Delusions as exploitative deception

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Abstract

Thomas Szasz' constructive theory of mental illnesses – that they are (often deceptive) social strategies – can be reframed as a testable scientific hypothesis using concepts from evolutionary biology. Most data on non-bizarre delusions support the hypothesis that delusions evolved to mitigate the dangerous consequences of social failure by serving to unconsciously deceive others into providing social benefits that otherwise would not be forthcoming. In ancestral environments, a delusional individual convinced others that he or she possessed valuable information or social contacts, faced dangerous external threats, or was ill, and was thus eligible to receive valuable benefits. If delusions are adaptations to mitigate social failure, then they should onset when an individual faces a serious social threat, they should effectively convince others to provide benefits – at least in the short term – and they should cease when the social threat ceases. I investigate this hypothesis using numerous published studies of Delusional Disorder (DD).

Studies of the relationship between DD and life events, immigrant status, prison psychoses, and discrimination all indicate that severe social problems cause delusions in otherwise healthy individuals. Cross-cultural data collected in traditional societies show that delusions can elicit social benefits. Finally, studies show that positive social variables are the most important predictors of remission of DD. A case can therefore be made that delusions are an effective adaptation to social failure. In the case of delusions, Szasz' strategic view of mental illness is supported by the evidence.

1 Introduction

Thomas Szasz is well known both for his biting critique of the mental illness concept (e.g., Szasz, 1961) and his vehement condemnation of what he views as the coercive nature of modern psychiatry (e.g., Szasz, 1970). Less well known is that in addition to these philosophical and social critiques, Szasz has offered a constructive theory of mental illness, namely that so-called mental illnesses are

really strategies in the social games in which we are all engaged. Hysteria and all other phenomena called mental illnesses are:

> made to happen by sentient, intelligent human beings and can be understood best, in my opinion, in the framework of games. "Mental illnesses" thus differ fundamentally from ordinary diseases and are similar, rather, to certain moves or techniques in playing games. Suffering from hysteria is thus far from being sick and could more accurately be thought of a playing a game, correctly or incorrectly, skillfully or clumsily, successfully or unsuccessfully, as the case might be. (Szasz, 1961, p. 225)

According to Szasz, these strategies are incorrectly labeled illnesses because they often involve socially undesirable behaviors like lying, cheating, and deception. The illness label then justifies the social control of these behaviors (Scheff, 1999). Psychiatry, however, is strictly prohibited from considering a strategic view of mental illness as, for example, a type of lie:

> For the contemporary psychiatrist to speak of lying in connection with so-called mental illness is anathema. Once a person is called a "patient" his psychiatrist is no longer even permitted to consider such a thing as lying. The prohibition placed on this term and all it connotes has been at least as strong as that on sex in Victorian society, and perhaps even greater. Anyone who speaks of lying in connection with psychiatric problems, tends ipso facto to be identified as "antipsychiatric" and "antihumanitarian," meaning thereby that he is both wrong and bad. I believe this is most regrettable, and merely signifies the contemporary psychiatrist's (and lay person's) sentimentalizing attitude toward the so-called mentally ill. Such an attitude toward mental illness is harmful to science and has no place in it. (Szasz, 1961, p. 272)

Szasz' theory of mental illness as strategic deception can be framed as a testable hypothesis using theories from modern evolutionary biology. Given this framing, much evidence collected using the illness model actually supports Szasz. The argument I will develop here, however, differs in important ways from Szasz'. First, I am not advancing a social critique of psychiatry; I am merely interested in whether the illness model is the correct scientific model of certain types of psychiatric symptoms or whether some other model fares equally well or better. Second, I am not proposing that Szasz is correct about all mental illnesses - I strongly suspect that he is not, especially for conditions like autism and schizophrenia. I will only be investigating a single psychiatric symptom: non-bizarre delusions. Finally, unlike Szasz, I will specify in detail the special social circumstances that should elicit deceptive strategies and the benefits such strategies can deliver in the types of social environments in which humans evolved.

