

Sensitivity to Indirect Contacts With Other Persons: AIDS Aversion as a Composite of Aversion to Strangers, Infection, Moral Taint, and Misfortune

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College students and their parents rated their willingness to wear sweaters previously worn by a target person described as having AIDS, another infectious illness (tuberculosis), a misfortune (maimed in automobile accident), moral taint (convicted murderer), or simply as a healthy but unknown man. Parallel ratings were obtained with respect to beds slept in or automobiles previously owned by the same set of target persons. Results indicated that there are strong individual differences in sensitivity to 4 sources of aversion to indirect interpersonal contagion: infection, misfortune, immorality, and unfamiliarity. Individual sensitivity to any one of these sources predicts sensitivity to the others (r s in the .30s). Aversion to indirect contact with a person with AIDS (by sweater, bed, or car) includes all 4 sources of aversion.

This article examines a general phenomenon of interpersonal contagion and aversion: the reluctance of many people to make physical contact with objects used (contacted) by other people (Rozin & Nemeroff, 1990; Rozin, Nemeroff, Wane, & Sherrod, 1989). Interpersonal aversion is a symptom in a number of clinical disorders, including avoidant personality disorder and obsessive-compulsive disorders. In addition, interpersonal aversion is a frequent response to people who are supposed to be either physically or mentally ill. Understanding of this common response should aid in comprehending how people deal with those they take to be mentally ill.

To understand the factors that may contribute to interpersonal aversion, we elected to study this phenomenon as instantiated in the reluctance to wear clothing previously worn by someone with AIDS (demonstrated by Rozin, Nemeroff & Markwith, 1992).

Evidence of a Dual Origin of Reactions to AIDS

There is, among many people in the United States, a remarkable overresponse to the risks of AIDS. Some Americans are concerned about buying houses previously inhabited by people with AIDS, renting houses to people with AIDS, sharing a common workplace with people with AIDS, or having their child attend a school that is also attended by a child with AIDS

(Hunter, 1989). One study reported that 32% believe AIDS can be transmitted by a hot tub, and 35% believe AIDS can be acquired by donating blood (Ambrosio & Sheehan, 1991). Some or all of this reluctance may be due to hypervigilance associated with the fear of AIDS infection, a fear that is perhaps intensified by mistrust of medical information on transmission (Herek & Glunt, 1988). However, the fact that this concern seems not to have been markedly reduced by assurances about the mode of transmission of AIDS has led to the hypothesis that AIDS represents a dual threat: a risk of infection with a deadly disease and a moral taint (e.g., Pryor, Reeder, Vinacco, & Kott, 1989). In this article, we present evidence that negative reactions to objects used by someone with AIDS come not only from aversion to contact with infection and moral taint but also from aversion to contact with misfortune and aversion to contact with even a healthy stranger. We also show that all four of these aversions are positively correlated.

The idea of a dual origin of fear of AIDS has been suggested by several investigators. Triplet and Sugarman (1987) attributed fear of AIDS to both fear of a disease with an unknown cause and to antihomosexual attitudes. Similarly, Bouton et al. (1989) reported survey results indicating that fear of AIDS correlated .55 with homophobia. Bouton et al. also reported a positive association between fear of AIDS and regular church attendance, although Ambrosio and Sheehan (1991) found neither religiosity nor belief in a just world significant predictors of fear of AIDS. Crandall (1992a, 1992b) demonstrated a desire for increased social distance between subjects and people with either moral taints or infectious diseases but no interaction between the two.

The most articulated position on the dual infection/moral origins of the fear of AIDS comes from the work of Pryor et al. (1989) who identified instrumental (infection fear) and symbolic (homophobia) components in the fear of AIDS. Their study of college students and elementary school parents, within the framework of the Ajzen-Fishbein attitude model, measured

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reluctance to have one's child attend a class that included a non-homosexual child with AIDS. Symbolic and instrumental factors both contributed to this reluctance.

Four-Factor Theory of Reactions to Indirect Contact With AIDS

Our analysis of reactions to AIDS led us to predict that there are four different factors that might be involved in aversion to even indirect contact with AIDS. In addition to infection and moral contamination, we hypothesized that aversion to contact with AIDS includes aversion to contact with misfortune and to contact with any unfamiliar person. We operationalized these factors in terms of four possible target persons: a healthy male stranger, a man who lost a limb in an accident (misfortune), a man with tuberculosis (infection), and a man convicted of murder (moral taint).

Summary of Approach in This Study

In the present article, we assess reaction to AIDS and other negative targets with a methodology developed in earlier research on contagion (Nemeroff & Rozin, in press; Rozin & Nemeroff, 1990; Rozin, Nemeroff & Markwith, 1992; Rozin et al., 1989). In this work, we consider contagion broadly to encompass the widespread belief that all sorts of properties (including personal characteristics and moral standing) can be permanently transferred by physical contact. We measure aversion to contact in terms of liking to wear or use an object previously used by a target person. We compare responses to sweaters worn by different target persons, who represent different types of threats (moral, infection, misfortune, or combinations) and confirm our findings with parallel measures from two other articles besides the worn sweater: liking for driving an automobile previously owned by a target person or liking for sleeping in a clean hotel bed that the target person had previously used.

Method

Respondents

In 1989, a survey of attitudes toward AIDS and a number of other issues, which we call the photo survey, was distributed to every member of an introductory psychology class with a registration of approximately 260 students. The photo survey included ratings of how much the respondent would like to wear a sweater worn by a set of male target persons, including a target person with AIDS. A photograph of the male target person wearing the sweater referred to in the survey was included on the page with the survey questions. Students were given copies of the same survey for their parents in an envelope that contained a stamped envelope addressed to the experimenters. Students addressed the outer envelope to their parents and were encouraged to write a note to their parents at the bottom of the introductory letter accompanying the questionnaires. The students and parents were told that the results from the survey would be shared with the class, which they were, including a printed summary of results.

