

# Contamination without contact: An examination of intention-based contagion

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## Abstract

Contagion refers to the belief that individuals or objects can acquire the essence of a particular source, such as a disgusting product or an immoral person, through physical contact. This paper documents beliefs in a "contact-free" form of contagion whereby an object is thought to inherit the essence of a person when it was designed, but never actually physically touched, by the individual. We refer to this phenomenon as contagion through creative intent or "intention-based contagion" and distinguish it from more traditional forms of contact-based contagion (Studies 1 and 2), as well as alternative mechanisms such as mere association (Studies 2 and 3a). We demonstrate that, like contact-based contagion, intention-based contagion results from beliefs in transferred essence (Study 1) and involves beliefs in transfer of actual properties (Study 4). However, unlike contact-based contagion, intention-based contagion does not appear to be as strongly related to the emotion of disgust (Study 1) and can influence evaluations in auditory as well as visual modalities (Studies 3a–3c).

Keywords: sympathetic magic, music, contagion, morality.

## 1 Introduction

People are averse to objects that were once in contact with disliked or disgusting sources such as a sweater worn by a serial killer, or a hat that belonged to a Nazi officer (Hood, 2009; Rozin, Haidt, McCauley, Dunlop & Ashmore, 1999; Rozin, Millman & Nemeroff, 1986). These phenomena are often explained by the *law of contagion* (Frazer, 1890/1959; Mauss, 1902/1972) — the belief that individuals or objects can inherit the 'essence' of a particular source through touch (Rozin et al., 1986). A growing literature within psychology has demonstrated that beliefs in contagion are quite pervasive and can influence people's attitudes and behaviors across a variety of contexts. Contagion beliefs have been shown to affect purchase decisions in: retail settings (Argo, Dahl & Morales, 2006; 2008; Morales & Fitzsimons, 2007); preferences for luxury goods (Newman & Dhar, 2014); auction behavior and collecting (Newman & Bloom, 2014; Newman, Diesendruck & Bloom, 2011); desires to keep sentimental possessions (Grayson & Shulman, 2000); gambling decisions (Mishra, Mishra & Nayakankuppam, 2009; Wohl & Enzle, 2002); predictions about the future (Stavrova & Meckel, 2016); ability and performance (Kramer & Block, 2014; Lee, Linkenauger, Bakdash, Joy-Gaba & Proffitt, 2011); preferences for sacred land (Rozin &

Wolf, 2008); and even the choice of organ transplant donors (Hood, Gjersoe, Donnelly, Byers & Itajkura, 2011; Meyer, Leslie, Gelman & Stilwell, 2013).

Historically, researchers have emphasized the importance of physical contact in motivating contagion effects. In fact, physical contact is central to how contagion has been defined in the literature (Rozin et al., 1986). More recently, however, a number of studies have documented apparent cases of contagion that seem to obtain in the absence of physical contact per se (Kim & Kim, 2011; Smith, Newman & Dhar, 2016). For example, Kim and Kim (2011) showed that not only objects touched by a murderer but also objects in his physical proximity are rated as less desirable. In another example, Smith et al. (2016) demonstrated that products (e.g., vinyl records) with earlier (vs. later) serial numbers are perceived as more likely to embody the "essence" of the artist and are valued more — a phenomenon the authors refer to as "temporal contagion".

The present studies document another form of "contact-free" contagion whereby objects are believed to acquire the essence of a person when they were designed, but never actually physically touched, by the individual — a process we refer to as *intention-based contagion*. Six experiments examine the similarities and differences between intention-based contagion and more traditional forms of contact-based contagion. We also distinguish intention-based contagion from other related phenomena such as mere associations. We demonstrate that, like contact-based contagion, intention-based contagion results from beliefs in transferred essence (Study 1) and therefore, individuals who show stronger belief in the transfer of essence are more likely to respond to

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intention-based contagion. Also, we show that, similar to contact-based contagion, intention-based contagion is subject to "negativity bias" (Rozin & Royzman, 2001) (Studies 1, 3a and 3c), shows a certain degree of permanence (Study 4), and involves beliefs in transfer of actual properties rather than just valence (Study 4). However, unlike contact-based contagion, we also demonstrate that intention-based contagion does not appear to be as strongly related to the emotion of disgust (Study 1), is restricted to spiritual characteristics such as morality (Studies 2 and 4), and can influence evaluations in auditory as well as visual modalities (Studies 3a–3c).

### 1.1 Theoretical background

The concept of contagion was first articulated by early 20<sup>th</sup> century anthropologists (Frazer, 1890/1959; Mauss, 1902/1972) as a way to describe rituals and cultural practices observed in many "primitive" societies, such as eating animals in the hope of taking on those animals' properties, or attaching one's own lock of hair to land as a means of establishing ownership. More recently, numerous studies have demonstrated that contagion beliefs are also evident in modern day American and European cultures (Hood et al., 2011; Kim & Kim, 2011; Kramer & Block, 2014; Newman et al., 2011; Rozin, Grant, Weinberg & Parker, 2007; Rozin et al., 1986; Rozin, Nemeroff, Wane & Sherrod, 1989), in adults and children (Diesendruck & Perez, 2015). For example, these studies have shown that individuals are reluctant to drink orange juice briefly touched by a sterilized cockroach, to wear a sweater touched by a Nazi (Rozin et al., 1986; Newman et al., 2011) or to accept a perfectly healthy heart transplant from a murderer (Hood et al., 2011; Meyer et al. 2013).

Interestingly, an aversion caused by a brief contact with a negatively-valenced source cannot be completely eradicated by different purification procedures, including sterilization, deodorizing or even burning, often interpreted as evidence of contagion's permanency: "once in contact, always in contact" (Nemeroff & Rozin, 1994). Further studies have shown that contagion can lead to the perception of objects actually acquire certain valenced characteristics of the source. For example, interviews have revealed that people thought of a sweater worn by a "creepy person" as "creepy" (Nemeroff & Rozin, 1994, p. 178). This idea is also reflected in the notion "you are what you eat", meaning that this particularly intimate instance of contact — ingestion — can allow the properties of the source (in this case, food) to transfer to the recipient (person). Indeed, a series of studies have demonstrated that for example, boar eaters are rated as more boar-like (aggressive, good runners) than turtle eaters (Nemeroff & Rozin, 1989).

Another hallmark of contagion beliefs is the so called "negativity bias" (Nemeroff & Rozin, 2002; Rozin et al.,

1986; Rozin & Royzman, 2001). According to this principle, individuals like items touched by immoral sources less than neutral items but do not necessarily prefer items from positively-valenced sources over identical neutral items (although instances of "positive contagion" have been documented in the literature as well (Newman et al., 2011; Mishra et al., 2009; Rozin & Wolf, 2008).

Importantly, the contagion effect is unlikely to be driven by general psychological processes, such as associations. For example, in a recent study, individuals showed less aversion to an object strongly associated with (but never touched by) somebody immoral (a brand-new copy of *Mein Kampf*) compared to an object with a weaker association but an intense contact with the source (Hitler's used English dictionary) (Fedotova & Rozin, 2016, Study 1). Signaling and impression management concerns have also been ruled out as potential sources of the contagion effect as well. In one study, individuals preferred to wear gloves when interacting with a child molester's shirt even if the "interaction" signaled absolute rejection of the shirt's owner (e.g., involved tearing the shirt apart) (Fedotova & Rozin, 2016, Study 3).

To date, the dominant psychological mechanisms associated with contagion have been disgust and the concept of a transferred essence. For example, individuals feel disgusted at potential sources of microbial contamination (spoiled food, animal and body products) and even when they can be assured that those sources are harmless, will avoid items that have come into contact with them. In a similar fashion, people may also feel disgusted at violations of moral principles (Danovitch & Bloom, 2009; Haidt, Rozin, McCauley & Imada, 1997; Rozin, Haidt, McCauley, Dunlop & Ashmore, 1999) and will avoid objects that have come into contact with immoral individuals, such as a serial killer or a Nazi.

Drawing from this similarity, researchers have often explained these cases of contagion in terms of a false application of microbial contamination to the domain of morality (Lindeman & Aarnio, 2007) — a conceptual 'blurring' of emotionally related, but ontologically distinct categories (Lindeman & Aarnio, 2007; Lindeman & Svedholm, 2012). Contagion beliefs emerge as individuals' knowledge of physical contamination (intuitive biology) is implicitly extended to disgusting but harmless objects (a sterilized cockroach) and ultimately, to sources of immorality. As a result, "we find that Hitler's personality can spread into his sweater" (Lindeman & Aarnio, 2007, p. 734). This idea is also reflected in a distinction between physical models of contagion, which describe a material transfer of germs or some residues, and spiritual models of contagion, in which some non-material essence of the source is transferred to the object (Nemeroff & Rozin, 1994).

Indeed, qualitative studies have shown that individuals often refer to some kind of "stuff" or "essence" contained in such objects and implicitly believe it might spread onto them

(Nemeroff & Rozin, 1994). This belief in the "transfer of essence" has been shown to explain individuals' preference for certain authentic products (Newman & Dhar, 2014; Smith et al., in press). For example, products with earlier serial numbers are believed to be more likely to contain "essence" of their creator (Smith et al., 2016); similarly, participants' preference for items from a company's original manufacturing location are explained by beliefs in the transfer of essence (Newman & Dhar, 2014).