1.1 The mystery of delusions

Delusions are tenaciously held, false beliefs that are unresponsive to the presentation of evidence contrary to the belief. The individual is preoccupied with the belief, finds it difficult to avoid thinking or talking about it, and does not report subjective efforts to resist it (in contrast to patients with obsessional ideas). The belief involves personal reference, rather than unconventional religious, scientific, or political conviction (Meissner, 1987; Oltmanns, 1988).

Delusions are generally divided into two categories, bizarre and non-bizarre. Bizarre delusions are beliefs that are inconsistent with a person's culture - for example, an American's tenaciously held belief that insects were living in his brain. Non-bizarre delusions are tenaciously held false beliefs that nonetheless could be accepted as true in that individual's culture - for example, an American's tenaciously held, false belief that he knew of an assassination plot against the President. Non-bizarre delusions are often systematized, with the delusional system forming a logical and coherent whole. Recent events may be incorporated into the system, or used as supporting evidence. This paper will be solely concerned with non-bizarre delusions, which are accompanied by the preservation of clear and orderly thinking, and whose etiology, as discussed in more detail below, almost certainly involves severe social problems and is therefore quite distinct from that of bizarre delusions.

A final criterion for delusions is that the beliefs are not shared by others (Oltmanns, 1988). As Bell et al. (2006b) showed in a study of 'mind-control' experiences reported on the internet, however, even these bizarre delusions (albeit ones with a distinctly persecutory flavor, e.g., reports of police using brain implants) attract adherents. Although Bell et al. admit that their "social network analysis showed signs of community engagement between likely-psychotic people," they found it "noteworthy that the sampled authors [of mind control reports] are also likely to be an active part of a wider, non-psychotic community, who may have thematically similar, albeit differently motivated, concerns." It is critical to the thesis advanced here that, contrary to current psychiatric conceptions, delusions *are* believed by healthy members of the wider community.

Enormously disruptive to sufferers and their families, delusions are among the most difficult psychiatric conditions to treat. After more than a century of research, however, no compelling explanation of delusions has emerged. Delusions have been attributed to disturbances in affect and thinking, deficits in perception, defects in the psyche, projections or externalizations of personal wishes, conflicts, or fears, altered views of the self, susceptible personality types, existential conflicts, avoidance responses, unsuccessful social interactions, and cybernetic regulation of the self and others. Most theories can be characterized by two major "themes": delusions are either motivational (individuals are motivated to explain unusual perceptions, or they are motivated to reduce or ameliorate uncomfortable emotional or psychic states), or delusions are a sign of an underlying cognitive defect (see Winters and Neale, 1983, for references and critique).

Cognitive deficit models of delusions appear to be attracting the most re-

search attention. This research has revealed numerous deficits in cognition that distinguish individuals with persecutory delusions from both other psychiatric patients as well as normal controls. These deficits are typically grouped into a limited set of categories, such as attentional biases, attributional biases, 'jumping-to-conclusion' biases, and theory-of-mind deficits. For example, compared to non-delusional psychiatric patients and controls, individuals with persecutory delusions preferentially attend to threat-related stimuli, preferentially recall threatening episodes, spend less time reappraising potential threats in ambiguous pictures, take more credit for successes, more strongly deny responsibility for failures, tend to attribute failures to active malevolence on the part of others, draw conclusions based on less information and are more confident in these conclusions, and are less able to correctly infer the mental states of others (for reviews, see Bentall et al., 2001; Blackwood et al., 2001; Bell et al., 2006a).

But do these findings reveal cognitive deficits, or do they simply reveal cognitive *differences*? Imagine, for the sake of argument, that a person with persecutory delusions had real enemies. It would not be surprising that this person preferentially attended to threat-related stimuli, preferentially recalled threatening episodes, tended to attribute failures to the malevolence of others, and so forth. Because none of these studies controlled for individuals' social circumstances, it is impossible to conclude that these cognitive differences are evidence of genuine cognitive deficits, that is, of mental illness. The evidence is equally consistent with a strategic interpretation that views delusions as an adaptive response to certain kinds of real social threats.

