs or according to the perceived experimenter demand: (a) "While answering the questions about Monica and Nandita, I was trying to give my honest opinions"; (b) "While answering the questions about Monica and Nandita, I was trying to give the responses that I think I was supposed to give, even if it meant not being honest about what I really thought"; (c) "While answering the questions about Monica and Nandita, I was mostly thinking about how I personally felt about it"; (d) "While answering the questions about Monica and Nandita, I was mostly thinking about how the people who designed in this survey wanted me to answer"; (e) "While answering the questions about Monica and Nandita, I wanted the researchers to know what I really think"; and (f) "While answering the questions about Monica and Nandita, I wanted the researchers to get results that they would be most happy with." Participants selected *True* or *False* for each item.

After this social desirability measure, we presented participants with the two scenarios again, but instructed them as follows:

You will now be presented with the same scenarios about Monica and Nandita that you just read. This time, please tell us how you think we, the people who made the survey, wanted you to respond to these questions. DO NOT tell us what you personally think, but tell us how you think *we, the people who made the survey*, wanted you to respond to each question.

Therefore, we specifically assessed the perceived experimenter demand using the identical materials as used in the first part of the study.

Results

We first assessed beliefs about emotional residue using one-sample *t* tests, testing whether participants' responses to the four questions significantly differed from zero. We found this to be the case for all four measures: Scenario 1, feelings measure, $t(58) = 14.95$, $p < .001$, $M = 3.10$; Scenario 1, behavior measure, $t(58) = 14.08$, $p < .001$, $M = 2.97$; Scenario 2, feelings measure, $t(58) = 11.78$, $p < .001$, $M = 2.68$; Scenario 2, behavior measure, $t(58) = 11.89$, $p < .001$, $M = 2.90$. Thus, we found that Indian participants believed that emotional residue can influence others' feeling and behaviors.

We then tested for the presence of social desirability and experimenter demand. For the six-item social desirability measure, we computed the proportion of items to which participants gave the socially desirable response. A one-sample *t* test confirmed that this variable differed from zero, $t(58) = 3.96$, $p < .001$, $M = 0.24$, indicating that significant social desirability concerns existed. We then tested whether participants perceived the experimenter as wanting them to indicate some belief in emotional residue and found that to be the case using one-sample *t* tests comparing the observed means to zero: Scenario 1, feelings measure, $t(58) = 14.70$, $p < .001$, $M = 3.52$;

Scenario 1, behavior measure, $t(58) = 15.41, p < .001, M = 3.44$; Scenario 2, feelings measure, $t(58) = 14.43, p < .001, M = 3.34$; Scenario 2, behavior measure, $t(58) = 14.75, p < .001, M = 3.29$.

We next averaged participants' personal responses to the two scenarios ($\alpha = .67$) and also averaged their perceptions of how the experimenter would want them to respond to the two scenarios ($\alpha = .85$). We ran a regression with participants' personal ratings (range 0–6) as the dependent measure, and their social desirability score (range 0–1) and perceptions of the experimenter's wishes (range 0–6) as the independent variables. We found a marginally significant effect of the social desirability measure, $\beta = 1.11, t(55) = 1.76, p = .084$, indicating that a shift from 0 to 1 on social desirability should shift participants' responses to the scenarios by 1.11 units. We also found a main effect of the perceived experimenter's wishes, $\beta = 0.44, t(55) = 4.96, p < .001$, indicating that a one-unit shift in the perceived experimenter's wishes changed participants' responses by 0.44 units. Most crucially, the constant coefficient in the regression, which indicates the expected response when all predictors are 0 (i.e., when there is no social desirability and when the experimenter is perceived as wanting participants to indicate no belief in emotional residue), was significantly different from zero, $\beta = 0.57, t(55) = 2.02, p < .05$, indicating evidence for a belief in emotional residue even in the absence of perceived experimenter demand and social desirability.

Discussion

Study 4 established that perceived experimenter demand effects did not account for all the findings of Studies 2 and 3. While social desirability and perceived demand did account for variance in participants' responses, we found support for a belief in emotional residue even in their absence. However, one limitation of this study is that the demand effects were measured with the same participants who took part in the main experiment, in light of Orne's (1962) suggestion that demand effects be measured using a second group of participants who are not part of the main experiment.

Furthermore, Study 4 found that people also believe that emotional residue can influence the feelings and behaviors of those who come into contact with it. However, this study included only Indian participants, so we do not know whether Americans also hold this idea. Studies 5–7 addressed this issue.

Pilot Study

Studies 1–4 explicitly assessed Indians' and Americans' beliefs about emotional residue by asking participants whether emotions can transfer between human beings and physical spaces (Study 1), whether they would sense emotions in vacated spaces (Studies 2 and 3), and whether emotional residue accumulated in spaces would influence others' feelings and behaviors (Study 4). Using these explicit measures, we found cultural differences in the extent to which Indians and Americans appear to believe in emotional residue, possibly because Indians' lay theory of persons and emotions is more consistent with emotional residue (Daniel, 1984; Marriott, 1989; Shweder & Bourne, 1982), despite the likely prevalence of the property transmission heuristic in both cultures (White, 2009).

The goal of Studies 5–7 was to test the belief in emotional residue without explicitly asking participants about the concept. With an implicit procedure, we expected the cultural differences to disappear and both Indian and American participants' responses to correspond to the property transmission heuristic. We decided to use the demand-free impression-formation technique for this purpose, a "seldom used technique for determining unacknowledged and/or unacceptable beliefs" (Nemeroff & Rozin, 1989, p. 50), a technique for which "there is no indication to the subject of either the hypotheses or the general area of interest of the experimenter" (Nemeroff & Rozin, 1989, p. 54; see also Asch, 1946; Haire, 1950; Woodside, 1972). In Nemeroff and Rozin's (1989) instantiation of this technique, participants were presented with different pieces of information about a group of people, such as their occupation, family life, gender roles, and, crucially, what they typically eat. Manipulating between subjects what the group was described as eating (keeping all other information constant) influenced participants' responses consistent with the belief that "you are what you eat."

