
The “Disgusting” Spider: The Role of Disease and Illness in the Perpetuation of Fear of Spiders

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Recent studies of spider phobia have indicated that fear of spiders is closely associated with the disease-avoidance response of disgust. It is argued that the disgust-relevant status of the spider resulted from its association with disease and illness in European cultures from the tenth century onward. The development of the association between spiders and illness appears to be linked to the many devastating and inexplicable epidemics that struck Europe from the Middle Ages onwards, when the spider was a suitable displaced target for the anxieties caused by these epidemics. Such factors suggest that the pervasive fear of spiders that is commonly found in many Western societies may have cultural rather than biological origins, and may be restricted to Europeans and their descendants.

One of the most common phobias in Western cultures is fear of spiders (Costello, 1982; Cornelius & Averill, 1983; Kirkpatrick, 1984), and over the past twenty years psychologists have explained this fear by arguing that it is a result of evolutionary selection: that is, since some spiders are venomous, this acted to select for a disposition to fear such animals (Seligman, 1971; Öhman, 1986). However, a number of recent studies have demonstrated that there is a close relationship between some common animal fears and the food-rejection response of disgust. There is evidence that fear of spiders is also associated with the disgust response, and that the development of spiders as a focus for fear may have resulted from this animal's historical association with disease and infection – particularly in Europe.

Traditional Explanations of Fear of Spiders

In studies conducted on adult populations in the United Kingdom and the Netherlands, the spider was one of the top five most feared animals (Bennett-Levy & Marteau, 1984; Merckelbach, van den Hout & van der Molen, 1987). In a study of

261 adults in the UK, 32% of females and 18% of males reported that spiders made them feel either anxious and nervous or very frightened (Davey, 1993a).

It has generally been accepted that fear of spiders is an example of a biologically prepared fear. The theory of biological preparedness assumes that most feared objects (such as spiders) are those which had been hazardous for our pretechnological ancestors (other hazardous stimuli would include snakes, darkness, heights, etc.). The selection pressures generated by these hazardous stimuli had then resulted in the evolution of phylogenetically-based predispositions to associate these pretechnologically "prepared" stimuli with traumatic consequences (Seligman, 1970, 1971). Since at least some spiders are lethally venomous, the implicit assumption is that this is the selection factor which generated a biological predisposition to associate spiders with fearful consequences.

Studies which have paired pictures of spiders with aversive consequences (normally a mild electric shock) have found that the fear which becomes conditioned to spider pictures in such procedures is significantly more resistant to extinction than fear that is conditioned to fear-irrelevant stimuli such as pictures of flowers or houses (McNally, 1987; Öhman, Dimberg & Öst, 1985). Such findings suggest that, once acquired, fear of spiders may be relatively difficult to shake off.

However, while consistent with the biological preparedness explanation of spider fear, such findings are not necessarily confirmation of it (cf. Davey, 1992a). Recent studies have suggested that the ability of spider pictures to become strongly conditioned to aversive consequences is not necessarily superior to the ability of ontogenetic fear-relevant stimuli to become conditioned to aversive consequences (e.g. Honeybourne, Matchett & Davey, 1993). Ontogenetic fear-relevant stimuli are those stimuli which have potential selection pressure but are too recent in the history and experiences of humans to have generated genetically-mediated predispositions (e.g. guns, electric outlets). This suggests that the strong conditioning effects found with spiders are not necessarily confined to phylogenetic fear-relevant stimuli, and thus their tendency to become the foci for fear reactions might be explained by processes other than genetically-encoded predispositions.

Fear of Spiders and Disgust Sensitivity

Davey (1992b) found no consensus among spider phobics as to the frightening features of spiders. However, they did show an increased tendency to fear other animals that are normally disgust-evoking (e.g. slug, snail, worm, maggot).

Subsequent studies have demonstrated that fear of spiders does covary with fear of other animals that exhibit a disgust-evoking status (Ware, Jain, Burgess & Davey, 1993). Ware et al. (1993) labeled this category of animals "fear-relevant" because they evoke fear without being predatory – other animals in this category include bat, lizard, rat, slug, leech, snake, mouse, eel, cockroach. The fact that fear of these animals covaried suggests that a single major variable underlies fear to all "fear-relevant" animals. It is unlikely that this single underlying factor is an evolutionary predisposition to fear either venomous or harmful animals, because it is difficult to conceive of the selection pressures that would have selected for fear of some of the animals in this covarying group (Davey, 1992b). It is unlikely that our ancestors ever had to avoid packs of predatory slugs or snails!

