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The Role of Suggestions and Personality Characteristics in Producing Illness Reports and Desires for Suing the Responsible Party

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Abstract

For this project, 92 students entered an abandoned theater room in an old basement of the university where sand was scattered throughout. The purpose of the study was to experimentally demonstrate that psychological suggestions could produce illness reports and to explore who is most likely to say that they would sue for personal damages. The students filled out the Trait-State Anger Scale and two subscales, Anger Temperament and Anger Reaction (C. D. Spielberger, G. A. Jacobs, S. Russell, & R. S. Crance, 1983) as well as the Costello-Corey Anxiety Scale (G. C. Costello & A. L. Comrey, 1967), the Hardiness Inventory (S. C. Kobasa, 1982), the Pennebaker Inventory of Limbic Languidness (J. W. Pennebaker, 1982), and, embedded in the Hardiness Inventory, measures of current illness as a result of exposure to the basement room. Half the participants were met by a confederate student who claimed to be cleaning up the remains of a production of "Lawrence of Arabia," and the other half were met by a confederate construction worker who claimed that "The stuff will tear up your skin and your lungs." Those in the experimental groups who perceived danger and scored low in the hardiness dimension of challenge were more likely to report symptoms of illness. Willingness to file a law suit was predicted by a model including perceived danger and the personality characteristic of anger reactivity.

Key words: hypochondriasis, mass hysteria, mass psychogenic illness, sick building

A HEADLINE STORY in the New York Times (March 31, 1996) read, "10 Years Later, Through Fear, Chernobyl Still Kills in Belarus." The article by Specter quoted Harvard physicist Richard Wilson as saying that the worst disease in Chernobyl is not the radiation sickness. Wilson said that fear had done much more damage than the Chernobyl incident itself. Havenaar, a psychiatrist who has worked in the area, was quoted as saying, "These people are sick. It's just not the type of illness they think. We have to realize that the psychological damage here runs very deep. And we need to treat that every bit as vigorously as we need to treat cancer."

How ubiquitous is suggestibility? Could a suggestive climate really produce many of the illness reports in Belarus? Is it possible that suggestions rather than toxins could be responsible for producing some of the illness symptoms reported in cases of alleged toxic spills or sick building syndrome? To date, there have been no experimental designs that have permitted causal analyses of suggestions and misinformation in the production of illness symptoms or that have examined personality characteristics rendering some individuals more affected by such suggestions. My

purpose in the present investigation was to provide an experimentally based approach to these and other related issues. I also designed the study to shed light on why some individuals are more likely than others to file a lawsuit in such situations.

One form of suggested illness has been called mass psychogenic illness (formerly termed mass hysteria). Mass psychogenic illness has been written about for centuries and is said to occur when a group of people report physical symptoms suggesting an organic illness when in fact there is a psychological rather than an organic cause. Although there have not been any well-documented laboratory experimental demonstrations showing cause and effect relations between suggestions and psychogenic illnesses, there have been several correlational and natural experiments implicating the importance of suggestions and other psychological factors in the production of illness beliefs.

In one such natural experiment, an accidental environmental spill of organophosphate produced behaviors more characteristic of mass psychogenic illness than symptoms of atropine-like toxicity (McLeod, 1975). Mass psychogenic illness has also been found with suspected toxic gases in the workplace (Alexander & Fedoruk, 1986). These studies seemed to show that the mere suggestion of a toxic spill was sufficient to produce panic and physical complaints in spite of the fact that no toxin could be found. A notable recent example of mass psychogenic illness was observed in the Persian Gulf War. When there were Scud attacks on Israel, several people fearing poison gas attacks were taken to the hospital with symptoms analogous to gas poisoning. Two people died of heart attacks. It was later discovered that the warheads did not carry the suspected toxic gas. Thus, the physical symptoms more likely had psychogenic rather than biologic origins.

