

The Science of Self-Report

Implications for Research and Practice

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CHAPTER

17

Psychological Factors Influencing the Reporting of Physical Symptoms

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Researchers and practitioners routinely ask individuals about their health. We ask people to what degree they are experiencing a variety of physical symptoms from headache and upset stomach to dizziness and pain. Often, these symptom reports are thought to serve as proxies for underlying physiological activity. Not surprisingly, however, we find that although people may report, for example, a headache, no clear biological referent exists to confirm whether or not the person truly is feeling pain in his or her head. Even when biological measures are available, researchers find that the correspondence between physiological activity and self-reports of physiological activity are modest at best.

The purpose of this chapter is to explore how symptoms in general are perceived and reported. For example, there is little doubt that the physical symptoms of both well-understood disorders, such as influenza, and less-understood problems, such as chronic fatigue syndrome (CFS), are subjectively distressing. Despite their possible physiological bases, the symptoms of both influenza and CFS indicate that psychological and perceptual factors are related to both the etiology and possibly the treatment of their symptoms. Virtually all diseases—whether biologically validated or not—have physical symptoms that are influenced by psychological and individual difference processes.

THE PERCEPTUAL PROCESS: THE ACTIVE VERSUS PASSIVE PERCEIVER

In most western cultures, the majority of common health problems are associated with a variety of subjective physical symptoms, including fatigue, difficulty concentrating, racing heart, shortness of breath, anxiety, headache, upset stomach, dizziness, and muscle tension. Indeed, these sensations are also among the most common among healthy samples of normal individuals (Pennebaker, 1982), those diagnosed with somatization disorders (e.g., Robbins & Kirmayer, 1991), and even those diagnosed with hypertension (Pennebaker & Watson, 1988) and diabetes (Cox et al., 1985; Pennebaker, Gonder-Frederick, Cox, & Hoover, 1985). Similarly, most of these physical symptoms are also typically associated with diagnoses of clinical depression (APA, 1995). Within the personality literature, these constellations of symptoms are the basis of Negative Affectivity, or NA (Watson & Pennebaker, 1989).

Although many illnesses are associated with a variety of symptoms that do not have clear biological bases, the prevailing opinion is that their reports are subjectively real. That is, when individuals report symptoms and sensations, they subjectively experience significant bodily activity. The question that immediately comes to mind, then, concerns the perceptual information that influences how individuals attend to and interpret their body's ambiguous signals. Research that has addressed this issue has evolved considerably over the last century.

The laboratories of Wundt and Fechner yielded the first scientific investigations relevant to symptom perception. In developing the science of psychophysics, Wundt and others demonstrated a one-to-one correspondence between external stimuli and the perception of stimuli (Boring, 1950). When all extraneous variables were held constant, perceptions of light, sound, touch, and other sensory dimensions were mathematically related to the sources of the percepts.

Gibson (1966, 1979) was one of the first researchers to question the psychophysics tradition within perceptual psychology. The crux of his argument was that organisms relied on information from a variety of sources in order to perceive even the simplest stimulus arrays. Further, this information was processed by virtually all of the senses simultaneously in order to create a stable percept. Accordingly, organisms were not passive recipients of information. Rather, they actively searched the environment in order to understand it better and, consequently, to behave appropriately and efficiently.

Consider how individuals perceive the brightness of the moon at night. Of course, they rely heavily on their eyes and their visual systems in general. But the perception of the brightness of an object depends on much more than the stimulation of a portion of rods and cones within the retina. Visu-

ally, perception of brightness will also vary depending on the background of the sky, other visible objects, and the degree of adaptation to darkness. Beyond the visual system, the perception of brightness will also be affected by our beliefs about or needs concerning the object. For example, if we live in a primitive culture and believe that moonlight exerts an evil influence, we may over- or underestimate its brightness. Similarly, an adolescent couple trying to walk undetected in their neighborhood at night may overestimate the moon's brightness. Conversely, their curious neighbors may underestimate its brightness.

More relevant to the present discussion concerns the role of nonvisual information that can affect visual perception. The apparent brightness of an object can be altered if the perceiver experiences intense pain, loses vestibular cues (and a corresponding sense of balance), becomes paralyzed, or even hears a loud noise. The point that modern-day perceptual researchers emphasize is that we simultaneously rely on all of our perceptual systems in making sense of any visual arrays.