## 1.2 Intention-based contagion and the extended self

The belief in the transfer of essence is also consistent with the notion of an "extended self". A number of researchers in psychology have proposed that the sense of self can extend beyond one's physical body and mental states and include one's possessions, relatives, friends, etc. (Belk, 1988; Beggan, 1992; Burris & Rempel, 2004; Dittmar, 1992; Dixon & Street, 1975; Newman, Smith & Bartels, 2014; Pierce et al., 2003). Under such a view, contagion effects may be construed as a way of conceptually representing extensions of a particular agent's identity (Newman, Smith & Bartels, 2014).

The majority of the research on the extended self has focused on possessions (Beggan, 1992; Belk, 1991; Pierce et al., 2003). However, possession is not the only way in which objects can be incorporated into the self-concept. Following Sartre (1943/1992), researchers have suggested that intentional creation may also be an important way in which objects can be regarded as a part of the extended self. For example, Belk (1988) writes, "handcrafted pieces to the craftsman, and artworks to the artist may become a part of extended self, because we have intentionally worked upon or created these things, investing both energy and self in them" (Belk, 1988, p. 151). Supporting this idea, recent research has shown that people tend to value items they create themselves more than perceptually identical items created by others — the so-called, "IKEA effect" (Norton, Mochon & Ariely, 2012).

Consequently, intentional creation may be relevant for understanding the concept of contagion. We suggest that when a person creates an object, that object may be more likely to be seen as part of the extended self. As a result, objects that were created, but never actually touched by particular individuals, may be perceived as embodying the creator's essence. This suggests an important theoretical similarity between contact- and intention-based contagion: like contact-based contagion, beliefs in transferred essence may also play a critical role in explaining intention-based contagion. In our view, this similarity is explained by a common "spiritual model of contagion" (Nemeroff & Rozin, 1994), in which some non-material essence of the source person is believed to transfer to the object.

However, in contrast to contact-based contagion, we sug-

gest that intention-based contagion can operate without any physical contact between the person and the object. Creation itself does not necessarily imply physical contact, and therefore, intention-based contagion potentially has a much larger scope than contact-based contagion. Further, unlike contact-based contagion, intention-based contagion may affect valuation of non-physical goods, such as music, cooking recipes, literary work and ideas in general.

## 1.3 Overview

In the present studies, we examine whether the process of intentional creation can give rise to contagion beliefs. Study 1 compares *intention-based contagion* to the more "classic" form of contagion via touch (*contact-based contagion*). Study 2 disentangles intention-based contagion from an association account by showing that it applies to immoral but not unhealthy sources. Study 3 (a, b and c) explores whether intention-based contagion can affect valuation of non-material goods, such as a piece of music. Finally, Study 4 examines whether intention-based contagion shares two further characteristics with contact-based contagion: belief in transfer of actual properties, and permanency (Nemeroff & Rozin, 1989; Rozin et al., 1986).

## 2 Study 1

Study 1 explores whether the moral characteristics of a person affect the valuation of a product that was designed by, but never touched by, the person. Specifically, we compare intention-based contagion to the classic "physical contagion scenario", in which a target person touches an object. We did not have any specific predictions regarding which process — contact or creation — might elicit a stronger reaction. However, based on the literature on the extended self presented above, we did predict that both contact- and intention-based contagion share a mechanism of "transferred essence" — i.e., both effects are related to the perception that the item has acquired the essence of the person who designed/touched it.

In addition, Study 1 explored how contact- and intention-based contagion effects might differ. Taking into account a more physical nature of contact- versus intention-based contagion, we expected the emotion of disgust might be more important in driving the contact-based contagion effect. Therefore, we asked participants to imagine whether touching contact- vs. intention-based contagion objects would elicit the emotion of disgust.

### 2.1 Method

We recruited 301 adults from Amazon Mechanical Turk, with a benchmark of 50 participants per cell (Buhrmester, Kwang & Gosling, 2011). Participants were randomly assigned to one of 6 experimental conditions in a 2 (contact-

vs. intention-based contagion) x 3 (morality: moral vs. immoral vs. neutral) between-subjects design. In all conditions, participants were shown a picture of a unisex sweater. To manipulate the type of contagion, participants were asked to imagine that the sweater was either worn by the target person (contact condition) or that the sweater was designed but never touched by the target person (intention condition) (i.e., "This person did not touch the sweater in any way; they merely provided the design"). To manipulate the morality of the target, the person was either described as "someone who is incredibly moral and a pillar of the community" (moral) or "an evil person who was recently sent to prison" (immoral). In the neutral conditions, participants were shown the picture of the same sweater but were not provided with any further information regarding who owned or designed it.

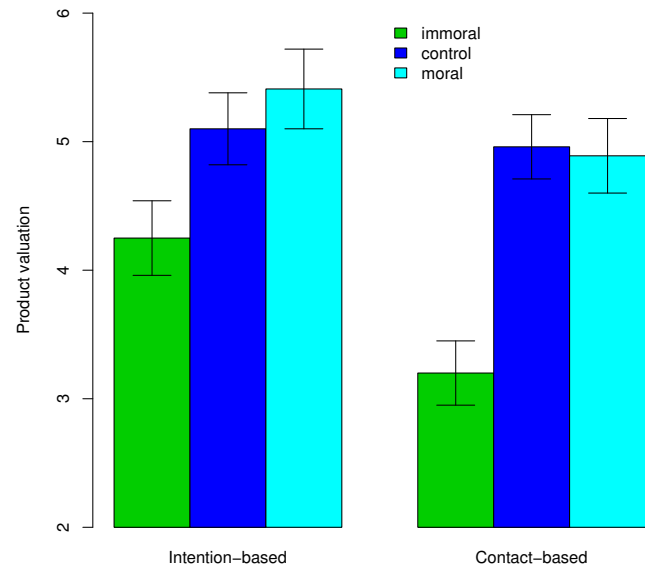
Following, participants responded to several measures designed to measure their valuation of the sweater. Specifically, participants rated how much they liked the sweater, the quality of the sweater, how much they would like to own it, whether they would buy it if it was for sale, whether they would like to hold it in their hands and whether they would like to wear it (9-point scales, 1 = "not at all", 9 = "a lot"). These measures were averaged to produce a single measure of valuation (Cronbach's  $\alpha = .95$ ).

Next, participants in all conditions responded to six questions, which measured how strongly they endorsed a process of 'transferred essence'. For example, "How strongly does this sweater reflect its designer's / prior owner's sense of self?", "How much of the designer's / prior owner's essence does this sweater contain?" (see supplementary materials for all items). We additionally adapted a pictorial measure developed by Aron, Aron & Smoller (1992), which consisted of overlapping circles. One circle was labelled "sweater", while the other circle was labelled "designer" / "owner" (depending on the condition). The scale varied the distance between the two circles and participants were asked to indicate which picture best described the degree of connection between the sweater and the owner/designer. This item was scored on a scale from 1 (farthest circles) to 7 (closest circles). All seven (six verbal and one pictorial) items were combined into a scale of transferred essence (Cronbach's  $\alpha = .94$ ).

Afterwards, participants were asked to imagine wearing the sweater and were asked to indicate the extent to which this experience would make them feel disgusted and repulsed (combined into a single measure of disgust,  $r = .88$ ). For exploratory reasons, we included other emotions (ashamed, embarrassed, guilty (Cronbach's  $\alpha = .96$ ); angry, outraged (Cronbach's  $\alpha = .93$ ); happy, proud (Cronbach's  $\alpha = .94$ ); and, scared, distressed (single items). The emotion questions were all answered on a 9-point scale (1 = "not at all", 9 = "a lot") and were presented in a different random order to each participant.

Finally, as a manipulation check, participants indicated whether the owner/designer of the sweater was a moral per-

Figure 1: Mean ratings of product valuation, Study 1. (Errors bars are standard errors.)



son (yes / no) and whether that person had physically touched the sweater (yes / no).<sup>1</sup> Participants in the contact condition were more likely to indicate that the source person had physically touched the sweater than participants in the intention condition ( $\chi^2(1) = 110.83, p < .001$ ); this effect did not differ by morality condition (contagion type x morality interaction in a logistic regression:  $\exp(b) = .33, p = .28$ ). Forty-two participants failed to correctly answer at least one of two manipulation check questions and were excluded, resulting in the final sample of 259 individuals (103 women,  $M_{age} = 35.51, SD_{age} = 12.42$ ). At the end of the study, participants answered a series of demographic questions.