Further, most, if not all, of these differences are state differences, not trait differences: cognitive differences covary with delusional symptoms. Correlation is not causation, so it could be that cognitive differences are the cause of delusions, that delusions are the cause of cognitive differences, or, as I will argue here, that both are correlated with a third factor: genuine social problems.

The achievement of researchers investigating cognitive aspects of persecutory delusions is to have experimentally operationalized paranoia. That is, they can now *detect* paranoia using cognitive tests, an important advance. It is far from clear, however, that they can *explain* paranoia.

There is excellent evidence that delusions are caused by changes in brain biochemistry - most antipsychotic drugs work by blocking dopamine and serotonin receptors, such as the D_2 and $5HT_{2A}$ receptors - but this is evidence in support of materialism, not of dysfunction. The brain is a electrobiochemical machine, so every difference in psychological state is caused by changes in electrobiochemistry. A person who is in love has brain levels of dopamine and norepinephrine that are different from a person who is not in love, and yet medicine would not say that that a person in love is suffering from an excess of dopamine or norepinephrine, nor would it say that a person who is not in love is suffering from dopamine or norepinephrine deficits. By blocking or activating various receptors in the brain, it should be possible to suppress or activate just about any brain function, including the formation of memories, rational thought, language, emotions, and laughter.

Regarding the many other theories of delusions, a comprehensive review con-

cluded, "In sum, despite large numbers of explanation and theories on delusional thinking, there is no agreed upon conceptualization or general model concerning their nature and very few theories enjoy empirical support" (Winters and Neale, 1983). A more recent appraisal (Roberts, 1992) was even more blunt: "Although delusion remains one of the basic problems in psychopathology, attempts to understand its pathogenesis have been dominated by unsubstantiated speculation."

1.2 Should a function for delusions be considered?

Genuine brain dysfunctions like Alzheimer's disease and stroke-related brain damage are best understood within mainstream psychiatry's illness model. It is less apparent, however, whether the same is true of other distressful psychiatric states like depression, anxiety, and delusions. As numerous critics of the Western concepts of "normal" and "abnormal" psychology have pointed out, labeling undesirable behaviors and emotions as "abnormal" allows them to be "treated," often with powerful drugs, and allows persons exhibiting them to be committed to institutions (e.g., Foucault, 1965; Scheff, 1999; Szasz, 1961). According to these critics, psychiatry then ceases to be medicine and instead becomes a form of social control.

Wakefield's concept of mental disorders as *harmful dysfunctions* (e.g., Wakefield, 1992a,b, 1999) provides a compelling resolution to the debate between psychiatry and its critics. Traits that evolved to serve some function – adaptations – are not illnesses, even if they are deemed harmful by society. If aggression is an adaptation, for example, it is not an illness, even if it causes social harm. On this view, aggression is then not a medical problem but a social problem. Conversely, traits that are dysfunctional, but cause no harm, are also not illnesses. A vasectomy sterilizes a man, but this reproductive dysfunction is exactly what he desires. Only mental or physical conditions that are both harmful and dysfunctions, like Alzheimer's disease, are illnesses. Disentangling biological function from judgments of harm permits the latter to be more easily debated and critiqued.

Establishing that a psychological phenomenon is an adaptation, and therefore not an illness, requires that (1) some important reproductive problem posed by the physical or social environment be identified (the *selection pressure*), and (2) that the psychological phenomenon in question be shown to effectively solve that problem. I will argue that severe social failure was an important selection pressure on the evolution of human psychology. I will then argue that certain types of deception would have effectively mitigated the costs of severe social failure. Finally, I will argue that delusions are exactly these types of deception.

Inquiring whether delusions are functional is especially urgent. The long-term use of older 'typical', and even the newer and safer 'atypical', antipsychotic drugs used to treat delusions is particularly dangerous. In a significant fraction of patients these treatments cause serious side effects like parkinsonism, and even irreversible brain damage, such as tardive dyskinesia: repetitive, involuntary, purposeless movements (Bagnall et al., 2003). If delusions are functional, they

are not illnesses, so the use of antipsychotic drugs to suppress them would require additional ethical considerations; new approaches to alleviate suffering would also be conceivable.