Several correlational studies have also implicated psychological factors in the production of illness reports. Through correlational research, illness beliefs and behaviors have been shown to increase an individual's risk for bacterial and viral infection, upper respiratory infection, asthma, stomach problems, skin problems, more reporting of and interpretations of normal physical changes as signs of pathology, negative affect, poorer perceptions of real symptoms leading to poorer medical diagnosis, and lowered quality of life (Cohen & Williamson, 1991; Langston, 1983; Leventhal, Easterling, Coons, & Luchterhand, 1986; Scheinberg & Holland, 1987; Taylor & Brown, 1985; Watson & Pennebaker, 1989). In addition to correlating with these physical symptoms of distress and uncertainty, negative illness beliefs and stress have correlated with psychosomatic illnesses, mass psychogenic illness, and hypochondriasis (Kellner, 1985; Watson & Pennebaker).

Although these results are convincing, the data are still only correlational. For example, in studies of individuals who reported symptoms, it might be that those who report the most symptoms already have more physical problems, and these problems really do contribute to a lower quality of life. Natural experiments also suffer from the problem of negative findings. That is, if people became ill and no toxin was found, was it because there was no toxin or was it because it simply was not announced by the scientists typically hired by the company or government agencies who may have been attempting to reduce chaos and instill calm?

An example of the doubts expressed over whether an episode in nature was really an example of mass psychogenic illness was recently illustrated in the New England Journal of Medicine. When Jones et al. (2000) presented what they considered to be an example of mass psychogenic illness, there was a flood of doubters, some of whom seemed to question the ethics of the investigation because of the failure to more completely rule out physical causes (Black, Welch, & Murray, 2000; Goode, 2000; Heuser, 2000; Miller & Ashford, 2000; Rifkin, 2000; Wessely, 2000). Thus, studies using natural experimental designs or correlational designs will always be fraught with problems, and relying on them alone will not allow us to conclude that mass psychogenic illness is a reality. Nor will such studies be able to delineate the psychological mechanisms for suggestibility in the domain of the genesis of illness symptoms.

I designed the present investigation to provide this important experimental link between suggestions and the creation of symptom reports. Thus, the major purpose of the present study was to experimentally manipulate suggestions of environmental pollutants to causally determine if such suggestions could create reports of illness. If this were possible, then a new paradigm could be offered to explore these and related phenomena more fully.

A second purpose of this study was to more fully explore possible personality variables that might render some individuals "more suggestible" in the reporting of symptoms of physical illnesses. According to Lindberg, Keifer, and Thomas (2000), although there is no general personality dimension of suggestibility, specific personality variables can cause some individuals to be more suggestible than others if the suggestions are congruent with a particular personality dimension.

One personality variable that could enter into one's succumbing to health suggestions is the notion of psychological hardiness (Kobasa, 1982). Hardiness has been hypothesized to result from an adaptive cognitive appraisal process wherein hardy individuals have been hypothesized to display higher commitments in daily activities, show greater perceived control over life events, and view unexpected change or threats as positive challenges rather than as aversive events. It has been suggested that these hardy cognitive processes include positive cognitive appraisals concerning the level of threat present and the ability to cope effectively with the stressor. Furthermore, hardy individuals have been hypothesized to suffer fewer illnesses (Friedman & Booth-Kewley, 1987; Kobasa, 1979). Thus, one might expect that the more hardy individuals would be least likely to develop psychogenic illness symptoms. That is, if they saw environmental stressors as challenges rather than as threats, then they might be less likely to respond to such threats with illness reports.

A second way in which symptom reporting has been studied is through the Pennebaker Inventory of Limbic Languidness (PILL; Pennebaker, 1982). Individuals who report symptoms most often, as measured by the PILL, have been found to visit their physicians more, report more illness in the previous year, consume more aspirin, report more anxiety, have lower self-esteem, feel less in control of their environments, come from a lower socioeconomic status, be female, and be of a Type A personality. I hypothesized that if high symptom reporters are those who are more likely to perceive and interpret states of the body as illness complaints, then those scoring high on the PILL are most likely to report more physical symptoms.