The Role of Attention

How do individuals first notice and attend to internal physical sensations as opposed to external visual, auditory, or other cues? Given that individuals can process only a finite amount of information at any given time, we have proposed that internal sensory and external environmental cues compete for attention (Pennebaker, 1982). As the number and salience of external cues increases, attention to internal stimuli will necessarily decrease, and vice versa. When the environment lacks meaningful external information (such as when people engage in boring or tedious tasks), attention will tend to focus more internally, thereby causing an increase in symptom reporting. Thus, people should perceive and report more symptoms in unstimulating environments than in interesting ones.

A great deal of research now supports this competition of cues model. Various experiments demonstrate that people report higher levels of fatigue (Fillingham & Fine, 1986; Padgett & Hill, 1989), increased heart palpitations, and even cough more in boring situations than in stimulating ones (Pennebaker, 1982). Manipulations that heighten self-attention also increase physical symptom reporting (e.g., Schmidt, Wolfs-Takens, Oosterlaan, & van den Hout, 1994). Indeed, symptom reports are elevated when individuals live alone (Mahon, Yarcheski, & Yarcheski, 1993), live in rural environments, or work in undemanding or unstimulating settings (e.g., NCHS, 1980). Conversely, increased focus of attention to the body heightens symptom reports, particularly during times of stress (e.g., Goldman, Kraemer, & Salovey, 1996). It is noteworthy, however, that these increased symptom reports are unrelated to accuracy of perceiving physiological change (e.g., Pennebaker & Watson, 1988).

The competition of cues idea helps to explain when and why distraction can serve as a useful short-term coping method. In a naturally occurring setting where distractions are available, symptoms can be temporarily reduced when attention is diverted elsewhere. During brief periods—such as during sports competitions or when patients are receiving relatively fast injections—distraction can also be beneficial. However, directly training people to distract themselves from bodily stimulation over extended periods of time does not appear to be effective. For example, Yardley (1994) reported that distraction techniques were ineffective in reducing symptoms of vertigo. Similarly, Nolan and Wielgosz (1991) found that distraction was one of the least effective ways for individuals to cope with symptoms following a heart attack. Attempting to directly manipulate focus of attention—even in the short run—may not be effective (cf. Fillingim, Roth, & Haley, 1989). The failure of the direct manipulation of attention may stem from the same processes of failed thought suppression (see Wegner, 1992). When individuals attempt to manipulate their attention away from a forbidden topic, they must still monitor the topic at a low level to be certain that they are not, in fact, attending to it.

The Selective Search for Information

Another line of research is based on the assumption that organisms actively search their environment for information that will enable them to behave more adaptively (e.g., Neisser, 1976). This scanning is not random but, rather, is guided by beliefs or mental sets that direct the ways in which information is sought and ultimately found. This principle is also relevant to the formation of health complaints. Health-related beliefs influence how people attend to and interpret bodily sensations (e.g., Skelton & Croyle, 1991).

Dramatic examples of the power of health beliefs, or schemas, can be seen in cases of medical students' disease and mass psychogenic illness. Regarding the former, approximately 70% of first-year medical students report symptoms of the diseases that they are studying (Woods, Natterson, & Silverman, 1978). The students, who are undoubtedly under stress from sleep deprivation, exams, or other reasons, can detect a number of subtle bodily sensations that probably reflect heightened autonomic activity. When they read about various obscure illnesses associated with ambiguous symptoms, the students now scrutinize their bodies particularly closely. Their disease beliefs or schemas direct the ways they attend to their bodies and interpret their symptoms (see Gijbers van Wijk & Kolk, 1996, for a nice empirical demonstration of the relative effects of differing perceptual processes on symptom reporting).

Schemas and selective search also play an important role in cases of mass psychogenic illness, or MPI (Pennebaker, 1982). In MPI, large groups

of individuals who typically work together report a related set of physical symptoms that have no clear organic basis. MPI usually develops when one person in a setting becomes overtly sick and displays observable symptoms such as vomiting or fainting. These symptoms affect the belief processes of others in the setting—especially friends—who consequently experience similar but less dramatic symptoms such as feelings of nausea or dizziness. It is also important to appreciate that cases of MPI are most likely to occur in settings where people are anxious or tense. Many of the most famous cases have occurred during the height of the production season, in companies with poor worker-management relations, loud and unpredictable noise, and jobs that restrict people from talking to one another (Colligan, Pennebaker, & Murphy, 1982).