2 The selection pressure: severe social failure

Few evolutionary theorists doubt that, over evolutionary time, successful human reproduction (termed *fitness*) required successful social relationships (e.g., Byrne and Whiten, 1988). In all known traditional societies, individuals receive very important benefits from their relations with others, including food, protection, health care, and mates (Brown, 1991; Cohen, 1977; Keeley, 1996; Kelly, 1995; Lee and DeVore, 1968; Sahlins, 1972; van den Berghe, 1990; Sugiyama, 2004). Yet one's social relationships face constant threats. A spouse can fall in love with another, a parent can die, a friend can betray, and so forth. Any circumstance that jeopardized one's social relationships also jeopardized access to these critical resources.

Social problems such as loss of close kin, a failure to form friendships, poor relationships, few benefits provided by social partners, renegotiation of relationships on less favorable terms, termination of one or more relationships, loss of social status, or hostile individuals impeding one's attempt to socialize with others or ostracizing one from the group would have decreased or eliminated access to essential resources, critically reducing one's biological fitness. Social failures would have greatly increased the difficulties in finding or keeping a mate, children would have received less care and investment, and close kin may have suffered as well. One price that humans pay for their almost unprecedented reliance on social relationships is the serious fitness cost that attends social failure.

3 The adaptations: vigilance and exploitative deception

The rest of this article will argue a simple proposition: that when individuals are in what would have been, in ancestral environments, a bad social situation, they will increase their vigilance and, in some cases, they will lie. When they are in a disastrous social situation, they will experience a strong compulsion to lie, and they will believe their own lies to increase the odds that others believe them too. What I am adding to this prosaic idea is simply that there are specialized psychological adaptations to increase vigilance and to lie. The lies are compulsory and completely unconscious, and are tightly focused on themes that garnered social benefits in ancestral social environments. Because these lies are often (but not always) implausible in modern states, they succeed less often than they would have in ancestral environments, and have therefore been misidentified as a psychopathology termed non-bizarre delusions. This proposal obviously represents a radical alternative to mainstream views of delusions as a

mental dysfunction of some sort. As such it is extremely speculative and will require considerable further testing.

3.1 Increased vigilance

Individuals suffering severe social failure have, by definition, few social partners. They have few people to take care of them if they are injured or fall ill, they have few people to provide critical resources like food, and they have few allies to help defend them in conflicts with others. Consequently, they are far more vulnerable than others to illness, injury, resource shortages and social conflicts (e.g., Sugiyama, 2004). Given this increased vulnerability, it becomes increasingly necessary to avoid such costly circumstances. To do so, socially vulnerable individuals must increase their vigilance, at the expense both of devoting more time and effort to other tasks and of mistaking benign situations for dangerous ones, what **?** refers to as the 'smoke detector principle' (smoke detector thresholds must be set low so that there are very few false negatives, at a cost of higher frequencies of false positives).

3.2 Signaling and deception: General theory

From an evolutionary perspective, adaptations for communicating information or sending signals evolved because they benefited the sender, and not necessarily the receiver (Dawkins and Krebs, 1978). Organisms may communicate either true or false information when it is in their fitness interest to do so. Because conflicts between organisms are common, deception should be rife in nature, and it is. Mimicry and crypsis are extremely widespread in vertebrates, arthropods and opisthobranch gastropods (Starrett, 1993). Every example of camouflage coloring in animals and plants is an example of an adaptation designed to deceive. In a naïve biological theory, bluff and deception would be the rule rather than the exception among organisms with conflicts of interest.