In the next three studies, we used this technique to test whether information about emotional residue influenced participants' judgments of how people will feel and behave. Before conducting the studies, we wanted to test whether the demand-free impression-formation technique is actually demand free in the context of measuring beliefs about emotional residue.

In the first part of the study, we presented 50 Indian participants with two scenarios in which a protagonist begins residing in a space that was previously occupied by someone who experienced either positive or negative emotions. We presented this information in the context of other irrelevant information that was held constant. A sample scenario is provided below:

Monica was a young woman working at an investment firm. She shared an apartment with her roommate who was also working in finance. Monica liked her job overall, although it involved a lot of work. Since the economy was booming and her company was doing well, she got a significant salary raise along with a bonus. Therefore, Monica decided to buy her own apartment. After searching extensively, Monica bought a 1-bedroom apartment from an old woman whose husband had just died of a genetic disease after suffering for many years in the apartment. Monica moves into the house and starts settling in. How do you think Monica would be feeling a couple weeks after moving into her new apartment?

Participants were then asked to rate how happy, cheerful, sad, and depressed the protagonist (i.e., Monica in the above scenario) would feel on 6-point scales ranging from 1 = *Not at all* to 6 = *A lot*.

Next, we asked participants, "What do you think was the purpose of the survey up to this point? Please describe below in the space provided." Two coders went through each response and coded whether participants had guessed the purpose of the emotional residue manipulation. Of the 50 participants surveyed, the coders identified only one participant who appeared to have seen through the manipulation, responding, "To study the effects of atmosphere of a living environment." It thus appears that the demand-free impression-formation technique is indeed demand free in the context of studying beliefs about emotional residue.

Study 5

Study 5 sought to implicitly assess beliefs about emotional residue by testing whether participants would spontaneously take information about emotional residue into consideration when making judgments about other people. Furthermore, whereas the previous studies primarily tested whether people believe that they can sense emotional residue, the present study tested whether people also believe that emotional residue can influence the mood of those who come into contact with it. Following from the idea that contamination from a polluted source can affect individuals' health and well-being (Rozin et al., 1992), we hypothesized that people believe that chronic exposure to accumulated emotional residue can lead individuals to experience moods that are affectively congruent with the accumulated residue.

We used Nemeroff and Rozin's (1989) demand-free impression-formation technique to measure the belief. Given that the belief in emotional residue is assessed implicitly, we hypothesized that participants' responses would be guided by the general property transmission heuristic rather than by cultural conceptions of the person.

Method

Participants. A total of 106 students at Stanford University in Stanford, California (65 women, 41 men; mean age 19.1 years; all U.S. citizens), and 122 students at St. Xavier's College in Mumbai, India (all women; mean age 17.5 years; all Indian citizens), participated in the study. Since there were no gender differences in the previous studies, the inclusion of an exclusively female Indian sample is unlikely to pose a confound.

Materials. Participants read a scenario in which a protagonist moved into a space that had been inhabited by someone who chronically experienced either negative or positive emotions over the past year, without the protagonist's knowledge (with information differing across versions in parentheses):

David was a hard-working student and studied well in high school. He was looking forward to going to college and wanted to study either civil or mechanical engineering. Fortunately he got admitted to a college that he really wanted to attend. Since his college had many dorms, he got a room of his own. During the previous year, the student who had been living in David's room had been feeling very depressed because of family problems (*feeling very happy because things were going well in his family*). David was studious and tended to spend a lot of time in his room. How do you think David would be feeling a couple weeks after starting college?

To reduce the likelihood of participants inferring that features of the physical space contributed to the emotions that the previous resident experienced, we specified that the previous resident experienced the target emotion due to reasons that were unrelated to the physical space (i.e., family issues).

Participants were asked to rate the protagonist's mood after living in the new space. Specifically, they were asked to rate the extent to which the new resident might experience two positive emotions (happy, cheerful) and two negative emotions (sad, depressed) after living in the new residence for a couple weeks, on a 9-point scale ranging from 1 = *Not at all* to 9 = *Very much*. If participants believed that emotional residue accumulated in a space influences people's general moods, then they would be

expected to rate the protagonist as feeling more negative after moving into the space when the previous occupant of the space was described as experiencing negative emotions rather than positive emotions.

Results

We averaged participants' ratings for how happy, cheerful, sad (reverse-scored), and depressed (reverse-scored; $\alpha = .78$), the protagonist would feel after living in the new space for a few weeks, and submitted this measure to a 2 (culture) \times 2 (valence) ANOVA. We found a main effect of condition, $F(1, 224) = 8.10$, $p < .005$, indicating that participants predicted the protagonist would be more happy and less sad when inhabiting a space occupied by a happy resident over the past year than when inhabiting a space occupied by a sad resident ($M = 6.77$ vs. 6.23). Neither the main effect of culture, $F(1, 224) = 1.66$, $p = .20$, nor the Culture \times Condition interaction, $F(1, 224) = 1.22$, $p = .27$, was significant, suggesting that with this more implicit measure, Indian and American participants' ratings of the protagonist's moods were similarly responsive to the emotional residue manipulation (see Figure 3). The main effect of condition held for the two positive emotions (happy and cheerful, $r = .84$, $p < .001$), $F(1, 224) = 6.16$, $p < .02$, and for the two negative emotions (sad and depressed, $r = .66$, $p < .001$), $F(1, 224) = 5.15$, $p < .03$, while the Culture \times Condition interaction was not significant in either case ($ps > .30$).