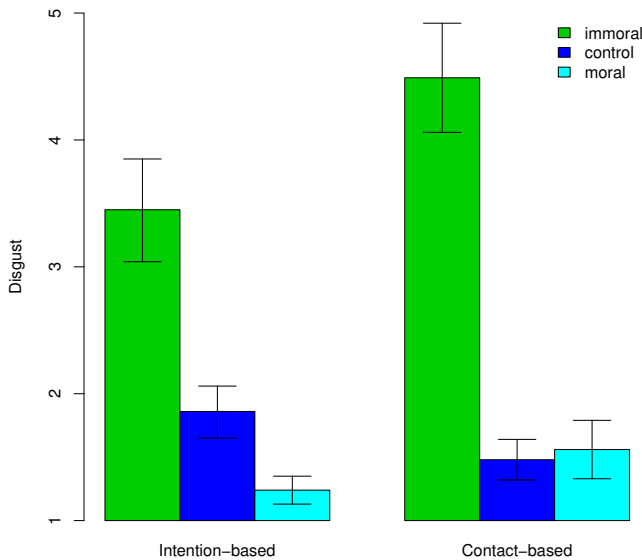
## 2.2 Results

We conducted a 2 (contagion type: contact vs. intention) x 3 (morality: moral vs. immoral vs. neutral) x 2 (response: valuation vs. disgust) mixed ANOVA with the latter factor modeled as a within-subject factor. We detected a significant three-way interaction,  $F(2, 253) = 3.28, p = .039$ , partial  $\eta^2 = .03$ , suggesting that the interaction between contagion type and morality differentially affected valuation vs. disgust rating. Therefore, we further examined the effects of the manipulated factors on valuation and disgust separately.

**Valuation.** We conducted a 2 (contagion type: contact vs. intention) x 3 (morality: moral vs. immoral vs. neutral) ANOVA with participants' ratings of valuation as the de-

<sup>1</sup>Participants in the moral condition were more likely to rate the source person as moral than participants in the immoral condition ( $\chi^2(1) = 120.95, p < .001$ ); this effect did not differ by condition (contagion type x morality interaction in a logistic regression:  $\exp(b) = 2.14, p = .41$ ).

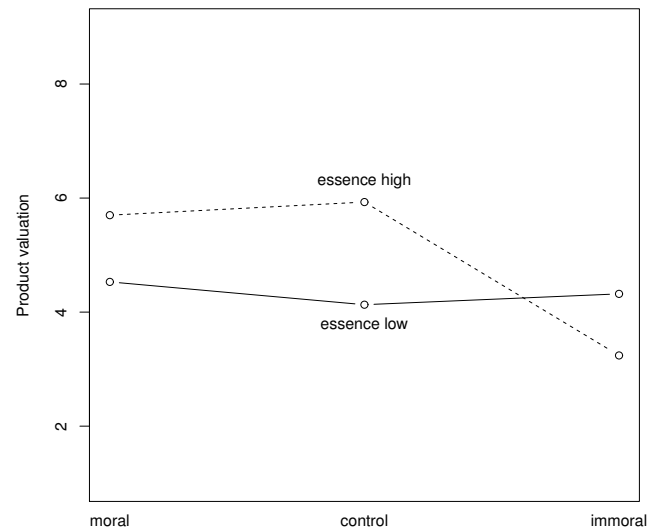
Figure 2: Mean ratings of disgust, Study 1. (Errors bars are standard errors.)



pendent variable. This analysis indicated a significant main effect of morality,  $F(2, 253) = 15.49, p < .001$ , partial  $\eta^2 = .11$ , and no contagion type  $\times$  morality interaction (see Figure 1),  $F(2, 253) = 1.42, p = .24$ . In the contact conditions, a planned contrast indicated that a sweater worn by an immoral person was valued significantly less ( $M = 3.20, SD = 1.65$ ) than a sweater worn by a moral person ( $M = 4.89, SD = 1.88, d = .96$ ) or a neutral person ( $M = 4.96, SD = 1.73, d = 1.04$ ),  $t(132) = 5.35, p < .001$ . Similarly, in the intention conditions, a sweater designed (but never touched) by an immoral person was valued significantly less ( $M = 4.25, SD = 1.78$ ) than a sweater designed by a moral person ( $M = 5.14, SD = 1.83, d = .44$ ) or a neutral person ( $M = 5.10, SD = 2.01, d = .64$ ),  $t(121) = 2.70, p < .008$ . Valuation of the sweater associated with a moral person did not differ from the neutral person in either the contact ( $p = .37$ ) or intention ( $p = .46$ ) conditions.

**Disgust.** To examine the role of disgust, we conducted a 2 (contagion type: contact vs. intention)  $\times$  3 (morality: moral vs. immoral vs. neutral) ANOVA with participants' ratings of disgust as the dependent variable. We found a significant effect of morality,  $F(2, 253) = 48.59, p < .001$ , partial  $\eta^2 = .28$ , qualified by a significant interaction with contagion type,  $F(2, 253) = 3.38, p = .036$ , partial  $\eta^2 = .03$ . As seen in Figure 2, the difference in disgust elicited by a sweater worn by an immoral person was greater than the disgust elicited by a sweater designed but never touched by an immoral person. The effect of morality on the other emotion scales (negative self-conscious, anger and positive emotions, distress, fear) did not differ by contagion type (all morality  $\times$  contagion type interaction  $ps > .18$ ).

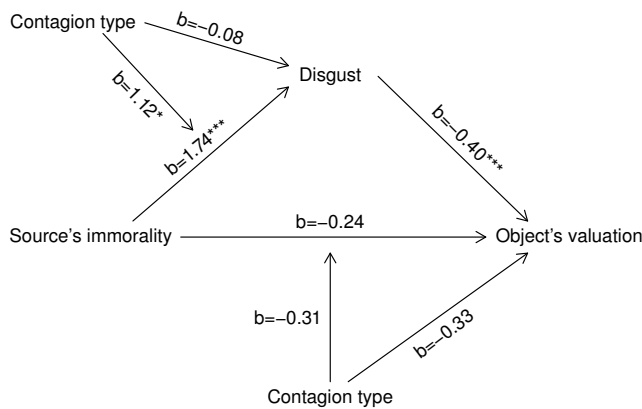
Figure 3: Effect of moral contagion on valuation estimated for a low and a high (+/- 1 SD) level of essence belief, Study 1.



**Transferred Essence.** To examine the role of essence beliefs, we then ran the 2 (contagion type: contact vs. intention)  $\times$  3 (morality: moral vs. immoral vs. neutral) ANOVA with participants' ratings of valuation as the dependent variable and beliefs in 'transferred essence' entered as a covariate. This analysis indicated a significant 2-way interaction between morality and essence belief,  $F(2, 247) = 17.13, p < .001$ , partial  $\eta^2 = .12$ . A simple slope analysis (Figure 3) revealed that the effect of morality on product valuation was restricted to participants with a high (+1 SD) essence belief, ( $M_{\text{dif(moral-immoral)}} = 2.46, p < .001$ ;  $M_{\text{dif(control-immoral)}} = 2.70, p < .001$ ). Participants with a low (-1 SD) essence belief did not show a difference in valuation based on morality (all  $ps > .30$ ). The three-way interaction was not significant ( $p = .55$ ). This was true for both contact-based contagion and intention-based contagion. Thus, the effect morality was moderated by essence belief in both the contact contagion ( $F_{\text{morality} \times \text{essence}}(2, 129) = 7.18, p = .001$ , partial  $\eta^2 = .10$ ) and intention contagion ( $F_{\text{morality} \times \text{essence}}(2, 118) = 9.89, p < .001$ , partial  $\eta^2 = .14$ ) conditions.

**Mediation analysis.** Finally, we examined whether the effect of morality on valuation was mediated by disgust and whether this indirect effect was stronger in contact- than in intention-based contagion. Therefore, we used a moderated mediation analysis (Model 8 in Hayes, 2013; 5,000 resamples), with morality of the source person as independent variable, the emotion of disgust as a mediator and contagion type as a moderator. The statistically significant interaction between the morality and contagion type on disgust ( $b = 1.12, p = .02$ ) implies that the indirect effect of morality on valuation through disgust is moderated by contagion type

Figure 4: Moderated mediation analysis, Study 1.



DV: Disgust:  $R^2 = .30, F_{4,254} = 26.60, p < .001$   
 DV: Object's valuation:  $R^2 = .28, F_{5,253} = 19.27, p < .001$   
 Intention-based contagion, indirect effect:  $-.69, SE = .20, 95\% C.I. [-1.11, -.34]$   
 Contact-based contagion, indirect effect:  $-1.13, SE = .25, 95\% C.I. [-1.68, -.68]$

(Preacher, Rucker & Hayes, 2007). Given this interaction, we estimated conditional indirect effects in the intention and contact contagion conditions. In case of intention-based contagion, the conditional indirect effect of morality on sweater's valuation through disgust was  $b = -.69, SE = .20, 95\% CI [-1.11; -.34]$ ; whereas in case of contact-based contagion, it was nearly twice the magnitude,  $b = -1.13, SE = .24, 95\% CI [-1.68; -.68]$  (see Figure 4 for the complete model). Hence, the emotion of disgust appeared to be a more important factor driving contact- than intention-based contagion.

### 2.3 Discussion

Study 1 provided the first demonstration of contagion through creative intent: a sweater designed but never physically touched by an immoral individual was valued less than an identical sweater designed by a moral or neutrally described person. More specifically, these results demonstrate the nuanced similarities and differences between contact- and intention-based contagion.

Most importantly, the effects of both contact- and intention-based contagion depend on belief in the transfer of essence. Individuals who endorsed the belief in transferred essence were more likely to devalue a product touched *or designed* by an immoral person than individuals who did not endorse this belief. We believe this finding to be particularly important as it provides some initial evidence that the intention-based contagion effect represents an instance of contagion rather than other more basic processes.