In cooperative relationships, however, where communication enhances the effectiveness of cooperation and future interactions are likely, outright exploitation of receivers should be rare (Markl, 1985). In fact, in cooperative social systems, signals should be cheap, reliable, and easy to send because this reduces the cost of cooperation, thus increasing its net fitness benefit. Receivers in cooperative relationships are nonetheless susceptible to third-party parasites that mimic the sender's signal, since discrimination against the parasite's signals may jeopardize the benefits obtained by communicating and cooperating with the sender (Hölldobler, 1977). This has been documented in nature. Ants are a highly cooperative social species, and they have evolved an elaborate yet inexpensive communication system based on both chemical and behavioral signals. This system, however, is exploited by parasites. Certain species of beetles have evolved to mimic ant feeding signals in order to receive food from the ants while providing nothing in return (Hölldobler, 1977).

Organisms living in social systems that rely on "cheap" signals for the exchange of substantial benefits are susceptible to exploitation by parasites that

can mimic these signals because the organisms cannot effectively discriminate against possible parasites without accidentally discriminating against real cooperators. For humans, who facilitate the exchange of extremely valuable benefits using a communication system (language) that relies on "cheap" vocalizations, these unavoidable "parasites" may be individuals who are suffering severe social failure.

3.3 Exploiting social partners

In biological theory, one of the principle mechanisms to deter deception in cheap signaling systems is to punish false or deceptive signals by defecting from repeated future cooperative interactions to the deficit of the deceiver (e.g., Silk et al., 2000, and references therein). An important cost that humans face for deceiving other group members, in other words, is the loss of social relationships. This consequence of "cheating" is predicted by virtually all models of the evolution of cooperation based on social exchange (Axelrod and Dion, 1988; Axelrod and Hamilton, 1984). An individual who is already suffering severe social failure, however, that is, one with few or no profitable social relationships and little access to future social benefits, cannot be deterred by such threats. This individual has nothing to lose and much to gain from successful deception that elicits social benefits they otherwise have no access to. An adaptation to deceive and exploit social partners should be present in all individuals, but only activate in those for whom the benefits of deception outweigh the costs. Among individuals already suffering severe social failure, the benefits of deception and exploitation will almost always outweigh the costs because there are few or no costs!

What would such a deceptive, exploitative adaptation look like? First, it should cause individuals suffering severe social failure to signal others that they need social benefits, and that they can provide social benefits in return. These individuals should behave in ways that are difficult to consciously imitate, like displaying intense fear or excitement (e.g., Ekman et al., 1980), because such behavior may be more likely to convince others. They should be able to give reasons for their behavior that are difficult to independently verify, at least immediately. Examples include the claim that one possesses important information or has an intimate relationship with a high status individual. The deceptive signals, like cues of need and distress, should be supported by explanations or additional information that provide a plausible basis for the signals. Individuals attempting to extract social benefits from others via deception will be plausible recipients of the intended benefits, and they should feel compelled to communicate their deceptions to others. The adaptation should deactivate if and when social partnerships are established.

There is evidence, discussed below, that delusions satisfy every hypothesis, and conversely, that these hypotheses account for most of the significant clinical, etiological, and demographic aspects of delusions, a psychotic psychiatric symptom. The only previous (brief) suggestion that I have encountered that psychoses function to mitigate social exclusion is Wallace (1960). He presents

no rationale for this function however. As I discussed earlier, Szasz (1961) has argued that "mental illness" in general is often a form of deception. Henderson (1974, 1981) has carefully investigated the hypothesis that "neuroses," though not psychoses, function to elicit care, and Sullivan (1953) is well known for his interpersonal approach to psychiatry. The exploitative deception hypothesis of delusions is consistent with the argument that self-deception functions to facilitate the receipt of social benefits (Alexander, 1979; Nesse, 1990; Slavin, 1985; Trivers, 1985).

3.4 Alternatives to deception

Individuals facing severe social problems should first respond by attempting to please others and to conform to their values in order to foster relationships. If these attempts fail, however, there are few alternatives to deception for the simple reason that it is difficult to compel others to form friendships. Although threats might successfully coerce social benefits in some circumstances, many individuals suffering severe social problems would not be able to credibly threaten anyone. Deception appears to be one of the few viable strategies for individuals facing severe social failure to obtain the social benefits they need to survive and reproduce.