Discussion

Using the demand-free impression-formation technique, Study 5 found that people believe that emotional residue can influence individuals' moods. Participants estimated that a person would be more likely to experience moods that were congruent with the emotions chronically experienced by a previous resident, experiencing more positive mood after moving into a space previously occupied by a happy resident and experiencing more negative mood after moving into a space previously occupied by a sad resident. Using this implicit measure of emotional residue, we found that both Indian and American participants indicated to a similar extent that emotional residue accumulated in a space influences the moods of people who are exposed to the space,

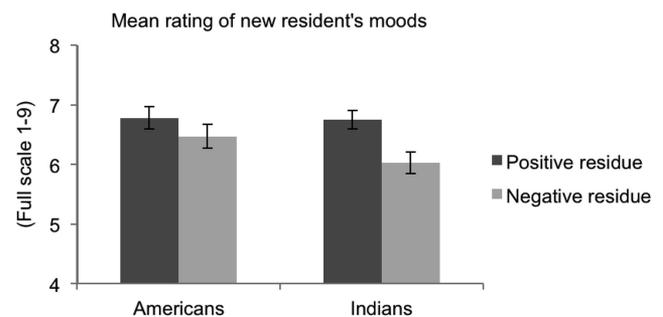


Figure 3. Mean ratings of the new resident's mood (with higher numbers indicating more positive mood) by valence of emotional residue and participant's culture (Study 5). Error bars represent standard errors of the means.

consistent with the idea that when the belief is measured implicitly, both groups are likely to respond according to the general property transmission heuristic.

Study 6

Although suggestive, the findings of Study 5 are subject to an important alternative explanation: valence priming. According to this argument, participants merely rated the target's moods according to the valence that the scenario had just primed them with. That is, after reading about positive emotions, participants rated the target's future emotions as being more positive than after reading about negative emotions. To tease apart whether participants' responses in Study 5 were due to a belief in emotional residue or to valence priming, we also manipulated the location of the emotional experience in the present study. According to valence priming, participants' responses will be influenced by the valence of the emotions mentioned in the scenario irrespective of the location of the emotional experience. In contrast, according to the lay theory of emotional residue, the valence of the emotions mentioned should influence participants' judgments only when the emotional experience occurred in the physical space that the protagonist subsequently occupied. We tested these contrasting predictions in the present study by manipulating whether the target inhabited the same residential space as or a different residential space than the one where the emotional experience occurred.

Method

Participants. A total of 182 students (112 women, 63 men, seven unreported; mean age 19.8 years) at Stanford University in Stanford, California, participated in the study. The design of the study was 2 (valence of residue: positive vs. negative) \times 2 (location of residue: same vs. different space) mixed-factorial design. Participants were randomly assigned to one of four conditions, as explained below.

Procedure. We presented participants with two scenarios in which they were asked to judge a target person's mood after the person moved into a new apartment or house. Participants in Conditions 1 and 3 were assigned to the same-location condition, which included scenarios like the one used in Study 4, but those in Conditions 2 and 4 were assigned to the different-location condition, in which the scenarios were identical to the ones in the same-location condition except that the target person moved into a different apartment/house than the one in which the emotion was experienced. Participants in Conditions 1 and 2 read about positively valenced emotions in the first scenario and negatively valenced emotions in the second scenario, and those in Conditions 3 and 4 read about the negative emotions first and positive emotions later. Two versions of Scenario 2 highlighting the same-location versus different-location manipulation are provided below (negative-valence versions not shown):

Scenario 2: Same location—positive valence condition:

Mark was an engineer who got promoted in his company. As part of his promotion, he moved to a new city and wanted to purchase a house. He stayed temporarily with a friend while looking for houses. After a few weeks of searching, he found one that he liked. The owner of the house wanted to sell it because he and his wife were happily

moving to their hometown after retirement. Mark bought the house and moved in. How do you think Mark would feel moving into his new house?

Scenario 2: Different location—positive valence condition:

Mark was an engineer who got promoted in his company. As part of his promotion, he moved to a new city and wanted to purchase a house. He stayed temporarily with a friend while looking for houses. After a few weeks of searching, he found one that he liked. The owner of the house wanted to sell it because he and his wife were happily moving to their hometown after retirement. However, Mark found a newly built house that he liked more, so he bought the new house and moved in. How do you think Mark would feel moving into his new house?

After each scenario, participants were asked to rate how happy, cheerful, sad, and depressed the protagonist would feel on a 7-point scale ranging from 1 = *Not at all* to 7 = *Extremely*.

Results

For Scenario 1, we averaged participants' ratings for the four mood items, happy, cheerful, sad (reverse-scored), and depressed (reverse-scored; $\alpha = .86$), and submitted this measure to a 2 (same vs. different location) \times 2 (positive vs. negative valence) ANOVA. We found a main effect of valence, $F(1, 178) = 5.40$, $p < .05$, indicating that participants expected the protagonist to experience more positive moods in the two positive-valence conditions than in the two negative-valence conditions. However, this main effect was qualified by a significant two-way interaction, $F(1, 178) = 13.54$, $p < .001$, indicating that in the same-location condition, participants expected the protagonist to experience more positive moods in the positive-valence condition than in the negative-valence condition, $t(94) = 4.55$, $p < .001$, but there was no difference by valence in the different-location condition, $t(94) = 0.89$, $p > .37$ (see Figure 4).