A similar survey, which we call the no-photo survey, was distributed to another introductory psychology lecture class of the same size, under the same conditions, and during the same week. The no-photo survey included the same set of questions about the sweater as the photo survey but without any photograph. The no-photo survey also included a par-

allel set of questions about driving an automobile and sleeping in a bed that had previously been used by a subset of the male target persons probed in the sweater survey.

The photo survey was returned, in usable form, by 94 male students, 113 female students, 141 fathers, and 159 mothers (total usable $N = 507$). The no-photo survey was returned by 102 male students, 111 female students, 107 fathers, and 133 mothers for a total sample of 453. Returns were received from more than 60% of the parents. The combined sample was 74% White, 5% Black, 15% Asian, and 6% other. The three largest religious groups were Jewish (38%), Protestant (20%), and Catholic (16%).

Questionnaires

Both surveys included standard demographic information and the 10-item M. Rosenberg (1965) self-esteem scale. The surveys also included questions on food habits, attitudes to interpersonal touch (e.g., massage, stroking), and acquired likes and dislikes. These items form part of another research program. No specific explanation was given for the full survey, except for the introductory statement: "We are interested in learning about family similarities and differences in a number of areas." We describe the no-photo survey in some detail and then indicate the modifications in the photo survey. In each survey, target person types are referred to by an abbreviation, listed in capital letters before each description.

No-photo survey: In the no-photo survey, respondents were instructed as follows:

"Consider a scale that runs from +100 (*something that you would like extremely*) to 0 (*something you would dislike extremely*). A rating of 50 would mean that you felt neutral. Now imagine a brand new unisex sweater of a style that you like. Rate how you would feel about wearing the sweater for 1 day after each of the following happens to the sweater. For each question, assume that we start with a different new sweater."

1. "How would you feel about wearing the brand new sweater?" (NEW)
2. "How would you feel about wearing the sweater after the sweater was worn by a perfectly healthy man? The sweater was thoroughly laundered after the man wore it." (MAN)
3. "How would you feel about wearing the sweater after the sweater was worn by a man who has tuberculosis (tuberculosis is a bacterial disease affecting the lungs and bones that can be caught by contact with infected individuals)? The sweater was thoroughly laundered after the man wore it." (TB)

Altogether, there were 13 sweater questions, of which we consider only 8 in this report (see McCauley, Rozin, Markwith, 1993, for results involving the other 5 questions, all dealing with the properties of a healthy male stranger than can make contact with that man aversive). All 8 of the sweater questions considered here described the sweater as thoroughly laundered.

The other questions had the same format as the MAN and TB questions; their specifics are indicated in the following list. The order of questions was constant and the same as the order presented here, except that the five additional questions about the healthy man were inserted between the MAN and TB questions. The eight questions of interest in this report concerned wearing the following:

1. (NEW) Brand new sweater (as previously described)
2. (MAN) Sweater worn by a healthy man (as previously described)
3. (TB) Sweater worn by a man with tuberculosis (as previously described)
4. (HOMOSEX) Sweater "worn by a man who is a homosexual who does not have AIDS"
5. (AIDS/HOMOSEX) Sweater "worn by a man who is a homosexual who has AIDS"

6. (AIDS/TRANSFUSE) Sweater worn by "a man who has AIDS; the man got AIDS through a blood transfusion following a car accident and was neither a homosexual nor an intravenous drug user"

7. (MURDER) Sweater "worn by a man who is a convicted murderer"

8. (ACCIDENT) Sweater "worn by a man who lost his leg in an auto accident; the man was not responsible for the accident"

After answering the questions about the sweater, the subjects, using the same scale, rated how they "would feel about sleeping in a hotel bed for one night under each of the following conditions. For each question, assume that we start with a different new bed and that fresh laundered bed sheets are on the bed."

1. "How would you feel about sleeping in a brand new bed in a Holiday Inn hotel?"

2. "How would you feel about sleeping in a Holiday Inn bed the night after the bed was slept in, by a perfectly healthy man?"

Questions continued in this format covering the same eight targets listed previously for sweater questions.

The final set of ratings dealt with an automobile. "Imagine a 1990 Toyota Camry with automatic transmission and air conditioning. The car had one previous owner and has 15,000 miles on it. Using the same 100-point scale, rate how you would feel about driving the car for 1 day after each person described next has owned the car. For each question, assume that we start with a different car."

1. "How would you feel about driving a brand new 1990 Toyota Camry?"

2. "How would you feel about driving a Camry that was previously owned by a perfectly healthy man?"

Questions continued in this format covering the same eight targets as for the sweater and bed questions.

Photo survey. In the photo survey, the same questions were asked about the sweater; no questions were included about the bed or automobile. However, a copy of a photograph of an attractive male student wearing a specific sweater was reproduced above the questions. Instructions were identical to those under sweater on the automobile survey, except for the following additions: "Now imagine a brand new unisex sweater, like the one on the man in the picture. Rate how you would feel about wearing the sweater for 1 day after each of the following happens to the sweater. For each question, assume that we start with a different new sweater. In each case, 'the man' refers to the man in the picture."

Follow-up study. A brief follow-up study was carried out in the fall of 1992 to help interpret some of the results of the original study. Participants were 204 students in an introductory psychology course at the University of Pennsylvania. Students completed a very brief, anonymous questionnaire on sweater aversions in class. Five different forms of the survey were distributed, using a different scale than previously described, a scale anchored at -100 (*dislike extremely*) to $+100$ (*like extremely*). Unlike the prior study, however, subjects in this study were asked to imagine a laundered, new sweater that they would rate "0" on the -100 to $+100$ scale.