Other personality variables that could enter into increased suggestibility for illness symptoms are levels of anger and anxiety. If anger and anxiety can be predictors of cardiac disease (Miller, Smith, Turner, Guijarro, & Hallet, 1996), is it not also reasonable to speculate that anger and anxiety could also be predictors of psychosomatic illnesses? Friedman and Booth-Kewley (1987) concluded that there is a disease-prone personality that involves anxiety and anger. According to the results of these studies, one could predict that scales tapping anger and anxiety would correlate with the production of illness reports. Related to hypotheses about anxiety, those who perceive the environment as dangerous might be those who would most likely develop symptoms congruent with the suggested dangers. Thus, another purpose of this study was to obtain estimates of "dangerousness" to determine if such estimates could play a role in the development of symptoms.

Another purpose of this study was to develop a paradigm that could be extended to test who might be most willing to file suit in these situations. One's willingness to file a lawsuit could be explained in several different ways. A first explanation would be the reactive aggressive hypothesis (cf. Berkowitz, 1993). If one's willingness to file suit were perceived as a retaliatory aggressive act, then according to Berkowitz's theory the only factors that would predict whether one would file suit would be one's perception of danger and one's reactive aggressiveness. Anger reactivity is defined as the tendency to be easily offended, to strike back quickly, and to encode neutral situations as threats or attacks. According to this formulation, those who are reactive aggressive types, when confronted with a perceived danger, would be most likely to respond with a retaliatory lawsuit.

A lawsuit as an aggressive act is not the only possibility. A second explanation may be a lack of psychological hardiness (Kobasa, 1982). That is, individuals who would be more likely to file suit are those who lack the ability to see threats as challenges that must be dealt with internally and therefore respond to threat by dealing with it externally (blaming someone else and suing). According to the hardiness interpretation (Kobasa, 1982), strong reactions to sue someone immediately after an unpleasant experience might be more properly explained by insufficient coping mechanisms and a lack of ability to perceive stressors as challenges rather than as aggressive responses.

A third explanation offers the opposite predictions from the insufficient coping mechanism's hypothesis. The willingness to "take the bull by the horns" hypothesis predicts that the hardy individual is more likely to stand on his or her own against an institution and would therefore sue. A fourth explanation would be that the individuals were anxious types who were chronic reporters of illness to begin with. Such anxious individuals (Pennebaker, 1982) would be the ones who would be likely to sue.

To test these possible explanations or hypotheses, I designed a study in which the participants filled out several personality instruments and also rated their perceptions of the danger of being in a room in which they were placed. Those in the experimental (danger) group were told that the sand in the room was dangerous; those in the control (non-danger) group were told that it was not. All the participants submitted symptom reports and indicated whether they were willing to sue the university for being placed in this room.

Method

Participants

The participants were 92 undergraduate introductory psychology students who volunteered for the experiment to receive extra credit. There were 22 men, 68 women, and 2 who did not indicate gender. There were more women than men because there were more women in the introductory psychology pool of participants. It should be noted that, in addition to the 92 participants, another two groups of participants (n = 15) in the danger group, on entering the room and hearing the suggestions, refused to participate and walked out. These participants were halted outside the building by another experimenter who signed their credit slips and debriefed them. Because of their refusal to participate, they were dismissed right after the debriefing, and no other data were collected from them.

Procedure

The experiment was conducted in the basement of an old building on campus that consisted of three theater storage rooms and was undergoing renovation. The room in which the participants were taken was 15 x 40 feet and contained five tables arranged in a U with 23 chairs surrounding the outsides of the tables. The room had exposed pipes, duct work, and holes in the walls that had formerly housed ventilation systems. When entering the room, the participants had to pass through another room with a doorway at one end that was blocked off by plastic. Both rooms had previously been thoroughly cleaned and mopped. Then, 300 pounds of washed wet sand were scattered about the room on the floor, on the ledges that protruded from the walls, and on the tables that were to be used for test administration.