Perceptual Learning

Where and how individuals pay attention to their bodies can also be strongly influenced by the rewards and punishments inherent in the environment. In a fascinating analysis of symptom reporting, for example, Whitehead and his colleagues (1994) argued that symptomatic disorders—such as irritable bowel syndrome (IBS)—follow very different reporting patterns than asymptomatic problems—such as hypertension. The authors found that IBS patients with the greatest reporting of symptoms as adults reported being systematically rewarded by their parents in childhood. Symptom reporting, then, contributed to secondary gain. Secondary gain, according to Mechanic (1978), results from the added attention, freedom of everyday responsibilities, and so forth that are inherent in the sick role. Symptom reporting, then, serves as a powerful social signal: If I say that I am feeling numerous symptoms, you should treat me with greater kindness.

Just as symptoms can be reinforced via instrumental conditioning, symptom awareness and reporting can be the result of association or classical conditioning. Individuals who have experienced salient symptoms in a particular setting will be particularly sensitive to their bodies whenever they are in the same situations. A striking example can be seen in cases of anticipatory nausea. Cancer patients who have undergone chemotherapy and have gotten sick at a hospital or treatment center subsequently feel sick and often vomit or gag even on seeing the setting in later weeks, months, or even years (cf. Challis & Stam, 1992).

The perceptual approach is important in clarifying how normal individuals typically detect and report symptoms in the real world. From consideration of these perceptual, learning, and motivational factors, it is apparent that self-reports of symptoms reflect far more than biological state. A report of a racing heart, then, may be based on heart sensations but also reflects the person's situational context, beliefs, emotions, and needs (for an in-depth discussion of these phenomena, see Leventhal & Leventhal, 1993).

GENDER, PERSONALITY, AND LIFE EXPERIENCES THAT PREDISPOSE PEOPLE TO SYMPTOM REPORTING

There are large individual differences in both the ways people report symptoms as well as the overall rates of reports. As will be discussed later in this chapter, there is evidence to suggest that gender, Negative Affectivity, and traumatic life events are linked to symptom reporting processes.

Gender Differences in Symptom Reporting and Information Processing

In most surveys among healthy populations, males and females report comparable levels of most physical symptoms. That is, no strong or consistent sex differences emerge when samples are asked to report the degree to which they are experiencing common symptoms and sensations such as headaches, upset stomachs, dizziness, or racing hearts. Although the baseline levels of symptom reports are comparable, a number of studies now indicate that there are clear sex differences in how individuals notice, define, and react to symptoms. Specifically, women are particularly sensitive to external environmental cues and men to internal physiological cues in defining their symptoms. This conclusion is based on laboratory and field studies that have attempted to learn how accurate individuals are at perceiving specific physiological activity (Roberts & Pennebaker, 1995).

Across a large number of controlled laboratory studies using psychophysics paradigms, men are consistently better able than women to detect heart rate, stomach activity, blood pressure, and blood glucose levels. Recall that psychophysics paradigms eliminate or control for virtually all situational cues—thus requiring participants to make judgments about internal physiological activity using only bodily sensations as information sources. In naturalistic field studies, however, both women and men are equally good at estimating blood pressure, blood glucose, and various autonomic channels (for general review, see Roberts & Pennebaker, 1995). These naturalistic studies, unlike in psychophysics paradigms, allow participants to use extraneous situational cues (e.g., time of day, emotional state, tangential thoughts and perceptions) in helping to define internal state.

In a particularly strong test of this, Cox et al. (1985) asked 19 diabetics who had had experience monitoring their blood glucose levels to participate in a two-phase study in the hospital and, later, at home. In the hospital phase, participants' glucose levels were directly manipulated over the course of a day. A machine that simulated the activity of the pancreas took each diabetic on a blood glucose roller coaster ride over the 8-hour experiment. Once every 10 minutes, subjects estimated their glucose levels. Over-

all, the correlation between actual and estimated blood glucose was .42 for men and .13 for women. Either in the months before or after the hospital study, the same participants estimated and measured their glucose levels several times each day for 2 weeks at home during their normal days. At home, where a variety of situational cues were present, the correlation between actual and estimated glucose levels were .58 for men and .69 for women.