For example, learning that a clothing designer is an evil person may lead one to avoid their clothes simply because they do not want to support such views. However, avoiding

such products to show one's disapproval of their creators' actions should not depend on individuals' subjective beliefs in essence transfer. Therefore, our finding that only individuals who believed in the concept of essence transfer showed an intention-based contagion effect provides initial evidence against this explanation.

A second important similarity between the contact-versus intention-based contagion effects was the specific differences in valuation across the three moral targets (moral, neutral and immoral). Consistent with prior findings on physical contagion, the cases of intention-based contagion showed a characteristic "negativity bias". That is, items associated with immoral individuals were valued significantly less than items associated with moral or neutral individuals. However, moral versus neutral sources did not differ from one another.

We also identified key differences. In particular, one difference between contact- and intention-based contagion effects was that imagining wearing a sweater previously used by an evil person evoked more disgust than imagining wearing a sweater designed but never touched by an evil person. In addition, as indicated by the moderated mediation analysis, the emotion of disgust could better account for contact- than for intention-based contagion effect. This finding highlights the more physical, disgust-driven nature of contact- versus intention-based contagion. Note, however, that there was a significant effect of disgust even in the intention conditions.

Having documented initial similarities and differences between contact- and intention-based contagion, the aim of Study 2 was to examine a potential alternative explanation of intention-based contagion. Namely, what we call intention-based contagion effect might actually reflect a more basic associative mechanism. Associative effects have long been acknowledged in attitude research (Dimofte & Yalch, 2011; Waltner, 2002) and it may be that the sweater designed by an immoral person was valued less because of just such an associative valence transfer. Importantly, according to the associative account, any valenced characteristic of one stimulus can be "transferred" to another stimulus (Dimofte & Yalch, 2011; Waltner, 2002). In contrast, intention-based contagion — as a type of spiritual contagion (Nemeroff & Rozin, 1994) — primarily operates with respect to "spiritual" characteristics, such as morality. Therefore, Study 2 examined intention- (and contact-) based kinds of transfer with respect to two types of characteristics: immorality (spiritual) and disease (physical). We expected intention-based contagion effect to emerge only with respect to morality, and we expected contact-based contagion effect to occur with both immoral and diseased sources.

### 3 Study 2

As in Study 1, participants read about an item that was either worn or designed by a person. Between-subjects we

manipulated whether the person was described as healthy (vs. unhealthy) or whether the person was moral (vs. immoral). With respect to intention-based contagion, we predicted that the manipulation of an item *designed by a moral vs. an immoral* person should affect its valuation, replicating the results of Study 1. In contrast, the manipulation of an item *designed by a healthy vs. an unhealthy* person should not result in a difference in valuation. With respect to contact-based contagion, we did not expect substantial differences as a function of the type of the characteristic being transferred. Note that an association mechanism predicts both contact- and intention-based contagion effects to emerge with respect to any valenced characteristic, be it morality or health.

### 3.1 Method

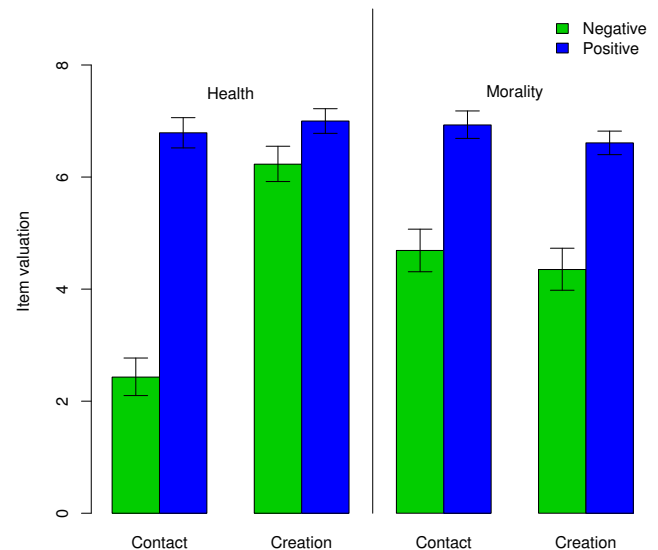
We recruited 408 adults from Amazon Mechanical Turk. Seven participants did not finish the study and were not considered in the analyses, resulting in the final sample of 401 adults (153 women,  $M_{age} = 32.30$ ,  $SD_{age} = 11.79$ ). Participants were randomly assigned to one of 8 experimental conditions in a 2 (transfer: contact vs. intentional creation) x 2 (attribute: morality vs. health) x 2 (valence: positive vs. negative) between-subjects design. In all conditions, participants were asked to imagine that they were shopping for a coat and found an appealing one at (contact: a second-hand shop / intentional creation: a local retail store). The stimuli presented were as follows:

*Now suppose that you learn that the coat was once (contact: worn by / intentional: designed by) a local artist who (health-negative: suffers from a contagious lung disease / health-positive: is in perfect health / moral-negative: is evil and was recently sent to prison / moral-positive: is incredibly moral and a pillar of the community).*

Participants next responded to several measures designed to elicit valuation of the coat. Specifically, participants indicated how much they would like to own this coat, whether it was worth keeping or whether they would rather throw it out, whether they would buy it if it was for sale (in all conditions, participants read that the money will go to the store that is selling the coat), whether they would like to hold it in their hands and whether they would like to wear it. These measures were averaged to produce a single measure of valuation (Cronbach's  $\alpha = .97$ ).

Finally, as a manipulation check, participants indicated how healthy (only in the four health conditions) or how moral (only in the four morality conditions) the previous owner (vs. the designer) of the coat was, as well as how much physical contact he had with the coat. All responses were given on a 9-point scale (ranging from 1 = 'not at all' to 9 = 'very much'). As expected, participants in the contact conditions reported that the person had more physical contact with the

Figure 5: Mean ratings of product valuation, Study 2. (Errors bars are 95% confidence intervals.)



coat ( $M = 7.10$ ,  $SD = 2.13$ ) than participants in the creation conditions ( $M = 1.80$ ,  $SD = 1.95$ ),  $t(397,408) = 26.08$ ,  $p < .001$ ; participants in the moral ( $M = 8.43$ ,  $SD = 1.39$ ) conditions rated the person as more moral than participants in the immoral conditions ( $M = 1.74$ ,  $SD = 1.43$ ),  $t(199) = -33.61$ ,  $p < .001$ ; and participants in the healthy ( $M = 8.28$ ,  $SD = 1.39$ ) conditions rated the person as healthier than participants in the unhealthy condition ( $M = 1.50$ ,  $SD = 1.15$ ),  $t(191,153) = -37.53$ ,  $p < .001$ . There were no interactions with the type of transfer on either health,  $F(1, 197) = 1.00$ ,  $p = .32$ , or morality,  $F(1, 196) = .01$ ,  $p = .91$ , ratings. At the end, participants answered a series of demographic questions.

### 3.2 Results

We conducted a 2 (transfer: contact vs. intentional creation) x 2 (attribute: morality vs. health) x 2 (valence: positive vs. negative) ANOVA with participants' ratings of value as the dependent variable. This analysis indicated a significant three-way interaction,  $F(1, 393) = 17.95$ ,  $p < .001$ ,  $\eta^2 = .04$ . To explore the nature of this interaction, we then conducted separate analyses for the morality and health domains.

The main results of these analyses are depicted in Figure 5. Consistent with our predictions, in the domain of morality, the preference for a coat from a moral vs. immoral source was present in both the contact conditions ( $M_{dif} = 2.24$ ),  $F(1, 196) = 26.25$ ,  $p < .001$ ,  $\eta^2 = .12$ , as well as the intentional creation conditions ( $M_{dif} = 2.26$ ),  $F(1, 196) = 25.63$ ,  $p < .001$ ,  $\eta^2 = .12$ . Interestingly, these effects were of the same magnitude, and the transfer x valence interaction was not significant  $F(1, 196) = .001$ ,  $p = .97$ .

In contrast, in the domain of health, we observed a transfer  $\times$  valence interaction,  $F(1, 197) = 38.29, p < .001, \eta^2 = .16$ . In the contact condition, a coat from a healthy source was valued more than a coat from an unhealthy source ( $M_{\text{dif}} = 4.36$ ),  $F(1, 197) = 113.27, p < .001, \eta^2 = .37$ , whereas in the intentional creation condition, the difference between the healthy vs. unhealthy source was much smaller and did not reach the conventional level of significance ( $M_{\text{dif}} = .77$ ),  $F(1, 197) = 3.45, p = .07, \eta^2 = .02$ .

### 3.3 Discussion

In sum, we observed that the morality of the source was important for both contact- as well as intention-based contagion. Importantly, the manipulation of the health of the source affected the valuation of the coat only in the contact-based condition but not in the intention-based contagion condition. These results suggest that — in contrast to what the associative account predicts — intention-based contagion does not involve beliefs in transfer of any valenced characteristic but is restricted to spiritual characteristics, such as morality. Together with the results of Study 1 showing that like contact-based contagion, intention-based contagion results from individuals' beliefs in transferred essence, the findings of Study 2 further corroborate our suggestion that despite its "contact-free nature", intention-based contagion most likely represents an instance of contagion rather than mere associations. At the same time, its independence from physical contact gives the intention-based contagion the potential to extend to nonmaterial goods — what we then pursued in Study 3.