For Scenario 2, we again averaged participants' ratings for the four mood items ($\alpha = .84$) and submitted this measure to a 2 (same vs. different location) \times 2 (positive vs. negative valence) ANOVA. We found a main effect of location, $F(1, 178) = 6.12$, $p < .001$; a main effect of valence, $F(1, 178) = 15.60$, $p < .001$; and a significant two-way interaction, $F(1, 178) = 10.52$, $p =$

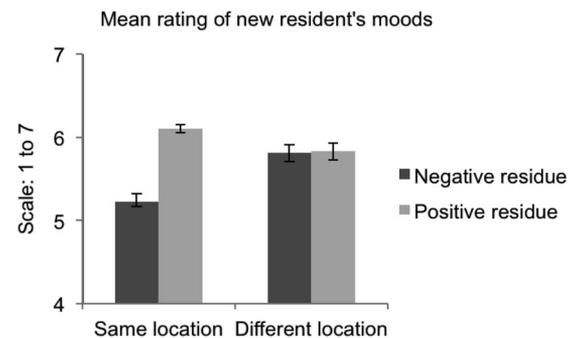


Figure 4. Mean ratings of the new resident's mood by American participants (with higher numbers indicating more positive mood) by valence of emotional residue and location of residue, averaged across the two scenarios (Study 6). Error bars represent standard errors of the means.

.001, again indicating that in the same-location condition, participants expected the protagonist to experience more positive moods in the positive-valence condition than in the negative-valence condition, $t(94) = 6.89, p < .001$, but not so in the different-location condition, $t(94) = 1.71, p > .09$ (see Figure 4).

Discussion

Study 6 replicated the findings of Study 5 by showing that participants expected a person to experience more negative moods after moving into a residence previously occupied by someone experiencing negative emotions than by someone experiencing positive emotions. Furthermore, Study 6 ruled out valence priming as an alternative explanation: Participants were not influenced by the valence of the emotions described when the emotions were experienced in a different location than the one the target moved into.

Study 7

Whereas Studies 5 and 6 suggest that both Americans and Indians believe that emotional residue can influence individuals' moods (i.e., emotion-to-emotion contagion), Study 7 went a step further by testing whether people might also believe that emotional residue influences others' behaviors (i.e., emotion-to-behavior contagion). We hypothesized that both Indians and Americans would believe that contact with intense emotional residue in an enclosed space would induce behaviors that are congruent with the valence of the residue. In other words, people might believe that emotional residue exerts a force that pushes individuals to act in certain ways. We again tested this hypothesis using the demand-free impression-formation technique (Nemeroff & Rozin, 1989), hypothesizing that both Indians and Americans would be similarly influenced by the information about residue, consistent with the general property transmission heuristic (White, 2009).

Method

Participants. A total of 140 students at Stanford University in Stanford, California (76 women; mean age 19.7 years; 59 European American, 28 Asian American, 12 African American, six Latin American, two Native American, one Middle-Eastern American, 29 multiracial, and three other; 68 Christian, 58 agnostic or atheist, four Jewish, two Buddhist, two Hindu, one Muslim, one Animist, and four other; all U.S. citizens), and 96 students at M. S. Ramaiah Institute of Technology in Bangalore, India (58 women; mean age 20.7 years; 84 Hindu, nine Muslim, two Jain, one Christian; all Indian citizens), participated in the study.

Procedure. The study employed a 2 (valence of emotional residue) \times 2 (congruence of behavior with emotional residue) \times 2 (culture) mixed-factorial design. Both valence of emotional residue and congruence of behavior with emotional residue were varied between subjects in the same scenario and within subjects across scenarios.

We provided participants with four scenarios in which a protagonist began residing in a space in which a previous resident had experienced either positive or negative emotions. Half of the participants read about positive emotional experiences in Scenarios 1 and 3 and negative emotional experiences in Scenarios 2 and

4, and vice versa for the other half. In each scenario, we told participants that the protagonist entered this space without knowledge of the emotion-eliciting event and immediately started engaging in an affectively charged behavior (i.e., crying in Scenario 1, sitting on a chair feeling depressed in Scenario 2, making exciting plans in Scenario 3, and jumping for joy in Scenario 4). All participants were provided with the same set of behaviors in the four scenarios, but the valence of the behavior was sometimes congruent and sometimes incongruent with the valence of the emotions experienced in the space depending on whether participants received the positive-valence or the negative-valence version of the scenario. We asked participants to rate how surprising they found the protagonist's behavior on a 7-point scale ranging from 1 = *Not at all surprising* to 7 = *Very surprising*. A sample scenario is provided below, with information differing across the positive-valence and negative-valence versions in parentheses:

Margaret was a college student who took a summer internship in another city. She started looking for a place to stay in the new city and found someone who was willing to rent her apartment to Margaret for two months. She rented the apartment from Alice, a student at a local college who had been feeling very sad (*happy*) over the past few months because of problems with her boyfriend (*her good relationship with her boyfriend*). When Margaret came to the apartment, Alice had already left and kept the key with the neighbor.

When Margaret entered the empty apartment on the day of her move-in, she started feeling very happy and quickly unpacked and made exciting plans for the summer. To what extent do you think Margaret's behavior is surprising?

Results

We analyzed the data using HLM with scenarios nested within participants. Participants' rating of how surprising they found the protagonist's behavior upon entering the new space was the dependent variable. Our trial-level predictor was a variable coding for whether the valence of the behavior was congruent or incongruent with the valence of the previously experienced emotions (with incongruent = 0, congruent = 1). At the participant level, culture was our sole predictor variable. The full HLM model is presented below:

$$\text{Surprisingness}_{ij} = B_{0j} + B_{1j}\text{Congruence}_{ij} + R_{ij}.$$

$$B_{0j} = G_{00} + G_{01}\text{Culture} + U_{0j}.$$

$$B_{1j} = G_{10} + G_{11}\text{Culture} + U_{1j}.$$

In support of our hypothesis, we found the predicted main effect of congruence between valence of the behavior and valence of the previously experienced emotions, $G_{10} = -0.37, t(967) = 3.71, p < .001$, indicating that participants found the target's behavior less surprising when it was congruent with the valence of the emotions experienced in the space than when it was incongruent. As predicted, we did not find a main effect of participants' culture, $G_{01} = 0.30, t(241) = 1.71, p = .09$, or a Congruence \times Culture interaction, $G_{11} = 0.11, t < 1$, indicating that both Indian and