As discussed elsewhere (Pennebaker & Roberts, 1992), situational cues—such as time of day, room temperature, and so forth—are usually redundant with internal physiological cues. In other words, we can make fairly accurate, educated guesses about people's physiological activity if we know the settings they are in. What is interesting, however, is that men and women differentially rely on internal versus external cues in defining the symptoms that they are feeling.

The use of differential perceptual strategies by men versus women may explain some puzzling gender differences in symptom-reporting patterns. Although the base rates of symptom reports are comparable between women and men in relatively benign settings, certain types of stressful environments indicate differential symptom patterns. Given that women are especially sensitive to situational cues, it would be predicted that their symptom-reporting patterns would reflect the settings that they are perceiving as stressful. Men, however, should often ignore the settings and focus on their physiological cues. Symptom reporting, then, would mirror situational fluctuations in women and physiological changes in men.

Interestingly, these predictions are consistent with cases of mass psychogenic illness (Colligan et al., 1982), sick building syndrome (Bachmann & Myers, 1995; Sternberg & Wall, 1995), video display symptom complaints (Aronsson, Dallner, & Aborg, 1994), and cases of multiple chemical sensitivity (Bell, 1994). In each of these phenomena, women consistently report greater symptom levels than men. In mass psychogenic illness, for example, women have been found to be more prone to episodes than men across cultures (e.g., Phoon, 1982) and over the centuries (e.g., Sirios, 1982). It could be argued that MPI—not unlike sick building syndrome, video display complaints, or multiple chemical sensitivity—is a phenomenon wherein a salient smell or label emerges to help explain the existence of naturally occurring symptoms of stress or illness. The more prominent the situational label, then, the more likely that females may use it to help define their internal state (see also Pennebaker & Memon, 1996).

Interestingly, these sex differences could be both adaptive and maladaptive. If, in fact, low levels of environmental or dietary toxins are directly causing subtle adverse biological activity, females would be more likely to detect it than males. On the other hand, if the situational cues are benign and detectable biological changes are resulting from toxin exposure, males

may be slightly more likely to detect them. Note that the gender differences in the perceptual bases of symptom reporting has been found in generally healthy individuals. Further, the effects are moderately strong but not overwhelming. At this point, the findings and explanations are intriguing and worthy of future study.

Negative Affectivity and Physical Symptoms

Within the last few years, researchers have begun to examine the role that personality variables play in the formation and reporting of physical symptoms. Much of this research has been based on a mood-related disposition called Negative Affectivity or trait NA (Watson & Clark, 1984). Trait NA is essentially identical to several other dispositional constructs such as neuroticism (Costa & McCrae, 1987), trait anxiety (Taylor, 1953), pessimism versus optimism (Scheier & Carver, 1993), and so on. Trait NA reflects pervasive individual differences in negative mood and self-concept. High NA individuals experience consistently higher levels of distress and dissatisfaction over time and across different situations. High NA subjects are also more introspective and tend to dwell differentially on their failures and shortcomings. They tend to be negativistic, focusing on the negative aspects of themselves and others.

Virtually any questionnaire scale that taps self-reports of anxiety, worry, stress-proneness, or negative emotions can be considered a measure of NA (see Watson, Clark, & Tellegen, 1988). A growing number of studies indicate that trait NA is highly correlated with virtually all measures of symptom reporting. Across several samples, using different NA scales and various measures of symptom reporting, NA markers typically correlate in the .30 to .50 range with symptom reports, with a mean coefficient of approximately $r = .40$. Interestingly, high NA individuals consistently report all types of sensations and physical symptoms to a greater degree than do low NA individuals—even though high and low NA subjects do not differ noticeably on various objective health markers (Costa & McCrae, 1987; Watson & Pennebaker, 1989).

The reliable link between NA and symptom reporting, in the absence of any NA-related differences in objective health status, indicates that symptom reports are strongly affected by the NA trait. High NA individuals appear to be hypervigilant about their bodies and have a lower threshold for noticing and reporting subtle bodily sensations. Because of their generally pessimistic view of the world, they are also likely to worry about the implications of their perceived symptoms. Indeed, these high NA individuals would also be the ones to worry more about chemicals, pollens, physicians, and the environment.