## 4 Study 3

Study 3 examined whether intention-based contagion extends to the evaluation of non-material goods: music. It comprises three experiments. Study 3a provided the first demonstration of intention-based contagion with respect to music and addressed an alternative associative explanation, using a different paradigm than in Study 2. Study 3b showed that intention-based contagion affects not only self-reported but also behavioral measures of valuation. Study 3c replicated the intention-based contagion effect in a non-western cultural context.

## 5 Study 3a

In Study 2, we attempted to address the alternative associative explanation by comparing the transfer of disease contaminants vs. moral characteristics. In Study 3a, we attempted to rule out an associative explanation using a slightly different paradigm rooted in evaluative conditioning research (Waltner, 2002). We asked participants to read a newspaper clip-

ping describing a moral act vs. an immoral act while listening to a piece of music. In the intention contagion condition, the moral vs. immoral act was attributed to the composer of the music, whereas in the mere association condition, participants were just simultaneously exposed to the music and the newspaper clipping. If the intention-based contagion effect can be completely accounted for by the associations between the target person and the stimulus, we should find that the moral characteristics of the person affect valuation of the music to (roughly) the same extent regardless of whether the target individual is specified as the composer versus not.

### 5.1 Method

For this study, we recruited 243 adults from Amazon Mechanical Turk. Participants were randomly assigned to one of 5 experimental conditions: (1) moral contagion: the moral newspaper article was about the composer, (2) immoral contagion: the immoral newspaper article was about the composer (3) moral association: the moral newspaper article was unconnected to the composer (4) the immoral newspaper article was unconnected to the composer, and (5) control condition (no newspaper article). In four experimental conditions, participants were asked to read a newspaper clipping. While reading, they listened to a piece of drum music (unknown author, duration 1:00 minute). In the moral condition, participants read a newspaper clipping about a man who risked his own life to save a stranger; in the immoral condition, the article was about a man convicted for school shooting. Participants that were assigned to the intention-based contagion conditions additionally learned that the person described in the newspaper was the composer of the music being played. In the control condition, participants were asked just to listen to and evaluate a piece of music.

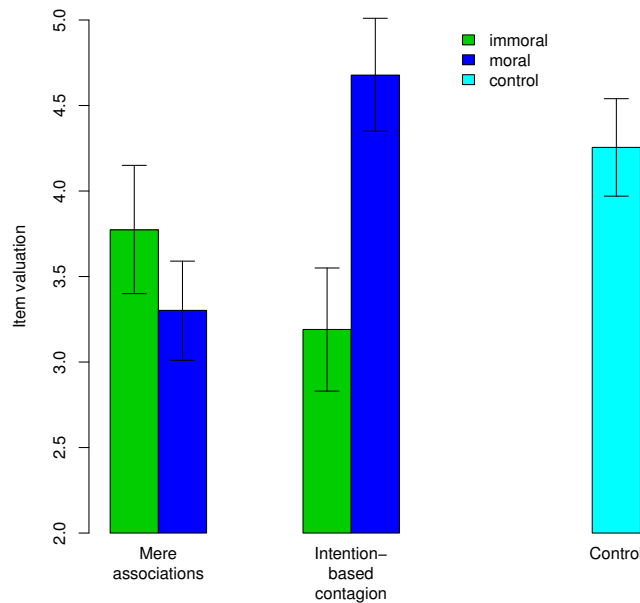
Participants were asked to indicate how much they liked the piece of music (1 = "not at all", 9 = "a lot") and whether they would like to purchase it if it was for sale. The responses to these two questions were combined to a measure of music valuation ( $r = .74, p < .001$ ). Following, participants filled in the PANAS-X scale (measured for exploratory reasons, not analyzed here) and indicated whether the music played was composed by the person that they read about at the beginning of the survey (yes/no; used as a manipulation check). Fifteen participants failed the manipulation check, leaving a final sample of 228 individuals (87 women,  $M_{\text{age}} = 32.15, SD_{\text{age}} = 9.90$ ). At the end, participants answered a series of demographic questions and were debriefed.

### 5.2 Results

**Valuation.** To examine whether the valence transfer occurred in both contagion and association conditions to the same extent, we conducted a 2 (morality: moral vs. immoral)  $\times$  2 (association type: intention-based contagion vs.



Figure 6: Music valuation by condition, Study 3a. (Errors bars are 95% confidence intervals.)



association) ANOVA with the valuation of the music as the dependent variable. This analysis indicated a significant morality x association type interaction,  $F(1,175) = 8.43$ ,  $p = .004$ , partial  $\eta^2 = .05$ . As predicted, the composer's morality affected participants' evaluation of the music in the intention contagion conditions,  $F(1,175) = 9.36$ ,  $p = .003$ , partial  $\eta^2 = .05$ , but not in the association condition ( $p = .32$ ). In the contagion condition, participants liked the music ostensibly composed by an immoral composer considerably less ( $M = 3.19$ ,  $SD = 2.31$ ) than the same music said to be composed by a moral composer ( $M = 4.68$ ,  $SD = 2.22$ ),  $F(1,176) = 9.36$ ,  $p = .003$ , partial  $\eta^2 = .05$ .

**Comparison with the control condition.** Next we compared the moral/immoral composer conditions to the control condition. A one-way ANOVA yielded a significant effect of morality,  $F(2,133) = 5.43$ ,  $p = .005$ ,  $\eta^2 = .08$ . A planned contrast analysis (immoral condition coded as -2 and both moral and control conditions coded as 1) showed that consistent with the negativity bias, participants liked the music that they thought was composed by an immoral composer substantially less ( $M = 3.19$ ,  $SD = 2.31$ ) than the music ostensibly composed by a moral ( $M = 4.68$ ,  $SD = 2.22$ ,  $d = .69$ ) or a neutrally described composer ( $M = 4.26$ ,  $SD = 1.96$ ,  $d = .50$ ),  $t(133) = 3.18$ ,  $p = .002$ . The difference between the moral and the control condition was not significant ( $p = 1.00$ ). A comparison of music valuation in the association conditions with the control condition was not significant,  $F(2,138) = 2.35$ ,  $p = .10$ . The results are depicted in Figure 6.

### 5.3 Discussion

Study 3a demonstrated that contagion beliefs affect the evaluation of a piece of music and showed that the simple associative transfer of valence is unlikely to explain the contagion effect on music appreciation. The mere simultaneous exposure to the information about a moral vs. immoral person did not change valuation of the music. The valence transfer happened only when the source person invested creative efforts in the product, suggesting that intention-based contagion cannot be completely accounted for by mere associations.

So far, we have demonstrated intention-based contagion effect with respect to valuation and aesthetic appreciation. Study 3b extends these findings to actual behavioral choices. It also investigates whether intention-based contagion could have been a result of experimenter demand effect.

## 6 Study 3b

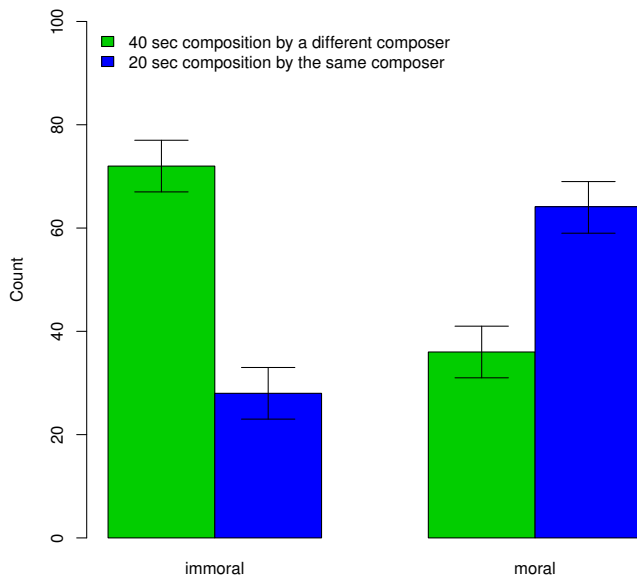
In this study we examined whether intention-based contagion has a downstream effect on actual behavior. Participants first listened to music composed by a moral (vs. immoral) person. Then, they were asked to choose between listening to a second piece of music by the same composer or a longer piece by a different composer. We expected that participants in the immoral condition would be more likely to choose a longer composition by a different musician, just to avoid listening to another composition by the immoral musician. To investigate whether the experimenter demand effect played a role in our results, participants also completed the Perceived Awareness of the Research Hypothesis scale (Rubin, Paolini & Crisp, 2010).

### 6.1 Method

200 adults recruited from Amazon Mechanical Turk completed the survey. Participants were randomly assigned to one of 2 experimental conditions (morality: moral vs. immoral) in a between-subject design.

In both conditions, participants were asked to rate two pieces of music. While listening to the first piece of music (the same as in Study 3, duration: 20 seconds), participants read that "the music that is being played was composed by John Kegan, a hobby musician and songwriter". In the immoral condition, participants learned that "John has been recently found guilty of murder. He killed 20 first-graders and six educators with a handgun in a school shooting". In the moral condition participants learned that "John is a very brave and compassionate person. He has recently become a hero after he rescued five people trapped inside a burning house". When the music stopped, participants were asked to use a 9-point scale (ranging from 1 = "not at all" to 9 = "very much") to indicate how much they liked the music and asked what piece of music they would like to listen to

Figure 7: Participants' choices by condition, Study 3b. (Errors bars are standard errors.)



next: "another drum composition by John (duration: 20 seconds)" or "a drum composition by a different hobby musician (duration: 40 seconds)". This choice constituted the focus dependent variable in this study. Participants then listened to the piece they had selected and rated it on a 9-point scale. Next, they indicated whether the first clip of music that had been played was composed by a hobby musician "who saved several people from a burning building" (vs. "found guilty of murder"; yes/no choice), which was used as a manipulation check question. Eight participants failed to correctly respond to the manipulation check question, resulting in the final sample of 192 individuals (66 women,  $M_{age} = 35.32$ ,  $SD_{age} = 44.67$ ).