Four undergraduate psychology majors acted as experimenters for this study. One woman served as the experimenter who greeted the participants and administered the test; a man and a woman were confederates who posed as part of each group of participants who met for testing. The fourth experimenter acted as the person cleaning the room. The participants were instructed to meet outside a room in a newer building on campus. They met in groups ranging from 6 to 15 depending on how many signed up for that time period of testing. The female experimenter came 2 min late and appeared to look surprised as she read a note taped to the door. It was a note informing her that the room could not be used and to take her group to the other room. After apparently reading the note to herself, she then told the participants that they would have to move to another building for testing. The experimenter, the two confederates, and the participants then descended three flights of stairs and walked about 150 yards to the building housing the testing rooms. They received one of two experimental treatments.

In the danger group, the participants walked through one sand-splattered room and entered a second where the construction worker confederate was on a ladder working on pipes and apparently removing the sand from the holes in the walls and from around the wiring. The experimenter said to the participants, "Come on in and sit down, I'll see what is going on." The construction worker, dressed in a navy construction worker's jumpsuit, hard hat, breathing apparatus, and tool belt said, "What are you doing here?" The experimenter replied, "Well, Dr. Lindberg said that we were supposed to use this room for experimental testing because they used

it last year. I've got the note right here." The construction worker then glanced at the note, and shook his head. The experimenter then asked, "Do you think you can come back later?" Lifting his breathing apparatus so that he could be heard, he replied, "I can leave but I'll have to come back and clean this stuff up as soon as possible." The male confederate then asked, "Why, is this stuff dangerous?" The construction worker replied, "Well, it'll mess up your skin and your lungs. I wouldn't be in here without this protective stuff on. " The construction worker then exited.

The female confederate said, "This is really awful," and the male confederate commented, "Yeah, this looks like it could be really bad for you!" The experimenter then said, "Come on, let's settle down, it can't be that bad. Let's just hurry up and get started." During the administration of each of the assessment instruments, the experimenter and the two confederates coughed twice, sniffed twice, and scratched twice. On the next to the last test the female confederate said, "Gosh this stuff is making me itch like crazy." On the final test, the male confederate said, "Man, this stuff is killing me. I can't breathe in here," as he brushed some sand from his section of the table.

The non-danger group was initially treated like the danger group, but this time the confederate who was cleaning the room was not dressed in construction worker attire but rather attire typically worn by students-jeans and a shirt. When the participants began entering the room, the experimenter said, "Come on in and sit down, I'll see what is going on. Excuse me, Dr. Lindberg told me that we could use this room for some experimental testing. I've got the note right here." The construction worker replied, "I know, he told me to have this sand cleared out of here. He is probably going to kill me for not having it cleared it out for you yet. I'll just come back later and clean it up." The female confederate then asked, "What did you say this is?" The construction worker replied that "It is just sand left by some theater group who did Lawrence of Arabia. I guess they got kind of wild and had a beach party." The construction worker then exited. The female confederate said, "I'm glad they didn't have camels if they were this messy." The male confederate then commented, "We've got the beach, so where's the water?" The experimenter said, "Come on, let's settle down and take these tests." On the next to the last test the female confederate said, "Gosh this stuff is kind of fun." On the final test the male confederate said, "I should have brought along my sand bucket and shovel," as he brushed some sand from his section of the table.

Measures

In both groups, the experimenter gave the participants the following directions: "This is a study designed to explore the correlation between personality traits and physical and mental well being. You will now fill out a series of tests designed to provide us with measures of your mental and physical health." The participants then filled out a series of personality batteries. The Trait Anger Scale (Spielberger, Jacobs, Russel, & Crance, 1983; Spielberger et al., 1985) contains 15 questions. The internal consistency ranges between .84 and .89. This scale can be broken down into several subscales: the State Anger Scale, defined as a current emotional condition consisting of subjective feelings of tension, annoyance, irritation, or rage; and the Trait Anger Scale, defined as how frequently a respondent feels anger over time. The Trait Anger Scale contains two subscales, the Anger Temperament and Anger Reaction scales. Anger reaction solicits

information on how angry respondents would become when confronted with hypothetical situations that are frustrating to them.