To emphasize the zeroing of the "baseline" sweater, subjects were asked explicitly to enter a zero on the survey next to the description of the new, laundered sweater. Six of 204 subjects wrote a nonzero number in this space, and their data were not used in the subsequent analysis. One group of subjects (ALL) was then asked (using the same question format as in the main study) to rate feelings about wearing a sweater that was worn by a healthy man, a man with Legionnaire's disease (described as "a serious and sometimes fatal respiratory disease that can be transmitted through the air"), a man with AIDS, a convicted murderer, or an accident victim (leg amputation). (Because news reports linking TB and AIDS appeared after the original study, we selected Legionnaires' disease for the follow-up study in place of tuberculosis in the original study.) Four other groups received only one question (after be-

ing asked to imagine the zero-rated laundered new sweater). The question asked was one of the four negative items in the ALL condition, that is, a sweater worn by a convicted murderer or a man with AIDS, an amputated leg, or Legionnaire's disease.

Results and Specific Discussion

Effects of Different Types of Contact Across Articles

The drop in desirability from the NEW sweater/bed/automobile baseline after a variety of contacts is a measurement we use in much of our analysis and discussion. This drop turned out to be extremely consistent across articles (sweaters, automobile, and bed), more so than the raw means because mean NEW ratings differed markedly across articles. The mean decrease from NEW ratings for each article is presented in Table 1. In this table, average ratings are presented for all respondents combined (fathers, mothers, daughters, and sons). Ratings for sweater without photo, for bed, and for automobile come from the same set of respondents (no-photo survey), whereas ratings from sweater with photo come from a different set of respondents (photo survey).

The negative effects of contact with various targets tend to be smaller for ratings of bed and automobile than for ratings of photo or no-photo sweater. For the MAN effect, neither the two-sweater (photo vs. no photo) nor the automobile-bed comparison show a significant difference on a t test, whereas either sweater condition was significantly more negative than automobile or bed targets (all t s significant at $p < .001$). For the AIDS transfusion target (using as a measure the rating for the NEW item minus the AIDS transfusion rating for the same item), the results are different. Both sweater conditions and the bed condition show no significant differences in effect size, but all three show a larger effect than the automobile condition (by t test, all p s $< .001$). We presume that the greater size of sweater effects for MAN reflects the fact that people are much more accustomed to driving others' automobiles and sleeping in hotel beds than to wearing others' sweaters. However, the pattern of negative response as a function of the target of contact is very consistent across articles. To measure this consistency, for example between the automobile and bed, we calculated a Pearson correlation of the mean value of automobile and bed ratings across the eight targets. We calculated a Pearson r , in this manner, for all six pairs of articles (i.e., photo-sweater vs. non-photo-sweater, automobile, bed; no-photo-sweater vs. automobile, bed; automobile vs. bed). The resulting correlations were extremely high; the smallest for the six pairings of articles was .94.

Follow-Up Study Confirming Basic Effects

The purpose of the follow-up study was to ensure that the pattern of mean ratings in the main study was not an artifact of order or anchoring effects that might occur as a result of having subjects respond to a sequence of rating questions using the same scale. The number of subjects returning the five different randomly distributed surveys ranged from 34 to 44. As indicated in Table 2, means generated from the single-question surveys were almost identical to those generated from the full five-item (ALL) survey, for LEGION (illness; difference = -1.11),

Table 1
Mean Decrease in Liking to Use an Article as a Function of Who Previously Used It

Previous user	Article			
	Sweater-photo (n = 507)	Sweater (n = 453)	Bed (n = 453)	Automobile (n = 453)
MAN	-20]**	-20]**	-8]**	-10]**
ACCIDENT	**[-33]**	**[-34]**	**[-23]**	*[-28]**
HOMOSEX	**[-42]**	**[-47]**	**[-41]**	**[-33]**
MURDER	-57]**	-62]**	**[-49]**	-48]**
AIDS/TRANSFUSE	-58]**	-63]**	**[-61]**	-50]**
AIDS/HOMOSEX	-60]**	-66]**	**[-63]**	**[-52]**
TB	-61]**	-64]**	**[-58]**	**[-44]**

Note. Targets are arranged vertically in order of increasing negative effects for the sweater-photo respondents. Liking was assessed with a scale ranging from 0 (*dislike extremely*) to 100 (*like extremely*). Mean ratings for NEW (sweater not previously worn by someone else) were 84 for sweater-photo, 92 for sweater, 86 for bed, and 90 for automobile. Brackets indicate significant comparisons. MAN = sweater previously worn by a healthy man; ACCIDENT = sweater previously worn by a man who lost his leg in an accident that was not his fault; HOMOSEX = sweater worn by a man who is homosexual who does not have AIDS; MURDER = sweater previously worn by a man who is a convicted murderer; AIDS/TRANSFUSE = sweater previously worn by a man who got AIDS from a blood transfusion following a car accident, who is neither homosexual nor an intravenous drug user; AIDS/HOMOSEX = sweater previously worn by a man who is homosexual who has AIDS; TB = sweater previously worn by a man with tuberculosis.
 * $p < .01$ (two-tailed test). ** $p < .001$ (two-tailed test).

$t(76) = .131$, *ns*, and MURDER (moral; difference = -0.1), $t(77) = .01$, *ns*. There are larger but still not significant differences for LEG (misfortune; difference = -8.34), $t(78) = 1.07$, *ns*, and AIDS (difference = -9.9), $t(68) = 1.25$, *ns*. The rank order of scores was the same for ALL and for the four separate items (LEGION worst, next MURDER, then AIDS, and finally ACCIDENT). These results generally support the validity of the multiple within-subjects question design, although there may be some influence of the multiple-question sequence. In particular, the MAN used sweater in the ALL condition was liked as well as the NEW sweater; there was no within-subjects MAN effect in the follow-up study.

Gender and Generation Effects

The four types of family members (father, mother, daughter, and son) are highly similar in the increased negativity they assign to the target-contacted objects. The results for the no-photo sweater are typical and are displayed in Table 3. With the exception of the MURDER target, there is rarely a mean difference between family members that exceeds 10 points for any target in any domain. Of the 144 possible pairings not including the MURDER target (six pairwise combinations of family members by six targets by four articles), only 11 showed a mean difference between family members that exceeded 10 points, and there was no pattern to these, except that 6 of the 11 were generated by unusually negative responses to MAN and ACCIDENT by mothers' rating of automobiles.