The fact that there is no consensus among arachnophobes as to the frightening feature of spiders also indicates that the primary reason for their fear is probably hidden. In a study of the relationship between disgust sensitivity (a measure of the strength of an individual's disgust response, and their sensitivity to dirt and contamination) and animal phobias, Matchett & Davey (1991) found that the strength of fear to "fear-relevant" animals was directly related to subjects' levels of disgust sensitivity and was not, as many other phobias appear to be, significantly related to their levels of trait anxiety (a measure of generalized anxiety). Subsequent surveys have shown that there is a significant correlation between self-report measures of spider fear and levels of disgust sensitivity (Davey, Forster & Mayhew, 1993). This suggests that a significant percentage of the variance in individual ratings of their own spider fear can be predicted by that individual's level of sensitivity to disgust and contamination.

Furthermore, while it has been known for some time that spider fear tended to run in families (Cornelius & Averill, 1983; Davey, 1992b), it had usually been assumed that this was a result of a biological predisposition being strengthened by intrafamilial modeling of spider fear. However, a study by Davey, Forster & Mayhew (1993) suggested that intrafamilial spider fear may not be determined by the direct transmission of spider fear from parents to offspring. They found that the only significant predictor of offspring's spider fear was the disgust sensitivity level of the parents – not the level of spider fear in the parents. This study again indicated that the relationship between disgust and spider fear was important, and implied that the transmission of spider fear within families may be rather complex and indirect.

This raises the question of how disgust sensitivity levels are transmitted between parents and offspring. Although a genetically inherited process cannot be ruled out, there are a number of theories which allude to cultural and social transmission of the disgust response (e.g. Rozin & Fallon, 1987; Davey, 1993b). These emphasize the role played by the imitation of facial expressions, social facilitation processes, and the learning of cognitive schema related to disgust and disgusting objects (e.g. Rozin & Fallon, 1987). Thus, given the acceptability of these theories, it is likely that spider fear is transmitted within families as the result of the social learning of the nature and intensity of disgust reactions - and one particular disgust stimulus is the spider.

While there is clearly considerable evidence linking spider fear with disgust sensitivity, this still begs the question of how spiders might have acquired their disgust-evoking status. Disgust is a food-rejection response consisting of a distinctive physiological manifestation (nausea), a distancing of the self from the disgusting object (avoidance), and a sensitivity to contamination from, or oral incorporation of, the offensive object (Rozin & Fallon, 1987). The adaptive benefit of the disgust response appears to be the prevention of oral incorporation of disgusting objects, and thus the prevention of the transmission of disease (Davey, 1993b).

Davey (1992b) outlined at least three ways in which fear-relevant animals associated with the disgust reaction might have acquired their disgust-evoking status: (1) by being directly associated with the spread of disease (e.g. rats, cockroaches); (2) by possessing features which resemble primary disgust-evoking stimuli such as mucus or feces (e.g. animals that are perceived as slimy such as snakes, lizards, slugs, worms, frogs); and (3) by being contingently associated with dirt, disease or contagion, or acting as signals for infection or diseased food (e.g. maggots).

The Historical Relationship Between Spiders and Disease and Illness

At first sight, the spider does not appear to fit easily into any of these three categories. However, the relevant literature reveals that historical association between spiders and disease and infection dates from the Middle Ages. For instance, in most of Europe during the Middle Ages spiders were considered a source of contamination that absorbed poisons in their environment (e.g. from plants). Any food which had come into contact with a spider was considered infected. Similarly, if a spider fell into water that water was then held to be poisoned

(Renner, 1990). In Central Europe during the Great Plagues, spiders were also seen as harbingers of the plague and death, and this association was subsequently used as the basis for Jeremias Gotthelf’s famous story, “The Black Spider” (Renner, 1990).

Until the late seventeenth century many European spiders were thought to be “poisonous” in the sense that their bites caused a variety of illnesses. For example, from the eleventh century the bite of some species of spider was associated with a mass hysterical reaction that came to be known as “tarantism” (Russell, 1979; Gloyne, 1950). Sufferers of tarantism believed that a spider bite caused an illness whose symptoms included dizziness, stomach pains, nausea and heart constriction. Various forms of tarantism have been described in Sicily, Spain, parts of Germany, Persia, Asia Minor, America and Albania (Russell, 1979), but it became most famous between the thirteenth and eighteenth century among the people of Apulia in Italy. It was not until the 1770s that it was concluded that the “apulian tarantula” (*Lycosa tarentula*) was harmless and that the sickness was caused by the systemic reaction from the bite of a completely different spider (Lewis, 1991) or merely by the heat of the midday sun (Katner, 1956)! Russell (1979) concludes that, “Excluding the toxic effects of the true bite of a scorpion or tarantula, it must be said that tarantism, like the dancing mania of the Middle Ages, is a hysterical phenomenon in which folklore, prejudice, superstition, and local cultural influences play a big part.” (Russell, 1979, p. 422).