Questions 16-24 borrowed questions from the Costello-Comrey Anxiety Scale (Costello & Comrey, 1967). However, whereas this instrument consists of 9-point scales, the present adaptation used a 4-point scale similar to the Trait Anger Scale. The Costello-Comrey Anxiety Scale has a split half reliability of .70. The third instrument was the PILL, which is said to tap the frequency of occurrence of a large number of common physical symptoms and sensations; the PILL has a Cronbach alpha of .88 (Pennebaker, 1982).

The fourth scale was the Hardiness Inventory (Kobasa, 1982). The hardiness questions (Personal Views Survey) were obtained from and scored by the Hardiness Institute and were divided into hardiness total measures, and measures of control, commitment, and challenge. Embedded in the Hardiness Inventory were the following measures of current illness that were suggested by the experimenters: "I find it difficult to breathe at this moment. I have a headache right now. My skin is itchy at the moment. My nose is more plugged up than usual right now. My eyes are itching and more painful than usual. In comparison to other times, right now I feel terrible." These measures, when added together, were termed Sick A.

After the participants had completed these questionnaires, the experimenter told them that she would like to just check on a couple of things that they might be feeling and thinking right now. This was done in what was intended to appear as offhand comments, things she was interested in rather than part of the experiment. She told the participants that she would like them to estimate how dangerous the stuff on the tables and floor was. She wrote the 4-point Likert-type scale ranging from not at all dangerous to very dangerous on the board. In a similar fashion she asked them to rate their willingness to sue the university for putting them in the room. After this, she asked them to again rate each of the six measures of illness (Sick A) that had been embedded in the Hardiness Inventory to see if these would change in this format. These second estimates were termed Sick B.

Results

Preliminary Analyses

I added the scores of the illness reports of symptoms from the first tests embedded in the Hardiness Inventory to provide the Sick A score and scores of their repetition at the end of the session to provide the Sick B score. It should be noted that Sick A was not a pre-measure. It was a measure of current symptoms embedded in another instrument, and Sick B was a second measure that was completed about 10 min after the first. Thus, these represented different points in time after the manipulations had taken place and were designed to see whether the illness reports changed substantially when they were written on the board by the experimenter after the questions about filing suit were asked.

Sick A and Sick B were correlated significantly, $r = .71$, $N = 90$, $p < .001$. When I combined the questions from Sick A and Sick B, the coefficient alpha was .91. The mean for Sick A was 1.69, and the mean for Sick B was 1.66. Thus, the two measures of symptoms, one embedded in the

Hardiness Inventory and one repeated at the end of the experiment, asked in an offhand way by the experimenter, produced very comparable values and a unified construct. The combined measure, Sick AB was therefore used as the dependent variable in the next analyses.

Illness Report Analyses

I examined the scores for Sick AB with a 2 (Sex) x 2 (Condition) analysis of variance (ANOVA). There was a significant main effect of condition, $F(1, 78) == 4.45$, $p < .05$, with those in the danger condition reporting more intense symptoms ($M = 1.80$) than participants in the non-danger condition ($M = 1.48$). It should be pointed out that when Sick A and Sick B were treated as repeated measures, the effect of condition was still the only significant variable in the analysis, $F(1, 78) = 26.96$, $p < .01$.

In another set of analyses, I explored the role of the tested personality traits along with the previously mentioned independent variables in regression. The first regression was performed on the sum of the repeated measures of the illness reports, Sick AB. The variables entered in the stepwise regression were as follows: the hardiness dimensions of challenge, commitment, and control; trait anger; state anger; anger reactivity; the PILL; participant's ratings of the dangerousness of the material; and anxiety. The results can be seen in Table 1. When the same regressions were performed with only the seven variables correlating significantly with Sick AB, the same variables entered the equation and the same RI was obtained.