The most consistent family difference was that women of both generations were more negative than men to MURDER contact (see Table 3, bottom). For contact with MURDER, all eight same-generation different-gender comparisons (mother-

father, daughter-son for each article) show mothers and daughters more negative by at least 10 points, with a mean gender difference of 19 points. These gender differences were not predicted and are not discussed further.

Effects of Use by Different Target Persons

Having established the consistency of the ratings, we now examine those features of targets that render objects that they use more negative. The targets distribute themselves into what appear, by visual inspection, to be four groupings (see Table 1). With subsample sizes of 450 to 507 for each value in Table 1, even small differences may be significant, but we focus, somewhat arbitrarily, on differences of at least seven points (dependent t test, $p < .001$, two-tailed). An initial clear drop in ratings occurs for MAN contact in every domain. Another drop, to a level lower than MAN, occurs for ACCIDENT. A third and still larger drop, to a level lower than ACCIDENT, occurs for HOMOSEX (without AIDS). A fourth, most negative group of contacts includes four targets: TB, MURDER, AIDS/TRANSFUSE, and AIDS/HOMOSEX. The statistical significance of differences between successively more negative targets is displayed in Table 1.

MAN effect. The data clearly indicate that previous use by a healthy, male stranger makes a sweater substantially less attractive to our respondents. The effect is smaller but still substantial for ratings of automobile and bed (see Table 1 and first result section on different types of articles for more details). There is wide individual variation in the MAN effect. For both types of sweaters combined, 325 subjects (34%) showed no difference between NEW and MAN, whereas 37 subjects (4%)

Table 2
Follow-Up Study: Decrease in Liking for Five Previously Worn Sweaters Tested in One Survey and for Four Sweaters Tested in Single-Item Surveys

Previous wearer	ALL (<i>n</i> = 35)	Comparable scores from main study (no photo; <i>n</i> = 453)	LEGION (<i>n</i> = 42)	MURDER (<i>n</i> = 43)	ACCIDENT (<i>n</i> = 44)	AIDS (<i>n</i> = 34)
MAN						
<i>M</i>	3.9	-20				
<i>SD</i>	18.3	—				
ACCIDENT						
<i>M</i>	-6.6	-34			-15.0	
<i>SD</i>	27.1	—			39.5	
MURDER						
<i>M</i>	-42.1	-62		-42.2		
<i>SD</i>	38.2	—		39.6		
AIDS ^a						
<i>M</i>	-21.9	-66				-31.8
<i>SD</i>	28.1	—				36.9
LEGION						
<i>M</i>	-48.2		-49.3			
<i>SD</i>	34.4		36.0			

Note. Liking was assessed on a scale ranging from -100 (*dislike extremely*) to 100 (*like extremely*). In this study, but not the main study, subjects were asked to rate the new, laundered sweater as 0. LEGION = sweater previously worn by a man with Legionnaire's disease; MURDER = sweater previously worn by a man who is a convicted murderer; ACCIDENT = sweater previously worn by a man who lost his leg in an accident that was not his fault; AIDS = sweater previously worn by a man who has AIDS; MAN = sweater previously worn by a healthy man.

^a In the main study, the man with AIDS was stipulated as homosexual, whereas only AIDS was mentioned in the follow-up study.

showed a maximal effect (0 rating) of the MAN sweater (see McCauley, Rozin, & Markwith, 1993, for more details).

Effects of misfortune, infection, and moral taint. We focus on three "pure" target cases that isolate specific candidate components of negative contagion. One is ACCIDENT, a case of pure misfortune with neither infection nor moral transgression at issue. The second is TB, a case of infection (possibly including a misfortune component) but with no negative moral connotation (the survey was completed before public disclosure of a TB/AIDS link); and the third is MURDER, a relatively pure moral issue. Each of these targets includes the MAN effect because the same MAN is posited as the target for all sweaters, automobiles, and beds. We, therefore, examine the decrease in rating from the MAN baseline that results from contact with each of these three types of targets. The actual sizes of the decrease cannot be usefully compared because we could obviously change these values by manipulating the degree of negativity of the target along each dimension (the ACCIDENT victim could have lost a leg or a toe, the infection case could be TB or a head cold, the moral transgression could be murder or cheating on income tax). The important point is that each type of negative property of the target clearly increases the negative reaction to the object contacted beyond the MAN effect.

Across all four articles (two sweaters, bed, and automobile; see Table 1), ACCIDENT (misfortune) causes a mean drop of 15 points, TB (infection possibly including some misfortune) a drop of 42 points, and MURDER (pure moral) a drop of 40 points. These effects are about the same size across all four do-

main (see Table 1, and recall the very high correlations of mean ratings across the eight targets for various pairs of articles). The effects of contact with MAN, ACCIDENT, TB, and MURDER suggest that there are four different factors that can contribute to negative contagion.

AIDS. In terms of the analysis we have been carrying out, AIDS is a complex case. It contains misfortune, infection, and potential moral components. The HOMOSEX (without AIDS) target is an attempt to isolate a moral component of AIDS and produces a mean drop from MAN of 26 (this and all subsequent figures in this section are averaged across all four articles). AIDS/TRANSFUSE, nominally freed from a homosexual context, shows a drop of 44 points, and AIDS/HOMOSEX, combining the infectious and moral components of AIDS, produces a slightly more negative drop of 46 points. Although this difference is small, it is significant ($p < .001$, dependent t test) for all four articles because very few subjects report more negativity to the transfusion sweater. The puzzle in these data is that the substantial negative effect of homosexuality adds almost nothing to the AIDS/TRANSFUSE case.