American participants took the information about emotional residue into account to a similar extent (see Figure 5).⁵

Discussion

Study 7 extended the findings of previous studies by demonstrating that both Indians and Americans believe that emotional residue influences people's behaviors in an affectively congruent manner: When a person was described as engaging in affectively charged behaviors upon entering a new space, participants found the behaviors to be less surprising when they were congruent with the valence of the emotions that a previous resident chronically experienced in the space than when they were incongruent. The results are consistent with the idea that when the belief in emotional residue is measured implicitly, both Indians and Americans would respond according to the general property transmission heuristic.

Study 8

Whereas the previous studies documented people's beliefs about the consequences of emotional residue, Study 8 examined whether people believe that the detectability of emotional residue varies systematically. We selected two variables that we predicted would influence participants' judgments of the detectability of emotional residue: (a) the relationship between the person who experienced the emotion and the person coming in contact with the residue and (b) the number of people who experienced the emotion. We hypothesized that despite cultural differences in the extent to which Indians and Americans explicitly state that they believe in residue, if these sources of variation in emotional residue are derived from the general property transmission heuristic (White, 2009), then one would expect Indians and Americans to be influenced by these sources of variation to similar extents. Furthermore, by varying the sources of variation in emotional residue between subjects rather than within-subjects and by not drawing participants' attention to these variables explicitly, we reduced the chances of experimenter demand.

Method

Participants. A total of 81 students from Stanford University in Stanford, California (41 women; mean age 19.0 years; 30 European American, three African American, 14 Latin American,

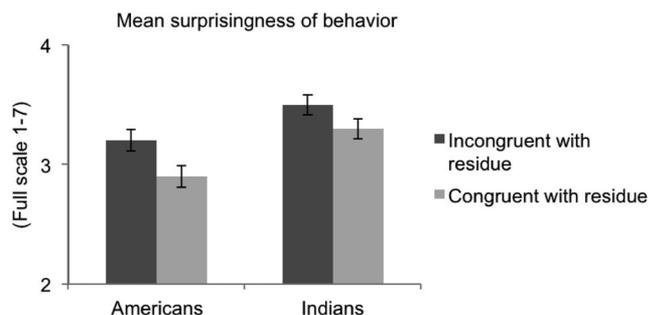


Figure 5. Mean surprisingness of the new resident's behavior by congruence of behavior with emotional residue and participant's culture (Study 7). Error bars represent standard errors of the means.

10 Asian American, one Native American, one Middle-Eastern American, 17 multiracial, and five other; all U.S. citizens), and 82 students from Mithibai College of Arts and Sciences in Mumbai, India (79 women; mean age 19.4 years; all Indian citizens), participated.

Materials. We presented participants with four scenarios (two scenarios testing each proposed source of variation). In each scenario, participants were told that the protagonist(s) experienced strong emotion in an enclosed space (e.g., a living room) and then left the space; participants were then asked to imagine that they entered the space after the protagonist(s) had left, without knowledge of the emotion-eliciting event.

To manipulate the relationship between the two persons, we created two versions of Scenarios 1 and 2 in which the protagonist was either very close to the participant (i.e., sibling, best friend) or not close (i.e., distant cousin, new roommate); participants received either Scenario 1 (sibling version) and Scenario 2 (new roommate version) or Scenario 1 (distant cousin version) and Scenario 2 (best friend version). The two versions of Scenario 1 are presented below, with information differing across versions italicized:

Protagonist close to participant:

You are at your parents' home for vacation from college and since part of the house is being renovated, you are sharing a room with your *sister*. *You and your sister are very close to each other and share a deep bond*. One day, you have gone out while your *sister* is in the room and receives a phone call from her fiancée. Unexpectedly, he breaks up with her, so she is very heartbroken. Your *sister* then leaves the house and immediately after that, you return and enter the room.

Protagonist distant from participant:

You are at your parents' home for vacation from college and since part of the house is being renovated, you are sharing a room with your *distant cousin who is visiting your city*. *You have met your cousin only a couple times in the past and barely know her*. One day, you have gone out while your *distant cousin* is in the room and receives a phone call from her fiancée. Unexpectedly, he breaks up with her, so she is very heartbroken. Your *cousin* then leaves the house and immediately after that, you return and enter the room.

To manipulate the number of protagonists who experienced the emotion, we created two versions of Scenarios 3 and 4 in which one or many people were engaging in an activity (i.e., watching presidential elections or a sports game); participants received either Scenario 3 (single individual version) and Scenario 4 (multiple individuals version) or Scenario 3 (multiple individuals version) and Scenario 4 (single individual version). The two versions of Scenario 3 are presented below, with information differing across versions italicized:

Single protagonist:

You and your roommate live together in an apartment. One day, while you have gone out, your roommate is in the living room *alone*. *She is watching a sports game in which her favorite college team is playing a big match against the rival college team*. As the game progresses,

⁵ The effect of condition was in the predicted direction for three of the four scenarios, although not individually significant for any scenario.

your roommate's favorite team is leading and finally wins by a huge margin. *She feels* extremely happy that *her* team won the game. *Your roommate* then leaves the apartment, and right after that, you return and enter the living room.

Multiple protagonists:

You and your roommate live together in an apartment. One day, while you have gone out, your roommate is in the living room *along with some of your common friends*. *They all are* watching a sports game in which *their* favorite college team is playing a big match against the rival college team. As the game progresses, your roommate *and your friends'* favorite team is leading and finally wins by a huge margin. *They all feel* extremely happy that *their* team won the game. *They all* then leave the apartment, and right after that, you return and enter the living room.