Because perceived danger and condition were major predictors of illness symptom production, and because of the introductory nature of this design in which manipulation checks are very important, both variables were entered into an ANOVA. As expected, a significant interaction was found, $F(l, 80) = 3.68$, $p < .05$, showing that those in the experimental condition who perceived danger were the only ones who reported the elevated symptoms. The means for symptom reporting were experimental group, high danger ($M = 2.47$); experimental group, low danger ($M = 1.36$); control group, high danger ($M = 1.57$); and control group, low danger ($M = 1.36$).

Lawsuit Analyses

I performed a second regression using the same independent variables on the participants' rated tendency to sue the university. These were simultaneous linear regression analyses with the levels of significance for entry set at the .05 level. These results are contained in Table 1. I also performed the regression with only those four variables correlating significantly with the dependent variable. The same variables entered the model, and the model had the same RI. Because this was only an initial demonstration study, one should also pay attention to Table 2, in which the correlations among all the measures are presented.

TABLE 1
Summary of Linear Regression Analyses for Symptom Reporting (Sick AB) and Willingness to Sue (Sue)

Variable	Predictor	*F*	*B*	*SE B*	r^2	*p*
Sick AB						
	Danger	31.46	.37	.06	.30	.0001
	Condition	6.17	−.33	.13	.05	.02
	Challenge	5.40	−.03	.01	.05	.02
Sue						
	Anger reactivity	10.16	.38	.16	.12	.002
	Danger	4.14	.18	.05	.05	.05

TABLE 2
Correlations Between Symptom Reporting (Sick AB), Willingness to Sue (Sue), the Experimental Conditions (Condition), and the Other Measures

Variable	1	2	3	4	5	6
1. Sue	1.	.37***	.31**	−.08	.07	.07
2. Sick AB	.37***	1.	.44**	.24*	.18	.03
3. Danger	.31**	.44***	1.	.04	.17	.05
4. Condition	−.08	−.24*	.04	1.	−.10	.04
5. Anxiety	.07	.18	.17	−.10	1.	.25*
6. Sex	.07	.03	.05	.04	.25*	1.
7. Anger reactivity	.36***	.31**	.34**	−.06	.35***	−.02
8. State A	.18	.10	.13	−.03	.41***	.02
9. Trait A	.25*	.21	.20	−.03	.45***	−.04
10. PILL	.10	.35**	.21	.09	.26*	.19
11. Commitment	−.21	−.22*	−.33***	.23*	−.15	.25*
12. Control	−.24*	−.21*	−.10	.18	−.15	.18
13. Challenge	.02	−.26*	−.09	.04	−.24*	−.02

Note. PILL = Pennebaker Inventory of Limbic Languidness.
*$p < .05$. **$p < .01$. ***$p < .001$.

7	8	9	10	11	12	13
.36***	.18	.25*	.10	−.21*	−.24*	.02
.31**	.10	.21	.35**	−.22*	−.21*	−.26*
.34**	.13	.20	.21	−.33**	−.10	−.10
.07	−.03	−.03	−.09	.23*	.18	.04
.35***	.41***	.45***	.26*	−.15	−.15	−.24*
−.02	.02	−.04	.19	.25*	.18	−.02
1.	.59***	.78***	.13	−.38***	−.31**	−.26*
.59***	1.	.89***	.17	−.25*	−.27**	−.07
.78***	.89***	1.	.20	−.32**	−.32**	−.19
.13	.17	.20	1.	−.20	−.14	−.15
−.38***	−.25*	−.32**	−.20	1.	.59***	.20
−.31*	−.27**	−.32**	−.14	.59***	1.	.09
−.26*	−.07	−.19	−.15	.20	.09	1.

Discussion

Participants in the group who perceived the sand as dangerous reported more illness symptoms, including headaches, skin irritation, difficulty breathing, and eye irritation. No other variables were significant. This pattern was basically simple and predictable from the correlational studies in this field. Thus, this experiment accomplished my first purpose in clearly documenting cause and effect between psychological suggestions and the production of illness reports.