3.5 Domains of deception

There are three domains where humans receive substantial social benefits: social exchange, defense, and mating. Each of these should consequently be the target of individuals wishing to extract social benefits via deception.

3.5.1 Social exchange

Individuals prefer to cooperate with individuals who have valuable benefits to offer (e.g., Dugatkin, 1995; Henrich and Gil-White, 2001). Deceptive cues of access to important information, people, or of possessing valuable skills should therefore increase one's social value to others, increasing access to social benefits. Additionally, individuals help others when they can provide large benefits to others at low cost to themselves (throwing a rope to a drowning man, for example) because they are then eligible for a return on this investment when the benefited individuals reciprocate (e.g., Gouldner, 1960; Trivers, 1971). Humans give off numerous cues of distress like crying and expressions of fear (e.g., Darwin, 1872; Ekman, 1989) indicating they are eligible for receiving these kinds of social investments. Social norms also often dictate providing assistance to needy group members. Deceptive cues of illness, fear, or distress should therefore elicit social investments from unsuspecting fellow group members.

3.5.2 Defense

Belief that there is an external threat provides a very strong impetus for cooperation among humans (e.g., LeVine and Campbell, 1972), and it has been

argued that external threats were a significant selection pressure for the initial evolution of cooperation among hominids (Alexander, 1987). Because a high level of within-group cooperation among a large number of individuals is essential to successful defense, external threats provide an extremely strong incentive to suppress internal political conflicts. Further, in the face of an external threat, each healthy group member has considerable value to other group members as a defender. Group members should readily cooperate against possible external threats because the costs of responding to a false threat are lower than the costs of not responding to a real threat. Deceptive claims of external threats should therefore elicit social benefits by reducing internal political conflicts that might threaten those with few allies, and by increasing one's social value as a provider of important information about enemies, and as a defender.

3.5.3 Mating

A mating relationship is usually a close and intimate relationship, in which partners have considerable influence on one another. Deceptive claims of a romantic relationship with a high status person would be difficult to disprove, and they imply that one has influence on that person, as well as access to their power and resources. It should be possible to trade on one's perceived relationship with a person of status and power to increase one's own status and power.

4 Delusions as exploitative deception

4.1 Mental illness as adaptation

Several authors have suggested that certain psychiatric symptoms and syndromes may be adaptations (Badcock, 1990; Chance, 1988; Gardner, 1982; Gilbert, 1989; Glantz and Pearce, 1989; Hagen, 1999, 2003; Huxley et al., 1964; Nesse, 1991; Price, 1972; Thornhill and Thornhill, 1990; Wilson, 1993). Unpleasant experiences like nausea, vomiting, and fever are healthy, functional physiological responses to toxins and infections. Analogously, intense, negative psychological experiences like delusions and hypochondriasis may be "healthy", functional responses certain types of social failure. If so, under Wakefield's illness concept they are not illnesses however distressing or harmful they might be.

4.2 Delusional Disorder

To avoid confounding the etiology of delusions with the etiology of depression, hallucinations, brain damage, substance use, or catatonic behavior, all of which can be associated with delusions (Manschreck, 1989), I will restrict my focus to delusions in the absence of any other symptom, that is, to the distinct nosological entity Delusional Disorder (DD). (Although there is still some debate whether DD is a valid and distinct psychiatric entity, it has been accepted as such in

the DSM-IV; see, e.g., Jørgensen and Jensen, 1988; Kendler, 1980, 1982, 1984, 1987; Kendler and Tsuang, 1981; Koehler and Hornstein, 1986; Opjordsmoen, 1987; Winokur, 1977, for work on the nosological validity of DD and related delusional psychoses.)

DD is defined (APA, 1994) by the presence of non-bizarre delusions of at least one month's duration, and by the absence of hallucinations, disorganized speech, disorganized or catatonic behavior, flattening of affect, markedly impaired functioning, odd or bizarre behavior, underlying medical condition, or physiological effects of a substance (i.e., drug use). Paranoid Disorder (DSM-III) is an older term for DD that included only persecutory or jealous delusions.[1] In other words, individuals with DD are cognitively, emotionally, and physically unimpaired, and their only symptom is a non-bizarre delusional framework.