After they read each scenario, participants were asked to respond to the question "Would you sense any emotion when you enter the apartment?" on a 9-point scale ranging from 1 = *No, I would not sense any emotion* to 9 = *Yes, I would strongly sense X*, where *X* referred to the emotion that the protagonist(s) were described as experiencing.

Results

We created two contrast variables representing the manipulations of relatedness and number of protagonists. The relatedness contrast variable equaled 1 if the protagonist in Scenarios 1 and 2 was described as being close to the participant and -1 if distant from the participant, and 0 for Scenarios 3 and 4. The number of protagonists contrast variable equaled 1 if Scenarios 3 and 4 described multiple protagonists, -1 if they described single protagonists, and 0 for Scenarios 1 and 2. We ran a linear HLM with participants' rating as the dependent measure, the two contrast variables as the trial-level predictors, and culture as a participant-level predictor:

$$\text{SenseEmotion}_{ij} = B_{0j} + B_{1j}\text{Relatedness}_{ij} + B_{2j}\text{NumProtagonists}_{ij} + R_{ij}.$$

$$B_{0j} = G_{00} + G_{01}\text{Culture} + U_{0j}.$$

$$B_{1j} = G_{10} + G_{12}\text{Culture} + U_{1j}.$$

$$B_{2j} = G_{20} + G_{22}\text{Culture} + U_{2j}.$$

Across all scenarios, Indian participants were more likely to state that they would sense the previously experienced emotions than were American participants, $G_{01} = 1.11$, $t(161) = 3.91$, $p < .001$, $M_s = 4.26$ versus 3.19. As predicted, the relatedness contrast was significant, $G_{19} = 0.24$, $t(645) = 2.03$, $p < .05$; participants stated that they would be more likely to sense emotions experienced by a close other than by a stranger (see Figure 6). The number of protagonists contrast was also significant, $G_{20} = 0.35$, $t(645) = 3.60$, $p = .001$; participants stated that they would be more likely to sense emotions experienced by a group of people than by an individual (see Figure 7). Notably, neither contrast was moderated by culture: For the relatedness contrast, $G_{11} = 0.34$, $t(161) = 1.71$, $p > .09$, and for the number of protagonists contrast, $G_{21} = 0.19$, $t(161) = 1.24$, $p > .20$.⁶

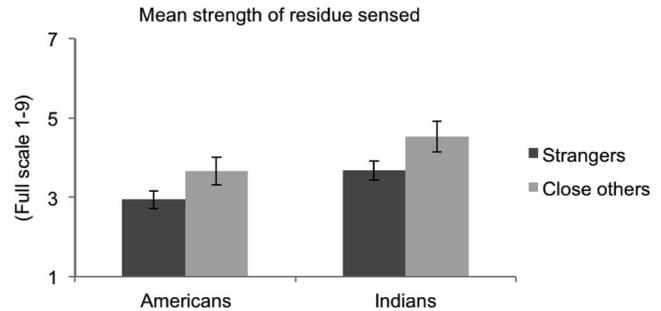


Figure 6. Mean strength of emotional residue sensed by relation with protagonist and participant's culture (Study 8). Error bars represent standard errors of the means.

Discussion

Study 8 supported our hypothesis that Indians and Americans would believe in the same patterns of variation in emotional residue: Both groups of participants believed to a similar extent that they would be more likely to detect the emotions experienced by close others than by strangers, and by groups of people than by single individuals. These findings suggest that perhaps both groups of participants based their responses upon the general property transmission heuristic (White, 2009), judging that the affective properties of close others and a larger number of people are more transferrable than those from strangers and fewer people. Notably, we found evidence for the two hypothesized sources of variation with a design that minimized experimenter demand effects by manipulating the key variables between subjects rather than within subjects, and by not drawing participants' attention to these variables explicitly.

Study 9

Studies 1–8 provide substantial evidence for a belief in emotional residue, but all of these studies used explicit or implicit self-report measures to assess the belief. The goal of Study 9 was to test whether information relevant to emotional residue can influence people's behaviors. Using signs about a previous emotional recall experiment posted on the lab room doors, we manipulated whether the two different lab rooms could be perceived to contain either positive or negative emotional residue, respectively. We tested whether participants were more likely to choose to complete a survey in the room where previous participants recalled positive experiences (and thus where positive emotional residue could have accumulated) compared to a room where previous participants recalled negative experiences (and thus where negative emotional residue could have accumulated). To the extent that this study implicitly measured the influence of information relevant to emotional residue on people's behaviors, we hypothesized that both Indians and Americans would be equally likely to choose the room where previous participants experienced positive emotions.

⁶ The effect of the manipulation was in the predicted direction for all four scenarios, although not individually significant for any scenario.

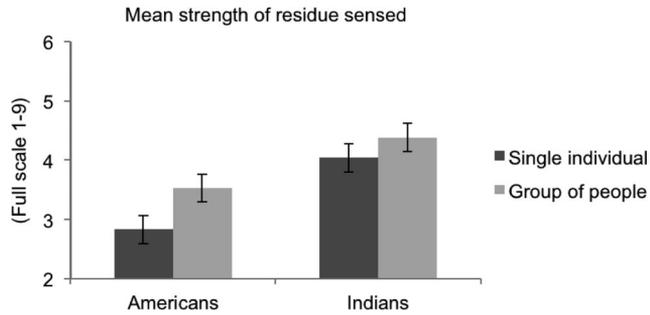


Figure 7. Mean strength of emotional residue sensed by number of protagonists and participant's culture (Study 8). Error bars represent standard errors of the means.