Danger was the best predictor, followed by condition, and then followed by the hardiness construct of challenge (see Table 1). In line with this, the ANOVA showed that those who were in the danger condition who received the illness suggestions and who perceived the situation as dangerous were the ones most likely to produce illness symptom reports. The challenge construct was said to measure one's tendency to see new things or experiences either as challenging or as threats (Kobasa, 1979). In the present context, those who were more likely to see things in general as threats, who believed that the material was dangerous, and who were from the danger condition, were more likely to report illness symptoms. This model accounted for 40% of the variance.

A simple summary would be to say that "fear" is a fundamental producer of psychologically caused physical symptoms. Because this was an initial descriptive and demonstration study, one should pay close attention to the table of correlations in developing more sophisticated models and testing interactions that will undoubtedly account for even more of the variance.

These findings are important from legal and health perspectives when they are combined with the results from the cognitive decision literature and the symptom reporting literature. From the present results, it appears that broad public warnings by the media, attorneys filing suits, or other nonexperts' opinions may do more harm than an alleged spill or a sick building. These results may also bear on the question of whether it is always the safest course of action for courts to offer medical monitoring in cases in which the preponderance of evidence suggests that illness reports have come from psychological rather than physical sources.

In the decision-making literature, Cioffi (1991) found that when participants were told that they were taking a (fictional) TAA blood test for a (fictional) pancreatic disorder and received an "uncertain no pathology" report, they came to believe that they had the disease. As the number of "uncertain no pathology" test results increased, as would be the case in medical monitoring for suggested illnesses, participants' beliefs that they had the illness also increased! The present experimental results and the results from correlational and natural experiments have shown that mere suggestions of toxins can create illness beliefs (cf. Alexander & Fedoruk, 1986; Kerckhoff & Back, 1968; Siros, 1974; Small & Borus, 1983).

Finally, illness beliefs and behaviors have been shown to increase an individual's risk for bacterial and viral infection, upper respiratory infection, asthma, stomach problems, skin problems, more reports of and interpretations of normal physical changes as signs of pathology, negative affect, poorer perceptions of real symptoms leading to poorer medical diagnosis, and lowered quality of life (Cohen & Williamson, 1991; Kellner, 1987; Langston, 1983; Leventhal et al., 1986; Scheinberg & Holland, 1987; Taylor & Brown, 1985; Watson & Pennebaker, 1989).

In addition to correlating with these physical symptoms of distress and uncertainty, negative illness beliefs and stress have also been correlated with psychosomatic illnesses, mass psychogenic illness, and hypochondriasis (Barsky & Kelerman, 1983; Kellner, 1985, 1987; Pennebaker, 1982, 1983, 1993; Watson & Pennebaker, 1989). Thus, if the present preliminary findings hold, then it could be reasoned that one of the worst things one could do for suggested illness reports is for the media to issue danger warnings or for attorneys to press for continued medical monitoring for alleged illnesses that are produced by suggestion alone, because these actions can in themselves produce the symptoms they are trying to deal with. The present results suggest that dealing positively with perceptions of danger and fear and responding with anger reactively are the most effective strategies for dealing with suggested illnesses.

These data also have bearing on cases involving allegations of posttraumatic stress disorder and related psychological complaints resulting from industrial accidents. In such cases, the courts typically require plaintiffs to demonstrate a mental disorder (psychic injury) and that the mental disorder is related to the specific incident (causality; Scrignar, 1999). Although one can use scales of the MMPI (Butcher, Dahlstrom, Graham, Tellegen, & Kremmer, 1989) to detect

possibilities of faking, the present results suggest that physical symptoms may not be caused directly by the accident itself but rather by the attorneys or media that came in afterward and suggested that the people were in great danger and that they must be sick. Thus, MMPI scores may be too conservative in that all they can presently rule out is deliberate faking. They cannot yet rule out suggestion as a cause of symptom reports. In conclusion, verbal reports in this domain of illness reporting seem to have the same problems of suggestibility found in other domains of eyewitness testimony (Lindberg et al., 2000).