One possibility is that there is a problem of a floor effect with our rating scale. It may be that most respondents are already at or close to zero for AIDS/TRANSFUSE and cannot lower their ratings any further. In fact, of 960 respondents rating sweaters, 377 (39%) rate AIDS/TRANSFUSE as zero. Thus, the potential for decreased rating rests with only 592 subjects. An appropriate group in which to test the added effect of HOMOSEX to AIDS is one that has the potential to drop from AIDS/

Table 3
Mean Decrease in Liking to Wear a Previously Worn Sweater
(No Photo) by Gender and Generation

Previous wearer	Rater			
	Father (n = 107)	Mother (n = 133)	Son (n = 102)	Daughter (n = 111)
MAN	-21	-24	-15	-15
ACCIDENT	-30	-36	-35	-34
TB	-62	-66	-61	-68
HOMOSEX	-46	-47	-50	-43
AIDS/TRANSFUSE	-64	-63	-64	-58
AIDS/HOMOSEX	-65	-64	-68	-63
MURDER	-49	-68	-56	-74

Note. MAN = sweater previously worn by a healthy man; ACCIDENT = sweater previously worn by a man who lost his leg in an accident that was not his fault; TB = sweater previously worn by a man with tuberculosis; HOMOSEX = sweater worn by a man who is a homosexual who does not have AIDS; AIDS/TRANSFUSE = sweater previously worn by a man who got AIDS from a blood transfusion following a car accident, who is neither homosexual nor an intravenous drug user; AIDS/HOMOSEX = sweater previously worn by a man who is a homosexual who has AIDS; MURDER = sweater previously worn by a man who is a convicted murderer.

TRANSFUSE (we examined, therefore, respondents with AIDS/TRANSFUSE ratings of at least 5) and is homophobic (respondents rating HOMOSEX lower than MAN by at least 10 points). In this group ($n = 510$), there is a larger but still not very large drop from AIDS/TRANSFUSE to AIDS/HOMOSEX, with the mean difference varying between 5.6 and 7.4 points depending on the article.

We have further evidence from a prior unpublished study that the negativity of homosexuality makes AIDS/HOMOSEX more negative than AIDS/TRANSFUSE. Respondents were 182 college students. Each target sweater was presented both as laundered and separately as laundered and sterilized. The scale used varied from +100 (as pleasant as anything that might happen in a typical week could be) to -100 (as unpleasant as . . .). This scale had twice the numerical range and somewhat more extreme verbal descriptions of endpoints than the scale used in the main study reported here. Perhaps for this reason, we achieved more discrimination between the more negative targets. In particular, AIDS/HOMOSEX was 9 points lower than AIDS/TRANSFUSE.

It appears, then, that there may be some floor effect in our study, but even taking account of this possibility still leaves us with the puzzle of why the difference between AIDS/TRANSFUSE and AIDS/HOMOSEX is so small. We are led to consider the possibility that the association of AIDS with homosexuality is so strong that the transfusion stipulation has little impact. This failure of discrimination could occur in two ways.

It could be that, because AIDS is strongly associated with homosexuality, AIDS/TRANSFUSE already engages the negative reaction to homosexuality, perhaps by associative network activation (Pryor & Reeder, 1990). A spread of negative association from transfusion AIDS to homosexual AIDS could explain, for

instance, the finding that homophobia predicted reactions to AIDS even when the person with AIDS was described as having contracted AIDS from a transfusion (Pryor et al., 1989). Alternatively, it could also be that a deep confounding of moral and illness factors (Murdock, 1980; see General Discussion) gives AIDS sufficient moral negativity that specific addition of homosexuality has little effect.

The negativity to AIDS is, surprisingly, no greater than negativity to TB and, in the follow-up study, less than the negativity to Legionnaire's disease. We have no convincing explanation of this result, but it might be because some subjects underrate their negativity to AIDS for "political" reasons.

Predicting negativity to AIDS. If AIDS has misfortune, infection, and moral transgression components, then individual differences in sensitivity to contacts with AIDS should be well predicted by sensitivity to ACCIDENT, TB, and MURDER. Because the MAN effect is part of each of these, sensitivity to the MAN effect should make no independent contribution to the sensitivity to AIDS. To test these predictions, a multiple regression was performed for each article; rating of AIDS/TRANSFUSE was predicted from ratings of MAN, ACCIDENT, TB, and MURDER (entered simultaneously). For all four articles, the same pattern was found (Table 4): MAN made no significant contribution to the regression (mean beta across

Table 4
Multiple Regression Account of AIDS Aversion (Four
Independent Variables Entered Simultaneously)

Article used by HOMOSEX/AIDS	Same article used by other targets (predictors)	Beta	<i>t</i>	<i>R</i> ²
No-photo-sweater ($n = 452$)	TB	.51	13.38***	.53
	MURDER	.19	4.92***	
	ACCIDENT	.19	4.25***	
	MAN	-.02	-0.35	
Photo-sweater ($n = 506$)	TB	.50	13.52***	.50
	MURDER	.21	5.41***	
	ACCIDENT	.11	2.25*	
	MAN	.04	0.84	
Bed ($n = 453$)	TB	.54	14.36***	.48
	MURDER	.22	5.24***	
	ACCIDENT	.15	3.27***	
	MAN	-.08	1.79	
Automobile ($n = 453$)	TB	.54	13.72***	.45
	MURDER	.15	3.67***	
	ACCIDENT	.13	2.74**	
	MAN	-.03	0.60	

Note. HOMOSEX/AIDS = sweater previously worn by a man who is homosexual who has AIDS; TB = sweater previously worn by a man with tuberculosis; MURDER = sweater previously worn by a man who is a convicted murderer; ACCIDENT = sweater previously worn by a man who lost his leg in an accident that was not his fault; MAN = sweater previously worn by a healthy man.

* $p < .05$ (two-tailed). ** $p < .01$ (two-tailed). *** $p < .001$ (two-tailed).