Any studies using self-reports of physical symptoms as outcome measures must consider the issue of NA. First, consistent with other aspects of

the trait, high NA individuals will be more likely than others to report symptoms across all situations and over long time intervals. Because of this, excessive symptom reporting is not only influenced by transient situational stressors but also reflects a stable personality trait. Second, reliance on symptom reports without a concurrent measure of NA can lead to a distorted view of the meaning and significance of these symptoms. Third, researchers and clinicians should be alert to the role of NA as a nuisance factor that must be assessed when trying to evaluate and treat reports of symptoms.

As discussed previously, symptom reports are influenced both by situational cues and by broad dispositional differences in distress and complaining. Closely allied with this evidence is work suggesting that the tendency to report symptoms and negative affect is strongly heritable (e.g., Bouchard, 1994). The genetic argument reflects common assumptions about the phenotypic bases of physiological functioning as well as recent findings concerning the inheritance of perceptual and emotional styles.

The awareness and reporting of physical symptoms depends, to a large degree, on the way information is processed in different parts of the brain. The somatosensory cortex, for example, fundamentally affects how individuals perceive sensations in their bodies. Beyond basic perception, the ability to report symptoms is dependent on the proper functioning of the language centers in the temporal and parietal lobes (e.g., Luria, 1980). Further, it is well documented that central nervous system structure and function are, in turn, strongly genetically determined. Monozygotic twins, for example, have remarkably similar—albeit not identical—cortical structures, neurotransmitter activity, EEG, and autonomic nervous system activation compared with fraternal twins (Young, Waldo, Rutledge, & Freedman, 1996). In short, the brain's biological hardware that underlies symptom perception clearly has a heritable basis.

Of particular relevance are a series of discoveries pointing to the genetic bases of personality dispositions and their associated cognitive-perceptual-behavioral styles. Of greatest relevance are the findings of Tellegen et al. (1988) who conducted a large-scale examination of the heritability of trait NA. The Minnesota researchers investigated over 400 pairs of identical and fraternal twins who were reared either together or apart. Overall, an estimated 55% of the variance on trait NA could be attributed to genetic factors, whereas only 2% was due to the shared familial environment. The remaining 43% of the variance is presumably attributable to measurement error and idiosyncratic situational influences that were not assessed by the researchers. A number of other large-scale studies have now reported similar findings in regard to the heritability of trait NA (cf. Bouchard, 1994).

Unfortunately, the Minnesota project did not directly examine the heritability of symptom reporting. Nevertheless, the heritability of the NA trait

strongly suggests that individuals' proclivity to report symptoms and sensations has a similar genetic basis. Given the currently available data, however, it is impossible to point with any certainty to the biological and/or psychological mechanisms underlying the genetics of symptom reporting or, more broadly, the psychiatric diagnosis of somatization disorder—wherein individuals chronically report high levels of physical symptoms. Perhaps the most promising hypothesis links attentional vigilance with specific physiological substrates.

Gray (1982) pointed to the importance of inhibitory centers within the brain (such as those in the septum and hippocampus) as influencing—both directly and indirectly—individual differences in trait NA. When these inhibitory centers are activated, individuals become hypervigilant about the presence of novel stimuli in the environment. Gray believed that high NA subjects, who he called trait anxious, have overactive inhibitory centers that result in their being characterologically hypervigilant. This hypervigilance probably affects symptom reporting in two ways. First, high NA subjects should be more attentive to subtle sensations in their bodies. Second, because their scanning is fraught with anxiety and uncertainty, high NAs may be more likely to interpret minor symptoms and sensations as painful or pathological. Interestingly, Barsky and Klerman (1983) also argued that hypervigilance, selective attention, and the tendency to view somatic sensations as ominous are all important elements in the amplification of symptoms. Thus, the perceptual style of high NAs may be largely responsible for their enhanced somatic complaining.

Traumatic Experiences and Symptom Reporting

Although situational and inherited dispositional factors can be powerful predictors of symptom reporting, certain broad life experiences also appear to influence symptom awareness—often in pathological ways. Symptom reports both with and without underlying objective disease markers increase after traumatic experiences. This is seen in studies where large groups of traumatized individuals are followed for weeks, months, or years after such traumas as rape, death of spouse, or other trauma (e.g., Lehman, Ellard, & Wortman, 1986; Pennebaker, 1989, 1997). Similarly, studies that have focused on large groups of individuals diagnosed with various somatoform disorders typically report trauma rates significantly above those of individuals either without somatoform disorders or other problems. What is it about a trauma that appears to exacerbate symptom reports?