Following, participants answered a series of demographic questions and completed the Perceived Awareness of the Research Hypothesis (PARH) scale, aimed at capturing the potential influence of demand characteristics (Rubin et al., 2010) (sample item: "I knew what the researchers were investigating in this research"; Cronbach's  $\alpha = .92$ ). Responses were given on a 7-point scale ranging from 1 = "strongly disagree" to 7 = "strongly agree". At the end, participants were debriefed.

## 6.2 Results

First, an independent sample t-test showed that the music composed by an immoral musician was liked less ( $M = 3.70$ ,  $SD = 2.31$ ) compared to the same music said to be composed by a moral musician ( $M = 4.79$ ,  $SD = 2.30$ ),  $t(190) = -3.27$ ,  $p = .001$ ,  $d = .47$ , replicating previous results.

Among the participants who listened to a piece by an immoral musician first, 72% preferred to listen to a two

times longer piece of music by a different author; among the participants who listened to the same piece said to be composed by a moral author, only 35.9% opted for a longer piece by a different musician ( $\chi^2(1) = 25.24$ ,  $p < .001$ ) (Figure 7).

Next, to examine whether participants' awareness of the research hypotheses could have influenced their responses, we conducted a regression analysis with the valuation of the first piece of music as dependent variable, the morality factor (1 = moral, 0 = immoral), participants' (standardized) scores on the PARH scale and their interaction as independent variables. The model explained 7% of variance in music valuation,  $F(3, 187) = 5.51$ ,  $p = .001$ . The morality factor ( $\beta = .28$ ,  $p < .001$ ) and PARH ( $\beta = .17$ ,  $p = .075$ ) positively predicted music valuation. Importantly, their interaction was not significant ( $\beta = .01$ ,  $p = .96$ ), suggesting that the effect of the morality factor was not influenced by participants' awareness of the research hypothesis. To explore whether the morality effect on participants' choice of the second piece of music was affected by demand characteristics, we conducted a logistic regression analysis with the choice (1 = 20 seconds piece by the same composer, 0 = 40 seconds piece by a different composer) as the dependent variables, the morality factor (1 = moral, 0 = immoral), participants' (standardized) scores on the PARH scale and their interaction as predictors. Only the effect of morality reached significance ( $\exp(b) = 4.75$ ,  $p < .001$ , 95% CI [2.55; 8.86]); neither participants' PARH scores nor their interaction with the morality factor were significant ( $ps > .47$ ).

## 6.3 Discussion

Study 3b demonstrated that individuals' aversion to the music composed by an immoral person is reflected not only in their valuation ratings but also in behavioral choices. Participants sacrificed their time just to avoid hearing another piece ostensibly created by a murderer. Additionally, this study showed that the intention-based contagion effect did not depend of participants' awareness of our research hypothesis, suggesting that the experimenter demand effects are unlikely to explain the present findings.

## 7 Study 3c

Psychological research has been criticized for relying on samples drawn from Western industrialized countries (Henrich, Heine & Norenzayan, 2010). Therefore, to ensure that the intention-based contagion effect is not restricted to American internet users, Study 3c tested intention-based contagion among undergraduate students in Tanzania.

With respect to contagion beliefs, Tanzania makes an interesting cultural comparison because in first documenting the concept of contagion in the late 19<sup>th</sup> century, Frazer (1890)

discussed several examples of contagion beliefs arising in tribal cultures in Eastern Africa, including the present-day Tanzania territory. Since then, nearly all examinations of contagion have been among U.S. participants and a couple of studies have been conducted with Indian adults (Meyer et al., 2013) and Asian Indian children (Hejmadi, Rozin & Siegal, 2004). A study of contagion beliefs with individuals living in modern-day African society provides an interesting opportunity to explore whether contagion beliefs also persist in locations where they were initially observed.

## 7.1 Method

Two-hundred and thirty ( $M_{\text{age}} = 24.58$ ,  $SD_{\text{age}} = 3.88$ , 123 men) students from two universities in Iringa town (Tanzania) participated in this study at the beginning of a class. They were asked to listen to "a short piece of music composed by a well-known artist and answer some questions regarding their appreciation of the music." We used two pieces of music: either a piano piece (Mike Foerstner, "Goodbye", duration 2:33) or a drum piece (unknown author, duration 2:27). As the kind of music had no effect on dependent variables, neither did it interact with the manipulated factor (all  $ps > .58$ ), we dropped it from further analyses. In the moral condition, participants learned that the music was composed by a musician "well known for his humanitarian engagement, a kind and caring person promoting the interests of the poor and the needy". In the immoral condition, participants learned that the music was composed by a musician who "has been recently convicted of a series of violent murders and is currently in prison". The complete wording is given in the Appendix. In the control condition, no information about the author was provided.

Participants were asked to rate this piece of music on the following dimensions: beautiful, repulsive (reverse-coded), creative and unique. They also indicated "how much they liked this piece of music", whether "they would like to listen to it again" and whether "they would download this piece of music if it was in open access to have it on their phone, recorder or MP3 player?" All valuation items were answered on a 7-point scale (1 = "not at all", 7 = "very") and were combined into a measure of music valuation (Cronbach's  $\alpha = .83$ ). Participants additionally indicated how much they would be willing to pay to purchase this piece of music in Tanzanian Shillings. As this measure was highly left-skewed (skewness = 4.42, kurtosis = 21.87), we log-transformed it for further analysis. Finally, participants answered basic socio-demographic questions<sup>2</sup>.

<sup>2</sup>The questionnaire also included several other questions, for example, regarding participants' perception of the composer's talent, morality and other characteristics (which were asked after the participants listened to the music), how they felt while listening to the music, other peoples' potential reactions to the music etc. These items are not analyzed here, as we were interested in these questions for reasons unrelated to the topic of the present paper.

## 7.2 Results

We conducted a 3 (morality: moral vs. immoral vs. control) x 2 (music type: piano vs. drum) MANOVA with the valuation of the music and the willingness to pay (in Tanzanian schillings) as the dependent variables. The main effect of morality was significant: Pillai's Trace:  $F(4, 448) = 5.76$ ,  $p < .001$ , partial  $\eta^2 = .05$ ; valuation:  $F(2, 224) = 7.61$ ,  $p = .001$ , partial  $\eta^2 = .06$ ; willingness to pay:  $F(2, 224) = 8.84$ ,  $p < .001$ , partial  $\eta^2 = .07$ . Neither the main effect of music type nor the interaction reached significance ( $ps > .59$ ). A planned contrast comparing music valuation in the immoral condition (coded as -2) to moral and control conditions (both coded as 1) showed that participants liked the music ostensibly composed by an immoral composer considerably less ( $M = 5.19$ ,  $SD = 1.51$ ) than the same music said to be composed by a moral ( $M = 6.01$ ,  $SD = 1.33$ ,  $d = .58$ ) or a neutrally described composer ( $M = 5.87$ ,  $SD = 1.24$ ,  $d = .49$ ),  $t(227) = 3.87$ ,  $p < .001$ . Similarly, participants were willing to pay less for the music that they thought was composed by an immoral composer ( $M = 195.92$  (=U.S. \$ 0.10),  $SD = 333.57$ ) than for the music composed by a moral ( $M = 1,360.26$  (=U.S. \$ 0.75),  $SD = 2,464.82$ ,  $d = .66$ ) or a neutrally described composer ( $M = 417.88$  (=U.S. \$ 0.23),  $SD = 671.93$ ,  $d = .42$ )<sup>3</sup>,  $t(227) = 3.86$ ,  $p < .001$ . The difference between the moral and the control condition was not significant ( $ps > .20$ ).

## 7.3 Discussion

Overall, Studies 3a–3c demonstrated that the influence of contagion beliefs is not restricted to material goods but can also affect the evaluation of a piece of music. We showed that this effect is unlikely to be explained by mere associations (Study 3a) or experimenter demand effects (Study 3b); it can affect aesthetic appreciation of music as well as actual behavioral choices (Study 3b); and, it generalizes to non-Western cultures (Study 3c).

In Study 4, we examined whether intention-based contagion shows further characteristics typically ascribed to contagion beliefs in the literature: belief in transfer of actual properties and permanence.