The present paradigm also afforded the opportunity to begin preliminary explorations into who might be more likely to sue in cases like this and to compare the viability of the hypotheses outlined in the introduction. The hypothesis that hardy individuals would be most likely to take up for themselves and sue the responsible party was not supported by the regression models. Furthermore, the Hardiness dimension of challenge was not significantly correlated with one's willingness to sue, $r = .01$. However, the other two scales were significantly correlated, control $r = -.24$, $p = .02$, and challenge $r = -.21$, $p = .02$. They were not, however, as strongly correlated as many of the other personality variables tested. The present results did clearly disconfirm the hypothesis that "hearty" individuals would be the ones most likely to sue.

The second hypothesis, that highly anxious people are more likely to report illness symptoms in the first place, was not supported by the regression analyses. Furthermore, neither the PILL nor the anxiety measure was correlated significantly with one's willingness to sue. The model best supported was the model hypothesizing that those with the personality characteristic of high anger reactivity, $r = .36$, $p < .002$, and those who perceived the situation as dangerous, $r = .32$, $p = .05$, were most likely to sue (cf. Berkowitz, 1993). Thus, such lawsuits may be more accurately conceived of as anger reactions by angry people who believed that they were placed in a dangerous environment. It is obvious that these are only initial findings and that they must be replicated and extended. However, the present paradigm offers an excellent procedure to explore these and related forensic issues.

As with any study involving such deceit and suggestion, one must always observe caution in overinterpreting the results. For example, one problem with this type of design was that, out of necessity in this initial demonstration study, the relative roles of several demand characteristics could not be entered into any causal analysis. For example, the participant's inherent trust of the university, the acting ability of the experimenters, and the appearance of the room were all potential factors in the production of the results. Because of this, all one can say is that illness reports can be causally produced from suggestions. This was one of the primary purposes of the experiment. However, these results did not show which of these factors was most responsible for producing the effects. This must be tested by further research.

It should be noted that for this study pilot experiments were performed and several rehearsals took place. The one check on the believability of the experimenter who had to ask in an offhand way how willing the participants would be to sue consisted of the first and second measures of sickness. The fact that the two measures did not differ, that they were correlated significantly, and that they made a unified construct with a higher alpha than when each measure was tested alone allows one to be somewhat confident that the participants were not suspicious of the latter

questions. Gullibility for these kinds of manipulations as well as the manipulations and related personality characteristics may interact in ways not tested here, and such possibilities should be tested in further research.

A final issue that must be addressed is the one of ethics. It should be noted that all participants were debriefed at the conclusion of the study. Those who left early were also met by an experimenter who explained to them what the study was about. It would have been interesting to see if continued suggestions would have increased the symptoms produced, because suggestions can increase or decrease memories of pain (Bruck, Ceci, Francoeur, & Barr, 1995), confabulations in false confessions, or eyewitness accounts (Kassin, 1997; Lindberg et al., 2000). However, it was deemed ethically unacceptable to allow the participating students to believe that they were in danger from such an exposure for a longer time period than the duration of the experiment. Thus, care must be taken when ethical considerations are applied to variations of this paradigm.

The primary purposes of the present experiment were fulfilled. First, psychologically suggested illness reports were experimentally produced when danger was perceived, and personality characteristics seemed to make some people more prone to reporting illness symptoms from suggestions. Second, those who were high in anger reactivity and who perceived the higher levels of danger were the ones most likely to file lawsuits in cases such as this. As noted at the outset, these considerations are more than just academic and must be explored further if we are going to be capable of better dealing with suggested sick building syndrome, reports of illness and distress in which the toxins never reached the litigants in toxic spills, and the reasons some people are more willing than others to sue in such cases.

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