For the last few years, my students and I have been examining this question from several perspectives. One important feature of traumas that is linked to self-reports of health and illness (and even health-related behaviors) is that those traumas that are not openly discussed with others are

more problematic than those that are talked about. Across various large-scale surveys, for example, we have consistently found that individuals who report having one or more traumas at any point in their lives about which they did not talk reported having significantly higher rates of reported minor health problems (headaches, upset stomach, racing heart) and well as serious diagnoses (high blood pressure, cancer, ulcers)—see Pennebaker and Susman (1988). Indeed, these symptom and illness rates were significantly higher than for subjects who had experienced the same types of traumas but who did talk about the events.

Why, then, would undisclosed traumas maximally elevate symptom reports? At least four overlapping hypotheses exist

Long-Term Stress Responses Resulting From the Trauma. One possibility is that these traumas are simply biologically stressful and, in some way, result in adverse autonomic and immune function changes that are accurately detected by the perceivers. This is probably true with many cases. However, closer inspection of people suffering from various somatoform disorders indicates that the majority are simply reporting more physical symptoms in the absence of heightened autonomic activity.

Symptom Reporting as a Distraction. People who have had traumas in their lives and who have not been able to resolve them may adopt certain cognitive strategies that allow them to avoid thinking about these events; they are always in search of distracters. Of all types of information, bodily cues are always available. By focusing on symptoms and sensations, individuals may be able to avoid addressing the overwhelming thoughts of emotional upheavals.

Traumatic Thought Suppression. A related hypothesis assumes that individuals who actively avoid trying to think about their traumas consistently work to block out trauma-relevant thoughts and emotions. In reality, aspects of the trauma are continuously processed on both a conscious and nonconscious level. When a dimension of the trauma pops into the individual's thoughts, he or she can suppress the thought fairly quickly. Of prime importance, the brief appearance of the thought together with the work of trying to suppress it results in an emotional and autonomic response. From the individual's perspective, however, the bodily changes associated with the emotional response are not immediately interpretable because trauma-relevant thoughts continue to be suppressed. In other words, the person experiences an emotion without a perceptible eliciting event. Unable to truly define the bodily state as an emotion, the person's only recourse is to label the emotional changes as their components: physical symptoms (cf. Wegner, 1992; Wegner, Shortt, Blake, & Page, 1990).

Secondary Gain. The reporting of symptoms is ultimately a social act. By telling others of one's symptoms, the person is seeking help in reducing the symptoms, seeking more information about the causes or consequences of the symptoms, and, in some cases, searching for acknowledgment, attention, or other forms of reward from others. Reporting of symptoms following a stressful event has previously been found to bring stressed families closer together (e.g., Minuchin et al., 1975) and allow the symptom reporters a way by which to escape from other stressful situations such as school or work (e.g., Mechanic, 1978).

In many ways, it is beyond the goals of this chapter to explore the many links between stressful life experiences and symptom reporting. Suffice it to say that in cases where ambiguous symptoms are reported at a high rate without a clear environmental or biological correlate, it would behoove the clinician or researcher to explore the patient's earlier traumatic life experiences.

IMPLICATIONS: INTERPRETING PHYSICAL SYMPTOM REPORTING IN THE REAL WORLD

The awareness and reporting of physical symptoms results from natural perceptual processes. As such, it can be misleading to assume that people's perceptions of symptoms reflect their presumed physiological referents. This dilemma is particularly relevant in situations where individuals are reporting symptoms in the absence of objective biological measures that could confirm their symptoms.

Over the last 20 years, we have witnessed the growth and popularization of several disorders that have helped people label and understand their ambiguous symptoms: iron-poor blood, hypoglycemia, chronic fatigue, mitral valve prolapse, Epstein-Barr, Seasonal Affective Disorder, depression, repressed childhood memories, and others. Similarly, a multitude of environmental factors have also been blamed for a comparable group of ambiguous symptoms: ionization of the air, video display terminals, refined sugar, animal fat, food additives, and so forth. Are these disorders and environmental toxins real? Yes, sometimes.