## 8 Study 4

Contagion beliefs imply that physical contact between the object and the source makes the object actually acquire certain valenced properties (Frazer, 1890/1959; Nemeroff, 1995; Rozin et al., 1986). For example, a sweater worn by Hitler itself becomes evil and may have the capacity to 'taint' other objects. In Study 4, we examined whether similar effects may exist for targets of intention-based contagion. In other

<sup>3</sup>For simplicity reasons, we report the raw means here, while using the log-transformed values for the MANOVA.

words, we tested whether an object designed by someone evil is actually evaluated as morally tainted compared to an identical object designed by someone good. Because intention-based contagion — as a type of spiritual contagion — is expected to operate with respect to spiritual characteristics, we compared its effect across the domain of morality (spiritual) and intelligence (non-spiritual). We expected participants to describe an object created by an immoral person as "immoral" but did not expect them to describe an object created by a smart person as "smart". In addition, to test whether intention-based contagion possess another typical feature of contagion — permanence — we explored whether morality of the creator would still be reflected in ratings of the object even when the object is described as broken.

## 8.1 Method

For this study, we recruited 200 adults (58 women, mean age was 29.71,  $SD = 9.24$ ) from Amazon's Mechanical Turk. This study employed a mixed-model design with attribute (morality vs. intelligence) and valence (positive vs. negative) as between-subjects factors and device function (working vs. broken) and rating dimensions (intelligence vs. morality) as within-subjects factors.

Participants were asked to imagine that "in the near future, (moral-positive: *a virtuous inventor known for his integrity, high ethical standards and humanitarian engagement* / moral-negative: *an evil inventor known for cruel experiments on human subjects that resulted in many deaths* / intelligence-positive: *a genius inventor known for his intellectual brilliance and vision* / intelligence-negative: *an inventor known for being rather dull and unoriginal*) creates a device that has great potential benefits but can also cause huge potential harm to society." Afterwards, participants were asked to use a 9-point scale to rate this device on the dimensions of morality (ranging from 1 = immoral to 9 = moral) and intelligence (ranging from 1 = unintelligent to 9 = intelligent).<sup>4</sup> Then, on a separate page, participants were asked to "consider the same device but imagine that it stops working and cannot fulfill its intended function any longer" and rated it on the same dimensions of morality and intelligence, using the identical scales.

## 8.2 Results

We conducted a 2 (attribute: morality vs. intelligence)  $\times$  2 (valence: positive vs. negative)  $\times$  2 (rating time: before vs. after broken)  $\times$  2 (rating dimension: intelligence vs. morality) mixed-model ANOVA. The four-way interaction was significant,  $F(1, 196) = 9.89$ ,  $p < .01$ ,  $\eta^2 = .05$ , therefore, we conducted separate analyses for measures of intelligence

<sup>4</sup>The third rating dimension that we measured for exploratory reasons was "usefulness".

and morality before and after the device has been broken. The results are presented in Figure 8.

First, we considered whether morality- and intelligence-related characteristics of the designer affected morality and intelligence ratings of a functional device, that is, before it has been broken. For intelligence ratings, neither of the manipulated factors reached significance (all  $ps > .10$ ). That is, the device was considered as equally intelligent regardless of how intelligent or moral its creator was. For morality ratings, there was a significant effect of valence,  $F(1, 196) = 24.72$ ,  $p < .001$ ,  $\eta^2 = .11$ , qualified by a significant interaction with the attribute of the designer (morality vs. intelligence),  $F(1, 196) = 18.84$ ,  $p < .001$ ,  $\eta^2 = .09$ . A simple effect analysis showed that the device was rated as more moral when created by a moral inventor ( $M = 5.36$ ,  $SD = 2.03$ ) than by an immoral creator ( $M = 3.00$ ,  $SD = 1.65$ ),  $F(1, 196) = 43.35$ ,  $p < .001$ ,  $\eta^2 = .18$ . In contrast, intelligence of the creator did not have an effect on the rating of his invention's morality,  $F(1, 196) = .20$ ,  $p = .66$ ,  $\eta^2 = .001$ .

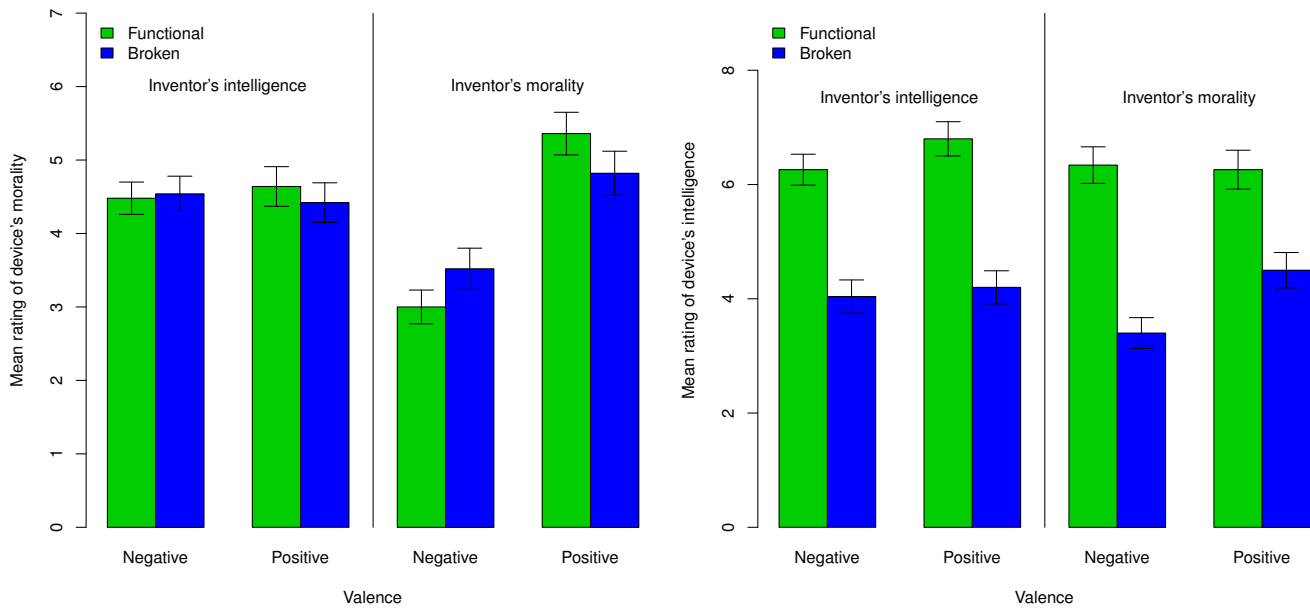
Next, we examined whether the device was rated as less moral and less intelligent after it has been broken and whether this change in rating depended on the inventor's characteristics. Regarding the ratings of intelligence, the broken device was rated as less intelligent than the functional one across all conditions (moral-positive:  $M_{\text{dif}} = 1.76$ ,  $F(1, 196) = 31.60$ ,  $p < .001$ ,  $\eta^2 = .14$ ; intelligence-positive:  $M_{\text{dif}} = 2.60$ ,  $F(1, 196) = 68.97$ ,  $p < .001$ ,  $\eta^2 = .26$ ; moral-negative:  $M_{\text{dif}} = 2.94$ ,  $F(1, 196) = 88.19$ ,  $p < .001$ ,  $\eta^2 = .31$ ; intelligence-negative:  $M_{\text{dif}} = 2.22$ ,  $F(1, 196) = 50.28$ ,  $p < .001$ ,  $\eta^2 = .20$ ). Regarding the ratings of morality, the broken device was rated as less moral than the functional one when it was created by a moral inventor ( $M_{\text{dif}} = .54$ ,  $F(1, 196) = 5.05$ ,  $p < .05$ ,  $\eta^2 = .03$ ); in contrast, when it was created by an immoral inventor, it was rated as more moral when broken than when functional ( $M_{\text{dif}} = -.52$ ),  $F(1, 196) = 4.68$ ,  $p < .05$ ,  $\eta^2 = .02$ .

Importantly, even a broken device created by a moral inventor was rated as more moral than a broken device created by an immoral creator ( $M_{\text{dif}} = -1.30$ ),  $F(1, 196) = 11.28$ ,  $p < .01$ ,  $\eta^2 = .05$ , highlighting the persistence of the belief in essence transfer.

## 8.3 Discussion

Overall, the results of this study showed that individuals' moral characteristics are perceived to be transferred to the objects: a neutrally described device developed by a moral inventor was evaluated as more moral than the same device ostensibly created by an evil inventor. Could participants have reasoned that an immoral inventor was more likely to create something for harmful purposes, which in turn caused participants to see the device as less moral? We believe this to be rather unlikely. First, the instructions clearly stated that the device has great potential benefits but can also cause huge

Figure 8: Ratings of the device’s morality (left panel) and intelligence (right panel), Study 4. (Errors bars are standard errors.)



potential harm to the society. Second, we have found that even a broken device — a device that could do neither harm nor good — was still considered less moral when created by an evil inventor than by a moral inventor.

We also found that only morality, but not intelligence-related characteristics of the source were perceived as being acquired by the object: a device created by an intelligent inventor was not considered to be more intelligent than the same device created by a non-intelligent inventor. Besides the theoretical relevance of this finding, it also makes clear that the attribution of source morality to the target cannot be explained by experimental demand effect (in which case, participants would have perceived any characteristic as being transferred to the object).

Overall, in this study we showed that, like contact-based contagion (Frazer, 1890/1959; Meyer et al., 2013; Nemeroff, 1995; Nemeroff & Rozin, 1989; Rozin et al., 1986), intention-based contagion does not just result in changes in valuation but also in the perception of objects actually acquiring the moral characteristics of the source. Also, similar to contact-based contagion, intention-based contagion appears to have long-lasting effects and thus likely possesses another key feature of contagion: permanence.