Table 5
Correlations of Ratings for Different Pairs of Targets With
NEW or MAN Partialled Out

Variable	ACCIDENT	TB	MURDER
MAN	.49	.32	.27
ACCIDENT	—	.33	.50
TB	.25	—	.40
MURDER	.46	.37	—

Note. Each correlation presented is the mean of the four correlations from the four articles (subsample sizes for the four correlations averaged ranged from 450 to 507); upper right values have NEW value partialled out; lower left values have MAN partialled out; ACCIDENT = sweater previously worn by a man who lost his leg in an accident that was not his fault; TB = sweater previously worn by a man with tuberculosis; MURDER = sweater previously worn by a man who is a convicted murderer; MAN = sweater worn by a healthy man; NEW = sweater not previously worn by someone else.

all four domains was $-.04$), and all three of the other predictors made significant contributions, with TB the strongest predictor and ACCIDENT the weakest. Mean betas (across the four articles) for each predictor were $.52$ for TB, $.19$ for MURDER, and $.15$ for ACCIDENT. R^2 s were $.50$ for sweater-photo, $.53$ for sweater-no photo, $.48$ for bed, and $.45$ for automobile. If the same four predictors are used to predict AIDS/HOMOSEX, the results are essentially identical (corresponding betas and R^2 change no more than $.02$).

Rather than using ratings of MURDER to predict sensitivity to contact with AIDS/HOMOSEX, we can use the ratings of HOMOSEX that presumably assess more directly the particular moral issue related to AIDS. As before, MAN made no contribution to the regression (mean beta across domains of $-.11$), whereas TB, HOMOSEX, and ACCIDENT did make significant contributions (mean betas of $.43$, $.47$, and $.15$ respectively; R^2 for sweater-photo, sweater-no photo, bed, and automobile domains of $.59$, $.62$, $.53$, and $.59$, respectively). As predicted, then, reactions to the hypothesized components of negative contagion do predict reactions to contact with AIDS and together account for about half of the variance in reactions to AIDS.

Correlations of MAN, Misfortune, Infection, and Moral Effects

Intercorrelations across respondents of the four contact effects—MAN, ACCIDENT, TB, and MURDER—were all positive, significant, and substantial (mean $r = .40$ across 24 correlations specified by all six pairings of the four contact effects for each of the four articles). Because these correlations might be inflated by variations in NEW sweater/automobile/bed ratings (an individual with a very positive NEW score would have more potential to drop for MAN and any of the other targets), we considered the appropriate correlations with the value of NEW partialled out (Table 5, above diagonal). The correlations presented were the mean of the four correlations generated from the four articles. The mean of all the correlations was $.38$, almost the same as the unpartialled correlations.

MAN correlated significantly with the three other targets.

This could mean that the same (or correlated) factors that make MAN negative also operate for the three other targets. Alternatively, and more prosaically, it could simply result from the fact that, because MAN is a part of each of the other targets, the common MAN component is producing the correlations between ACCIDENT, TB, and MURDER. For this reason, we re-calculated the correlations between ACCIDENT, TB, and MURDER, partialling out MAN (see Table 5, below diagonal). Correlations were only modestly reduced and still substantial and significant (the mean for the three correlations among accident, murder, and tuberculosis was $.41$ with NEW partialled out and $.36$ with MAN partialled out). In particular, TB and MURDER correlated $.37$ with MAN partialled out. Hence, a “pure infection” and a “pure moral” contact have correlated negative effects on ratings. Furthermore, MURDER and ACCIDENT (a pure misfortune) showed a substantial $.46$ correlation with MAN partialled out.

General Discussion

Our “liking to use” measures of contagion produced consistent data across four different articles (sweater with photo, sweater without photo, bed, and automobile) used by seven categories of male targets (man, accident victim, homosexual, murderer, TB patient, man with AIDS via transfusion, homosexual with AIDS). Ratings of liking to wear or use a particular object worn or used by a particular target person were very similar across respondents of both genders and two generations. This consistency suggests that the contagion paradigm may be of general use in future research as a measure of social distance, social identification, and group boundaries.

The substantial MAN effect in our main study is somewhat surprising insofar as the MAN described is healthy and has no particular negative qualities. In the photo-sweater survey, the MAN effect constituted 33% of the maximum aversion effect, that is, the drop in liking from NEW sweater to MAN sweater was 33% of the drop from NEW sweater to AIDS/HOMOSEX sweater. Corresponding percentages for the no-photo survey were 30% for sweater, 13% for bed, and 19% for automobile. Despite the substantial aversion effect of MAN for the average respondent, many respondents did not show this effect at all: Depending on the article, 33 to 61% of respondents rated the MAN-used object the same as the NEW object. A further surprise is that the follow-up study, in which subjects set new and laundered sweater at zero before making other ratings, showed no MAN effect. We suspect that the “zeroing” procedure was critical here; whereas subjects in the main study recognized that a MAN sweater was less desirable than a NEW sweater (although still desirable), subjects in the follow-up had to rate the MAN sweater as absolutely undesirable to show a MAN effect. The origin and meaning of the MAN effect are further elaborated elsewhere (McCauley, Rozin, & Markwith, 1993).

An interesting aspect of our results is the negative effect of contact with misfortune. We carefully worded the description of the man who had lost a leg in an automobile accident to include reassurance that the victim was not at fault. Nevertheless, the drop in liking from NEW to ACCIDENT was about 50% of the AIDS/HOMOSEX drop for sweater ratings and about 30% of

the AIDS/HOMOSEX drop for ratings of bed and automobile. The MAN effect is presumably part of the ACCIDENT effect, but the additional drop in ratings for ACCIDENT indicates a substantial aversion even for indirect contact with innocent misfortune.

Finally, the aversion effects for MURDER, AIDS/TRANSFUSE, and TB were all large and similar in size to the aversion effect for our most negative target: AIDS/HOMOSEX. Here the surprise was that AIDS/TRANSFUSE was only slightly less negative than AIDS/HOMOSEX. We suggested previously here that either a negative-association network or a confounding of moral and physical failings could explain this result.

The values we report for aversion to the various contact targets are all derived from questionnaire responses. Although the responses were anonymous, there is the possibility of indirect social influence or demand. As well, the sequence of many questions may have introduced bias into the responses, for example, by anchoring effects (Tversky & Kahneman, 1974). We discuss this later as one account for the correlations we report.