Based on our research on symptom reporting, we would predict that among a group of 100 people who experience the standard symptoms of fatigue, anxiety, racing heart, dizziness, upset stomach, and headache, a small percentage probably have iron-poor blood, low blood glucose, or spend too much time in front of a video display terminal. Similarly, some of these 100 people will be hyper-responsive to low dosages of chemicals. In fact, a few are probably being poisoned to death by the chemicals they fear while their physicians dismiss their symptoms as psychogenic.

But here is the dilemma. Although virtually all of our 100 people will be subjectively feeling the sensations they report, perhaps only a minority will exhibit biological activity that can explain the symptoms. Further, the presence of biological markers will typically be secondary to the power of perceptual and emotional factors in the symptom-reporting process. Unfortunately, it can be quite difficult to disentangle truly dangerous low-level toxic exposure from psychological factors in explaining the elevated symptoms. Using single-session survey or experimental designs, this is an almost impossible task—something akin to proving the null hypothesis. On a case-by-case basis, however, where individuals are repeatedly exposed to potential toxins and placebos in a double-blind fashion, we may be able to distinguish the individual symptom-reporting patterns in responses to substances. Note that this strategy may help to determine the dose-response gradient of toxins to symptoms for a particular individual in a controlled laboratory setting. The degree to which this knowledge generalizes to symptom reports in the real world may still be unknown because, after all, symptoms are subject to the various distortions inherent in the perceptual process.

A useful strategy for clinicians and researchers would be to acknowledge that symptoms are based on a multitude of factors. Certain psychological variables may be particularly potent in driving the symptom reporting process. The following checklist may be helpful in identifying the degree to which cases of elevated symptom reporting are being influenced by perceptual, emotional, or other psychological factors:

Perceptual Factors

1. Boring or tedious environment. People are more likely to pay attention to and to amplify bodily sensations in situations lacking in stimulation.
2. Situations fraught with tension or anxiety. Poor worker-management relations, interpersonal conflict at home, and other forms of stress or pressure can exacerbate physical symptoms. People in settings where they are unable to directly address the causes of their tension may be forced to look elsewhere to define their symptoms. For example, a person who has a specialized job with an abusive boss may not be able to acknowledge the tremendous tension brought about by his or her boss. An alternative label for this tension might be illness.
3. Isolation at work or home. Cases of MPI, for example, are likely to occur in places where individuals are unable or not allowed to talk with others. This can occur in settings with high levels of ambient noise (e.g., factories) or in places where talking is discouraged (e.g., libraries). Lack of interpersonal communication allows people more time to ponder their bodily sensations, may exacerbate tension or anxiety, and may fail to allow for

the normal social comparison that occurs when people try to understand their sensations.

4. An appropriate trigger or causal attribution. A new or unique smell, knowledge of chemical use, or recent exposure in the media of a medical problem or disaster (e.g., sick building, a celebrity diagnosed with cancer or AIDS) can help people organize their symptoms into a coherent explanation. A particularly powerful trigger can be the overt and unexplained sickness or death of a coworker or family member.

5. The social spread of the disorder. Within the workforce, psychogenic diseases have been found to spread along friendship lines rather than by proximity.

6. Secondary gain. Symptoms of all disorders are much more likely to be reported if the person receives some kind of reward from others. The reward could be attention or alleviation of responsibilities at work or in the home. Research within a family systems framework suggests that somatization disorders can help to control the dynamics within the family.

Individual Differences

1. Gender. Females are more likely to suffer from episodes of MPI, sick building syndrome, video display fatigue symptoms, and multiple chemical sensitivity brought about by presumed toxins in the environment. This may be partially due to the fact that males and females rely on different sources of information to interpret bodily state.

2. Negative Affectivity. Individuals with a history of reporting negative moods, thoughts, and symptoms may be especially prone to elevated symptom reporting.

3. Traumatic experiences in childhood. People report far more physical symptoms if they have had a traumatic experience in childhood. Further, those who have not disclosed this trauma to others are more likely to report a variety of health and symptom problems throughout the life cycle.

4. Recent traumatic experiences. Psychological upheavals (death of family member, divorce) in the preceding months may also contribute to elevated symptom reporting.

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