Although the association between spiders and illness is clearly laid out in these examples, it remains to be established how this legendary association came about – especially since in reality spiders are usually neither poisonous nor the agents of the illnesses they were thought to be. One suggestion has been that the spider’s bite was one way of explaining the causes of the many terrible epidemics of plague and disease that swept across Europe from the Middle Ages onward (Gloyne, 1950). While not fatally venomous, many European spiders do possess bites which cause a painful systemic reaction (cf. Bristowe, 1958), and these bites have been known to become opportunistically associated with causally unrelated diseases and illnesses (Renner, 1990; Gloyne, 1950; Hecker, 1846). Gloyne (1950) suggests that the hysteria exhibited by the tarantists could be explained by the anxieties generated by the regularity with which serious and inexplicable epidemics were crossing Europe at the time. The most frequent type of displacement in anxiety hysteria is to project anxieties onto a specific, externally-perceived danger.

Gloyne argues that in this way anxieties about the many inexplicable and devastating contemporary epidemics became projected onto the spider as a plausible external cause, and the deep-rooted fears of disease became manifested as a significant hysterical reaction to the spider.

During the Middle Ages, spiders were also perceived as harbingers of the Great Plagues that swept across Europe from the tenth century onwards (Renner, 1990). Apart from the spider's tendency to be associated with illness because of the systemic reaction occasionally caused by its bite, spiders were also found in profusion in those parts of a house also occupied by the black rat (e.g. thatched roofs). It was in fact the black rat that carried the fleas which spread the plague, but this was not established until the nineteenth century (McNeill, 1976).

It is still perhaps somewhat perplexing that it appears to be the spider and not some other animal, more obviously associated with disease, contamination and illness, that has become a primary focus for contemporary animal fears in Western societies. However, the prominence of arachnophobia may well be the result of the attention given to it in more recent years in a variety of media, including popular children's stories and modern horror and thriller films such as the American movie *Arachnophobia*. Controlled surveys of animal fears suggest that fear of other disgust-relevant animals which have a clear and obvious relationship to disease and contamination (such as cockroaches and rats) is more prevalent than fear of spiders (Davey, 1993a; Merckelbach, van den Hout & van der Molen, 1987; Bennett-Levy & Marteau, 1984).

Cultural Differences in the Perception of Spiders

It is possible, of course, that the historical association between spiders and illness might merely represent a rationalization of naturally selected fear of spiders – the real causal factors of which have long since disappeared. However, if this were the case, we would expect fear of spiders to be a relatively universal phenomenon since it should be an inherited feature of the human gene pool independent of individual cultural traditions. Nevertheless, fear of spiders and the association between the spider and disease, infection, and illness found in European tradition is not shared by many communities in other areas of the world.

For instance, in many areas of Africa the spider is revered as a wise creature and its dwelling places are cleaned and protected by the local people (Renner, 1990). In many areas of the world, including Indo-China, the Caribbean, and

Africa, and among the Native Americans of North America and the aborigines of Australia, spiders are frequently eaten as a delicacy (Bristowe, 1932, 1945). In some of these areas, those spiders that are trapped and eaten represent some of the most lethally venomous to humans. Native American children in Brazil frequently keep spiders as pets (Renner, 1990). Finally, many cultures consider spiders to be symbols of good fortune rather than fear, e.g. Hindus in eastern Bengal collect spiders to release at weddings as a symbol of good luck, and in Egypt it is common practice to place a spider in the bed of a newly married couple (Bristowe, 1958).

This evidence suggests that fear of spiders may not be a pervasive phenomenon. It may be restricted to Europeans and their descendants (the latter having inherited through cultural transmission the traditions, values, and superstitions of their ancestors from the Middle Ages). Unfortunately, there are no cross-cultural studies of animal fears available which would substantiate this prediction, but the author is currently involved in such a survey covering European, American and Asian populations.

Conclusion

Recent studies of spider phobia indicate that fear of spiders is closely associated with the disease-avoidance response of disgust. It is not immediately clear how spiders might have become associated with this response, although examination of the relevant historical literature does indicate a close association between spiders and illness in European cultures from the tenth century onward. The development of this association between spiders and illness appears to be closely linked to the many devastating and, at the time, inexplicable epidemics that crossed Europe from the Middle Ages onwards. In many areas of Europe, the spider appears to have been a suitable target for the displaced anxieties caused by these constant epidemics; in other cases, its proximity to the real causes of the epidemics may have fostered opportunistic associations between spiders and disease.

The tendency of Europeans and their descendants to be fearful of spiders does not seem to be shared by people in many non-European cultures, and this is not consistent with those evolutionary accounts of spider fear which suggest that spider fear should be a common feature of the human gene pool regardless of culture (e.g. Seligman, 1971). However, it is consistent with the present thesis which argues that spider fear developed as a result of the association between spiders and disease in Europe after the tenth century.

Notes

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