Method

Participants. Participants were 50 European American students (30 women, 19 men, one unreported; mean age 20.2 years) and 32 international South Asian students (16 women, 16 men; mean age 23.3 years), all studying at Stanford University in Stanford, California. International undergraduate students were in South Asia until the end of their high school, and international graduate students were in South Asia until the end of their undergraduate college.

Procedure. We set up the experimenter's desk in the middle of the hallway between two identical lab rooms that were adjacent to each other. Participants were run individually. Before each experimental session, we put different signs on the doors to the lab rooms on the left and the right of the experimenter. One sign indicated that a study on the recollection of happy life events had occurred in that room for 2 hr that afternoon, whereas the other sign indicated that a study on the recollection of unhappy life events had taken place in that room, both of which ended 15 min prior to the participant's scheduled time. For example, for a participant scheduled at 3:15 p.m. on a Wednesday, one sign would read "Recollection of HAPPY Life Events Study, Wed 1:00-3:00," and the other sign would read "Recollection of UNHAPPY Life Events Study, Wed 1:00-3:00." We counterbalanced whether the happy and unhappy signs appeared on the door to the left or the door to the right across successive participants. The times on the signs were also changed according to each participant's scheduled time.

When participants came to the experimenter's desk, the experimenter asked their name and checked it off a list of the day's participants. The experimenter then handed them a questionnaire with a blank cover page on a clipboard and said, "Here is the questionnaire that you need to complete today. You can fill it out in either of these two rooms," pointing to the rooms to the left and the right. The experimenter noted whether participants chose to complete the questionnaire in the room with the happy sign or the unhappy sign.

In the questionnaire, participants were provided with four scenarios measuring beliefs about emotional residue very similar to those in Study 3. After the scenarios, we explicitly measured participants' belief in emotional residue by the statement "In general, when a person is experiencing a strong emotion, the emotion pervades the room or the space that the person is occu-

pying." Participants responded on a 9-point scale ranging from 1 = *Strongly agree* to 9 = *Strongly disagree*. The questionnaire was designed to last 5 min, after which the participant was moved to a different room and the signs were changed for the next participant.

Results

The dependent measure was a binary variable coding whether participants chose to complete the questionnaire in the room with the happy sign (coded as 1) or with the unhappy sign (coded as 0). A one-sample test of proportions indicated that participants were more likely to choose to complete the questionnaire in the room with the happy sign than in the room with the unhappy sign, $z = 2.43$, $p < .02$, $M = 63\%$ vs. 37% , as hypothesized.

We next conducted a series of 2×2 chi-square tests of independence to assess whether participants' likelihood of choosing the room with the happy sign varied with a number of predictor variables. The first test indicated that both Indians and Americans were similarly likely to choose the happy room, $\chi^2(1, N = 82) = 0.11$, $p > .70$, $M = 66\%$ versus 62% ; individually, both groups were significantly different from chance according to one-tailed tests of proportion: For Americans, $z = 1.70$, $p < .05$; for Indians, $z = 1.77$, $p < .05$ (see Figure 8). Furthermore, participants were similarly likely to choose the happy room irrespective of whether the happy sign was on the door to the left or on the door to the right, $\chi^2(1, N = 82) = 0.39$, $p > .50$, $M = 60\%$ versus 67% .

The above findings present preliminary evidence for behavioral consequences of emotional residue. However, alternative explanations might apply, for instance, that participants' choices do not reflect a belief in emotional residue but a desire to avoid the memory that negative emotional experiences were previously recalled in the room, or their choices might reflect some sort of attraction to the room associated with positivity. To test whether participants' choice of rooms was indeed predicted by their general belief in emotional residue, we ran a probit regression⁷ where the dependent variable was participants' choice of room (0 = unhappy, 1 = happy) and the independent variables were participants' culture (0 = Indian, 1 = American), their agreement with the general statement about emotional residue (range 1–9, scored such that higher values indicate greater belief in residue), and Culture \times Residue Belief interaction. The main effect of residue belief was significant ($\beta = .16$, $z = 2.47$, $p < .02$), indicating that participants who were more likely to believe in emotional residue were also more likely to choose the room with the happy sign. Neither the main effect of culture ($\beta = -.01$, $z = 0.47$, $p > .60$) nor the Culture \times Residue Belief interaction ($\beta = -.11$, $z = 1.47$, $p > .14$) were significant.

Discussion

Study 9 unobtrusively manipulated information about whether people in a previous experiment recalled positive or negative life events in two different rooms and found that participants were more likely to choose to complete a survey in the room where previous participants presumably recalled positive life events

⁷ We conducted the analysis using robust standard errors clustered on the continuous independent variable.

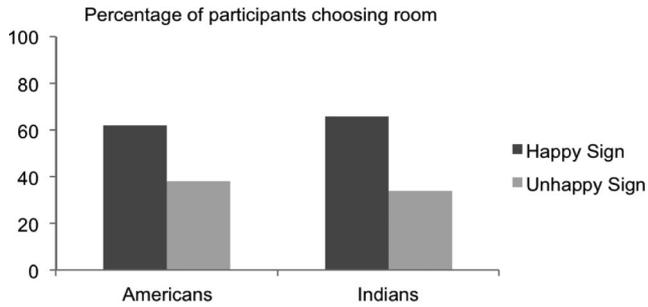


Figure 8. Choice of room by culture (Study 9).

rather than negative life events. Given that the information about emotional residue was manipulated implicitly, we did not find cultural differences in the extent to which Indian and American participants chose the happy room over the unhappy room. Moreover, this effect was predicted by a belief in emotional residue. Although much further research remains to be conducted, this study provides preliminary evidence that beliefs in emotional residue can influence behavior.