The intercorrelation of reactions to misfortune, moral taint, and illness was not a surprise to us. Our previous work indicated that contagion sensitivity is an individual-difference variable (Rozin, Fallon, & Mandell, 1984) operating in such a way as to make indirect contact with any negative target more aversive for some subjects than for others. However, the substantial intercorrelations call for more careful examination and, in fact, can be explained by at least five different hypotheses. Two of these (contagion and association sensitivity) refer to individual differences in sensitivity to negative contacts, two (moral, negativity) refer to a common core of properties of the targets coupled with an individual difference in sensitivity to this common core, and one (anchoring) is based on the methodology of collecting the data.

Differences in Sensitivity to Contagion

Individuals may differ in the extent to which they are susceptible to (e.g., believe in or respond to) contagion effects. A more contagion-sensitive individual would be expected to show greater negativity to direct or indirect physical contact with all negative targets and hence generate positive correlations across targets. There is evidence for individual differences in contagion sensitivity that may be transmitted across generations (Haidt, McCauley, & Rozin, in press; Rozin et al., 1984).

Differences in Sensitivity to Negative Associations

Sensitivity to negative targets need not involve physical contact (contagion). Rather, the sensitivity may be mediated by association, in the sense in which a person might avoid eating a piece of chocolate shaped to look like dog feces (Rozin, Millman, & Nemeroff, 1986) or might avoid an item of clothing owned but not worn by an undesirable person (Rozin et al., 1992). Cialdini, Finch, and De Nicholas (1989) showed that people try to emphasize and publicize associations with positive others (e.g., a winning football team, Abraham Lincoln) but try to avoid being associated with negative others (e.g., a losing

team, Rasputin). These tendencies to self-enhancement are found even with the most accidental associations, such as having the same birth date, and even when the only audience for the association is the self.

Cialdini et al. (1989) presented evidence to suggest that individuals with lower self-esteem might be more dependent on strategic manipulation of their associations with others to maintain or increase self-esteem. In particular, the self-esteem prediction is that there should be a negative correlation across respondents between self-esteem and drop in ratings for contact with MAN, ACCIDENT, TB, MURDER, and AIDS/HOMOSEX. Respondents with high self-esteem should have less need to worry about negative contacts or associations. With this prediction in mind, we included the 10-item M. Rosenberg (1965) self-esteem scale also used by Cialdini et al. (1989) in all of our questionnaires.

Correlations of self-esteem with ratings of the different targets were calculated with NEW or MAN partialled out, and, with the exception of MURDER, most correlations were below .10, and many were negative. The mean correlation with NEW partialled out was .00. With MAN partialled out the mean was .03. Ratings of MURDER did correlate weakly with self-esteem, with correlations between .10 and .20 in most cases (mean correlation with MAN partialled out was .16; three of the four MAN-partialled correlations were significant at $p < .001$). Thus, self-esteem only predicts ratings of contact with MURDER and only very weakly predicts these ratings.

The low correlations of self-esteem with negativity of contacted items suggest that the association account, insofar as it is mediated by self-esteem, is inadequate to account fully for the pattern of results. However, the significant correlations of self-esteem with avoidance of murderer-contacted items leaves open a role for self-esteem and negative associations. Furthermore, we used a trait measure of self-esteem. Cialdini et al. (1989) used both trait measures and state manipulations in their studies, but it may be that a state manipulation would have succeeded better with our respondents. Self-esteem remains a viable account for at least some of our data, and the more general negative association model is certainly a serious contender.

Moral Component in Illness and Misfortune

There is evidence in a number of populations that, even in the absence of a direct link between a disease and an immoral action, explanations of illness can involve a strong moral component. Cross-culturally, the most common explanation of illness is retribution for a moral transgression (Murdock, 1980). In Western culture, moral explanations for a variety of illnesses are common in preschool children, a finding described by Piaget as "immanent justice" (Bibace & Walsh, 1979; Kister & Patterson, 1980; Perrin & Gerrity, 1981; Piaget, 1932/1965). Even explanations of illness by adults in American culture have sometimes involved moral causation. For example, the medical profession favored a moral explanation of cholera until the onset of germ theory at the end of the 19th century (C. E. Rosenberg, 1962). If many people thus confound moral defect and illness, then those individuals who are sensitive to one should be sensitive to the other.

This formulation predicts that sensitivity to contact with targets with moral taint should be correlated with sensitivity to danger of infection and that both should be involved in reactions to persons with AIDS. The same argument may hold for misfortune. The "just-world" hypothesis (Lerner, 1980), based on evidence from contemporary Americans, suggests a moral devaluation of victims of physical misfortune on the grounds that one gets what one deserves. Note that a common moral core would account for the reported correlations only if there are individual differences in moral sensitivity.

Negativity of Targets

Negativity is, of course, in itself a common core for the targets. If some individuals consistently see negative targets as more negative than other individuals do, this would generate the predicted pattern of correlations. Consistent individual differences in perceived negativity of targets could result either from differences in the use of the rating scale or from subjectively greater negative response to the targets.

Anchoring Effects

A final account, suggested by a reviewer, is methodological and takes its origin from the phenomenon of anchoring (Tversky & Kahneman, 1974). According to this view, the sequential ordering of the target sweaters may induce a correlation in ratings because every rating is evaluated in terms of the prior ratings just made by the subject. Hence, if the subject shows a large decrease for the MAN sweater, this will form a lower anchor point for subsequent ratings than other subjects might have. This methodological artifact might well be operating in the data we present and could account for all or part of the pattern of correlations. The fact that partialing MAN out makes little difference in the size of the correlations argues against this possibility. The follow-up study, which reports positive correlations between negative targets from a shorter list of negatives, arranged in a different order, also argues against anchoring effects, as does the fact that the ordering of negativity in the follow-up study for subjects asked only one question is the same as that for subjects responding to five questions. However, anchoring still remains a possible account for the positive correlations among aversions to misfortune, illness, and moral taint articles.