## 9 General discussion

The results of six studies suggest that a person’s moral characteristics influence the valuation of items they created, but never physically touched, including non-material items such as a piece of music. Drawing on the literature on the ex-

tended self (Belk, 1988), we refer to this effect as *intention-based contagion* and differentiate it from contagion through touch (or *contact-based contagion*). While previous research has studied contact-based contagion in detail, to our knowledge, intention-based contagion has not been explored in the academic literature. We demonstrated that intention-based contagion effect extends to non-material products, such as a piece of music, does not only affect valuation but has downstream behavioral consequences and is observed in different cultural contexts (in U.S. internet users and Tanzanian students). In comparing contact- and intention-based contagion, we showed contact-based contagion to be more strongly related to the emotion of disgust than intention-based contagion. Also, in contrast to contact-based contagion, intention-based contagion applied only to spiritual characteristics (morality) and did not affect the transfer of non-spiritual valenced characteristics (such as disease or intelligence).

Despite these differences, both types of contagion showed important similarities (Table 1). Both were explained by the same underlying mechanism: the perception of transferred essence. Individuals with a strong belief in contagion/essence transfer showed a significant effect of the source person’s morality on product valuation, whereas individuals with less of a belief in contagion/essence transfer did not show an effect. Furthermore, intention-based contagion showed multiple key features of contagion described in the literature (Rozin et al., 1986; Rozin & Nemeroff, 2002). Like contact-based contagion, intention-based contagion involved transfer of actual properties, making items created by an evil person being seen as "evil" themselves. Like contact-

Table 1: Characteristics of contact- and intention-based contagion.

Characteristic	Contact-based contagion	Intention-based contagion
Physical contact required	X	-
Based on belief in transferred essence	X	X
Permanency	X	X
Negativity bias	X	X
Transfer of actual properties	X	X
Disgust sensitivity	X	X
Dose insensitivity	X	not tested here

based contagion, intention-based contagion showed a certain degree of permanence, such that an item once invented by an evil person was considered evil even after it has been broken. Finally, like contact-based contagion, intention-based contagion appeared to show a characteristic "negativity bias". Individuals valued items created by immoral individuals significantly less than items created by moral or neutral individuals. In contrast, the latter did not differ from one another, although in most cases the ratings were high, leaving little room for differences to manifest themselves. Taken together, these similarities suggest that our findings demonstrate an instance of contagion rather than other more reductive alternative explanations.

One of the most important alternative explanations of intention-based contagion is mere associations (Walther, 2002). Therefore, throughout the paper, we paid particular attention to this issue and demonstrated that intention-based contagion cannot be completely accounted for by mere associations. Specifically, in contrast to what the mere association account predicts, intention-based contagion did not emerge with respect to just any valenced characteristics (e.g., disease in Study 2 or intelligence in Study 4). Furthermore, the presence of the mere associations between the person and the product was not sufficient for valence transfer, only when the person was described as having invested creative effort in the product, was the product considered "contaminated" with the source person's moral characteristics (Study 3a). These findings taken together speak against the mere association explanation.

Another important alternative explanation is that our participants could be reluctant to purchase the product created by an immoral person just because this action could have

benefitted its creator. Also, participants' aversion towards products designed by immoral individuals might stem from impression management concerns (also see, social communication account, Fedotova & Rozin, 2016). For example, rejection of music composed by an evil person might be explained by participants' fear that listening or liking such music would be interpreted by others as evidence that one supports the composer's immoral acts. While these concerns could have played a role in our participants' responses, we believe them to be unlikely to completely account for our results. First, we used scenarios in which the money would not go to the person who created the product (Study 2) and non-monetary measures of liking (such as a choice to listen to a piece of music during the study, Study 3b), the endorsement of which is rather unlikely to benefit the creator. Second, all behaviors and responses in the survey were private and were thus unlikely to be driven by impression management concerns. Finally, neither of these alternative explanations predicts the contagion effect to be restricted to participants with a strong belief in transferred essence—the pattern predicted by the contagion account and detected in Study 1. Taken together, these arguments provide some initial evidence against these alternative explanations. Nevertheless, we acknowledge that more research is needed to completely rule them out.

### 9.1 Theoretical implications

The present findings might have implications for existing theoretical models of contagion. The current literature proposes a distinction between physical models of contagion (material transfer of germs or some residues) and spiritual essence model (some non-material essence of the source is transferred to the object) (Nemeroff & Rozin, 1994). Here, we propose that spiritual contagion itself may be construed as reflecting (at least) two different conceptual models. Specifically, a contact model in which essence transfer seems to function more like actual contagious entities (i.e., one's 'cooties') versus an extended self model where essence transfer seems to be much more abstract and incorporate non-physical modes of transfer (i.e., one's 'spirit'). These two different conceptual models capture the obvious distinction between contact-based contagion where essence is transferred through direct physical contact ("contact model") versus intention-based contagion where essence is transferred through creative intent ("extended self model").

Although not examined here, differences between these two conceptual models may be reflected in further differences regarding dose sensitivity or the ways in which these effects can be "undone." For example, drawing from a contamination model, negative physical contagion effects have often been discussed as dose insensitive — touching a sterilized cockroach to a glass of juice only once may be equally as tainting as touching the juice several times (Rozin et al.,

1986). Cases of negative symbolic contagion (e.g., Hitler's sweater) may function similarly (Rozin & Nemeroff, 2002). Intuitively, however, it seems that intention-based contagion and a 'spiritual' conceptual model may be dose sensitive — of course, not in terms of physical contact, but in terms of the degree to which the item is considered to be part of the extended self. For example, perhaps a deliberate, effortful design may be seen as embodying more of the creator's essence than a design that took little work or planning.

Further, in terms of 'un-doing' contagion effects, it might mean that sterilization and physical cleansing are more effective in case of contact-based contagion than in cases of intention-based contagion. By contrast, transforming an object in a way that changes its conceptual nature (what it was designed to be) might be effective in undoing intention-based contagion, while it has been shown to be ineffective in the context of contact-based contagion (Nemeroff & Rozin, 1994). For example, repurposing a coat designed by an evil person to serve a different function might alleviate the negative contagion effect. That is, conceptual differences between the two forms of symbolic contagion models may in turn, influence the various ways in which they may be thought to exist or persist over time.

## 9.2 Future directions

An examination of personality predictors of contact- and intention-based contagion beliefs may constitute an important contribution in establishing their relative similarities and/or differences. Our results have demonstrated that the individuals' perception of essence transfer was critical for both contact- and intention-based contagion to take place: the more that participants saw the essence of the source reflected in the objects, the more strongly they devalued items from an immoral source (Study 1). Indeed, our participants substantially differed in the extent to which they believed in essence transfer. What personality differences might account for these variations? For example, prior research on contact-based contagion suggests that the contagion effect is weaker in rational thinkers and more pronounced in intuitive thinkers (King, Burton, Hicks & Drigotas, 2007; Kramer & Block, 2011; Kramer & Block, 2014). An intriguing question for the future studies is whether this also applies to intention-based contagion. Similarly, existing research on contagion has identified its situational moderators. For example, contagion beliefs were shown to decrease when participants' judgment involved money rather than simple rating scales (Rozin et al., 2007). Another interesting and somewhat related question is whether increasing objective advantages (e.g., increasing quality, decreasing price) of the product created by an immoral source would "compensate" for its origin and make magical thinking play even a smaller role or even disappear completely.

Importantly, further research is needed to better under-

stand the intention contagion effect. For example, what is the critical component of the creation process (e.g., labor vs. idea) that gives rise to intention contagion effects? Also, as multiple people are often involved in the design process, what determines whose properties will be seen as transferred to the product? The literature on attribution of authorship suggests that contribution of ideas is more important in awarding authorship for a product (e.g., in a work of art) than contribution of labor (Li, Shaw & Olson, 2013). An interesting avenue for future research might be to explore how intention-based contagion effects operate for collaborative efforts. Therefore, future research could explore intention-based contagion further as well as search for other ways in which an individual's identity becomes incorporated into inanimate objects.

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## Appendix

### Study 3c

**Moral condition :** “This music has been composed several decades ago. The composer is a professional musician who is also known for his humanitarian engagement. He has been described as a kind and caring person promoting the interests of the poor and the needy. He cofounded the non-profit association "STRONG like lions" that is located at the Medical Centre in his hometown. The project cares for the mental and social wellbeing of its young and critically ill patients. Since the children are close to his heart the composer supports the project financially as well as non-materially. He is great and sensitive with children; he spends a lot of time in the hospital, organizes diverse activities for children and thus contributes to their healing process.”

**Immoral condition:** “This music has been composed several decades ago. The composer is a professional musician who has been recently convicted of a series of violent murders and is currently in prison. He was arrested after bags containing the dismembered body parts of one of his alleged victims were found on a roadside of his city. Later on police uncovered a cluster of 10 graves in composer’s parents’ backyard.”

Based on: “Singing serial killer Verry Idham Henyansyah releases album” by Arlina Arshad, Herald Sun, 31<sup>st</sup> of March, 2009, retrieved from <http://www.heraldsun.com.au/news/breaking-news/singing-serial-killer-releases-album/story-e6frf7jx-1225697262581>