General Discussion

Whereas previous research has identified physical contact between objects and similarity between objects as mechanisms of contagion (Rozin et al., 1986), our research identifies a novel mechanism of person-to-person contagion, emotional residue. According to this commonly held belief, the emotions that people experience emanate from their body and leave a trace or residue in the physical environment; when other people enter that physical space, they can sense the emotional residue contained in the space and are influenced by it.

Summary of Findings

Study 1 examined the bounded versus fluid conceptions of the person, prevalent in the United States versus India, respectively (Daniel, 1984; Geertz, 1975; Marriott, 1989), in the domain of emotion. Whereas both Indians and Americans were equally likely to believe that emotions flow between the brain and other parts of the body, Indians were significantly more likely than Americans to endorse the belief that emotions flow in and out of the human body in the form of a physical substance.

Studies 2 and 3 found that a substantial proportion of both Indian and American participants endorsed emotional residue (indicating that they would sense the residue of previous emotional experiences that took place in a space) but that Indians were more likely than Americans to endorse the belief. These studies demonstrated that a belief in emotional residue exists but that there are sizable cultural differences in the extent to which people explicitly state that they hold the belief. Study 4 conceptually replicated the findings of Studies 2 and 3 even in the absence of perceived demand effects and social desirability.

Whereas the previous studies found clear cultural differences in the extent to which people explicitly state that they would sense emotional residue, Studies 5 and 7 tested whether the cultural difference might decrease or disappear when the belief is measured

implicitly. Using the demand-free impression-formation technique, we did not find any cultural differences in the extent to which Indian and American participants appeared to believe that emotional residue would influence people's moods and behaviors. Study 6 ruled out valence priming as an alternative explanation for our findings.

Study 8 tested whether people believe that there are systematic sources of variation in emotional residue. We found that both Indians and Americans believe that emotions experienced by close others and by groups of people are more detectable than emotions experienced by strangers and single individuals, consistent with the property transmission heuristic (White, 2009).

Study 9 provided preliminary evidence that the belief in emotional residue not only influences people's judgments but also influences their behaviors: Both Indian and American participants were more likely to choose to complete a questionnaire in a room where previous participants experienced positive emotions rather than negative emotions. Furthermore, participants' choice of room was predicted by their belief in emotional residue.

Future Directions

Additional sources of variation in emotional residue. Although we examined only two sources of variation in emotional residue, a number of different factors might influence people's beliefs about whether they would sense emotional residue. For example, people might believe that emotional residue decays over time. Whereas magical contagion often does not decay over time, as characterized by the phrase "once in contact, always in contact" (Rozin et al., 1986, p. 704), people might believe that emotional residue decays because spaces continuously accumulate new emotional residue—if emotional residue did not decay, then all spaces occupied by humans would be saturated with emotional residue, and more recent residue might not be viewed as discriminable from previously accumulated residue.

People's beliefs about the detectability of emotional residue might also vary with the duration and intensity of the emotional experience. Whereas magical contagion is often insensitive to the duration of contact between a contaminated object and an uncontaminated object, as characterized by the principle of dose insensitivity (Rozin et al., 1992), if people view emotional residue as emanations whose potency depends on the source, they might believe that longer and more intense emotional experiences might generate more detectable and more impactful emotional residue. Future research can test whether manipulations of duration and intensity of the emotional experience influence people's judgments of emotional residue.

Although Study 3 did not provide evidence for negativity dominance, future research might more systematically test whether the principle of negativity dominance applies to emotional residue. According to this principle, negative entities are given greater weight than positive entities (Rozin & Royzman, 2001). That is, people might believe that negative emotions leave a more potent residue than positive emotions of similar intensity and duration. Beliefs in emotional residue might show negativity dominance because negativity dominance is a widespread bias evident among both humans and animals and is evident in diverse psychological processes such as attention, memory, and moral judgment (see Rozin & Royzman, 2001). Negativity bias is also visible in the

area of contagion; Rozin et al. (1989, p. 369) claimed that there is “a general tendency for negative contagion to be more salient than positive contagion for cases of forward action, to the point that, even with presumably positive sources (lovers and best friends), more subjects showed negative than positive effects.”

Consequences for behaviors. Future research might examine additional behavioral consequences of emotional residue, such as how much people will pay for a property that might have accumulated emotional residue. For example, information about the affective state of previous residents of a house might influence the amount that people would be willing to pay for the house. Belief in emotional residue might also influence people’s choices among different spaces in a manner that overrides other qualities of the space. For example, individuals might choose to work in an office that was previously inhabited by a cheerful employee rather than by a gloomy employee even if they did not know this employee personally, and perhaps even if the gloomy employee’s office was somewhat bigger or had a somewhat better view. People might also try to cleanse spaces that they believe are contaminated with emotional residue. For example, people in India often burn incense in newly purchased homes, presumably in part to cleanse them of accumulated residue, and even some people in the United States hire professionals to cleanse newly purchased homes (Haughney, 2011). Future research can examine these and other potential behavioral consequences of a belief in emotional residue.

Beliefs about other types of residue. Although we studied emotional residue in this research, people might also believe that other mental faculties, such as thoughts and motivations, also leave their residue in physical spaces. Indeed, in ancient Indian philosophical texts, emotions, thoughts, and desires are all thought to emanate from the body and accumulate externally over the lifetime (Thakar, 2006). For example, people might believe that someone who moves into a dorm room previously inhabited by a very motivated student would gradually become more hardworking. Future research can address these intriguing possibilities.

Conclusion

Most previous research has focused on contact between objects and similarity between objects as the mechanisms through which contagion occurs. The present research expands the scope of contagion to include physical space as a medium for the contagion of human experiences. Whereas many psychologists conceive of humans as self-contained, bounded individuals, many lay people might hold a more diffuse conception of the person, allowing for the frequent transfer of properties between individuals across time and space.

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