Conclusion

It is likely that both contagion and association (Pryor & Reeder, 1990) play roles in the interpersonal negativity that we have described. It is also possible that the negativity itself derives from both general sensitivity to negative events and moral confounds. Future work will have to separate these naturally covarying components to provide a more definitive account of negativity to indirect interpersonal contacts.

Our results should be confirmed with different methodologies. Our follow-up results using a different rating scale, new sweater baseline of zero, and some between-subjects comparisons are a step in this direction. However, clear discrimination of the various hypotheses and evaluation of the role of an an-

choring effect in the pattern of correlations will require extensive further investigations, perhaps including measuring the responses of subjects to actual choices of previously contacted items. Meanwhile, one significant implication of this work is that negative reaction to AIDS is multiply motivated and will not be eliminated by reassurances about the low risk of contracting AIDS from indirect contacts.

The present study is a first step to understanding interpersonal contagion in normal people. We suspect that unfamiliarity, misfortune, moral taint, and illness all contribute to negative reactions by normal people to those perceived as having a mental or physical illness. Furthermore, we believe that an understanding of at least some types of obsessive-compulsive disorders will be aided by a fuller comprehension of normal contagion responses.

References

- Ambrosio, A. L., & Sheehan, E. P. (1991). The just world belief and the AIDS epidemic. *Journal of Social Behavior and Personality*, 6, 163-170.
- Bibace, R., & Walsh, M. E. (1979). Developmental stages in children's conceptions of illness. In G. C. Stane, G. Cohen, & N. Adler (Eds.), *Health psychology: A handbook* (pp. 285-301). San Francisco: Jossey-Bass.
- Bouton, R. A., Gallaher, P. E., Garlinghouse, P. A., Leal, T., Rosenstein, C. D., & Young, R. K. (1989). Demographic variables associated with fear of AIDS and homophobia. *Journal of Applied Social Psychology*, 19, 885-901.
- Cialdini, R. B., Finch, J. F., & De Nicholas, M. E. (1989). Strategic self-presentation: The indirect route. In M. Kody & M. McLaughlin (Eds.), *The psychology of tactical communication* (pp. 194-206). Clevedon, England: Multilingual Matters.
- Crandall, C. S. (1992a). *AIDS-related stigmatization: Social and illness stigma*. Unpublished manuscript.
- Crandall, C. S. (1992b). *Multiple stigma and AIDS: Medical stigma and attitudes toward homosexuals and IV drug users in AIDS-related stigmatization*. Unpublished manuscript.
- Haidt, J., McCauley, C. R., & Rozin, P. (in press). A scale to measure disgust sensitivity. *Personality and Individual Differences*.
- Herek, G. M., & Glunt, E. K. (1988). An epidemic of stigma: Public reactions to AIDS. *American Psychologist*, 43, 886-891.
- Hunter, N. D. (1989). *Epidemic of fear*. New York: American Civil Liberties Union.
- Kister, M. C., & Patterson, C. J. (1980). Children's conceptions of the causes of illness: Understanding of contagion and use of immanent justice. *Child Development*, 51, 839-846.
- Lerner, M. J. (1980). *The belief in a just world: A fundamental delusion*. New York: Plenum Press.
- McCauley, C. R., Rozin, P., & Markwith, M. (1993). *Aversion to interpersonal contacts with strangers: A two component analysis*. Unpublished manuscript.
- Murdock, G. P. (1980). *Theories of illness: A world survey*. Pittsburgh, PA: University of Pittsburgh Press.
- Nemeroff, C., & Rozin, P. (in press). The contagion concept in adult thinking in the United States: Transmission of germs and interpersonal influence. *Ethos*.
- Perrin, E. C., & Gerrity, P. S. (1981). There's a demon in your belly: Children's understanding of illness. *Pediatrics*, 67, 841-849.
- Piaget, J. (1965). *The moral judgment of the child* (M. Gabain, Trans.). New York: Free Press. (Original work published 1932)
- Pryor, J. B., & Reeder, G. D. (1990, August). *AIDS stigma: A cognitive*

- conceptualization*. Paper presented at the 98th Annual Convention of the American Psychological Association, Boston, MA.
- Pryor, J. B., Reeder, G. D., Vinacco, R., Jr., & Kott, T. L. (1989). The instrumental and symbolic functions of attitudes towards persons with AIDS. *Journal of Applied Social Psychology, 19*, 377-404.
- Rosenberg, C. E. (1962). *The cholera years*. Chicago: University of Chicago Press.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Rozin, P., & Fallon, A. E. (1987). A perspective on disgust. *Psychological Review, 94*, 23-41.
- Rozin, P., Fallon, A. E., & Mandell, R. (1984). Family resemblance in attitudes to food. *Developmental Psychology, 20*, 309-314.
- Rozin, P., Millman, L., & Nemeroff, C. (1986). Operation of the laws of sympathetic magic in disgust and other domains. *Journal of Personality and Social Psychology, 50*, 703-712.
- Rozin, P., & Nemeroff, C. (1990). The laws of sympathetic magic: A psychological analysis of similarity and contagion. In J. W. Stigler, R. A. Shweder, & G. Herdt (Eds.), *Cultural psychology: Essays on comparative human development* (pp. 205-232). Cambridge, England: Cambridge University Press.
- Rozin, P., Nemeroff, C., & Markwith, M. (1992). Magical contagion belief and fear of AIDS. *Journal of Applied Social Psychology, 22*, 1081-1092.
- Rozin, P., Nemeroff, C., Wane, M., & Sherrod, A. (1989). Operation of the sympathetic magical law of contagion in interpersonal attitudes among Americans. *Bulletin of the Psychonomic Society, 27*, 367-370.
- Triplet, R. G., & Sugarman, D. B. (1987). Reaction to AIDS victims: Ambiguity breeds contempt. *Personality and Social Psychology Bulletin, 13*, 265-274.
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science, 185*, 1124-1131.

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