Paranoid Schizophrenia (DSM-IV), in contrast, is similar to DD, except that prominent auditory or visual hallucinations are present in addition to delusions. This paper will not propose an adaptive function for Paranoid, Catatonic, or any other type of schizophrenia. Unfortunately, studies of delusions often include individuals who might be diagnosed as schizophrenic or for whom a diagnosis of DD is excluded due the presence of prominent hallucinations or other psychotic symptoms. Besides delusions and hallucinations, psychotic symptoms include disorganized speech, and grossly disorganized or catatonic behavior. The use of data including any such individuals will be noted.

Although DD is rare (with a prevalence of approximately 0.01-0.03%), delusions in concert with other symptoms like depression and auditory hallucinations are not. One population survey found the prevalence of delusions to be 3.3% (Van Os et al., 2000). Another large (n=18,980) cross-cultural survey found the prevalence of delusions to be 1.9% (Ohayon and Schatzberg, 2002). Though delusions can be associated with a variety of other conditions, individuals with DD have delusions and nothing else. Identifying the cause of DD might therefore reveal the specific cause of non-bizarre delusions, a cause that could then explain the association of delusions with other disorders. Let's call this unknown cause 'X'. The association of delusions with, e.g., brain damage, hallucinations, catatonia, substance use, or depression might be via the association of brain damage, hallucinations, catatonia, substance use or depression with X. For example, brain damage could cause X, which then causes delusions. Seen from this perspective, the prevalence of delusions is expected to be much higher than DD. In section 5 I will discuss the considerable evidence that X, the unknown cause of non-bizarre delusions, is severe social problems.

Where possible, findings for DD will be contrasted with those for schizophrenia. Schizophrenia provides an excellent control case for DD since it is also a psychotic disorder whose symptoms include both bizarre and non-bizarre delusions, as well as the more disabling psychotic symptoms. As will be seen below, DD has a social "fingerprint" quite distinct from schizophrenia. When delusions are separated from other symptoms and conditions, an etiology of social exclusion and isolation emerges.

[1] These older DSM III criteria are still commonly encountered in the research literature.

4.3 'Paranoia' as increased vigilance

Paranoid Personality Disorder (PPD, DSM-IV) is not considered to be a psychotic disorder; individuals are not delusional-they do not cling tenaciously to an elaborated false belief – nor have they experienced other psychotic symptoms. They are, however, very distrustful and suspicious of others, whose motives are interpreted as malevolent. PPD may be an adaptation to social problems that employs vigilance rather than deception. Socially threatened individuals must be on the constant lookout for attempts to deprive them of material, social, or reproductive resources. Because they do not have social partners that would help them, they must also be more vigilant in avoiding injury and disease. PPD, anxiety, obsessive-compulsive, and certain somatoform "disorders" may therefore be vigilance-type adaptations to social and physical threats (see also Boyer and Lienard, nd). PPD appears to be more common than persecutory delusions, and, if an adaptation, may be used instead of deception for less severe social threats. Socially threatened individuals who fear members of their in-group may be increasing their vigilance towards likely internal adversaries rather than attempting to exploit them.

4.4 Delusions as adaptations for exploitative deception

In contrast to PPD, DD is characterized by the presence of a full-blown delusional framework. Delusional themes are not random or arbitrary. In principle, delusional themes could orbit any domain of human cognition involving belief formation, including any aspect of the physical environment (e.g., beliefs about the location of streets and buildings), the biological environment (e.g., beliefs about apples and lettuce), material culture (e.g., beliefs about how to open a car door or put on a pair of pants), or even numerous aspects of the social environment (e.g., beliefs about the meaning of English words). But they don't. Cross culturally, the vast majority of delusions can be characterized by a tiny subset of all conceivable themes: Grandiose, Persecutory, Erotomanic, Somatic, and Jealous (APA, 1994). These themes almost exactly match the domains of deception that are most likely to garner social benefits, as discussed above in section 3.5: social exchange, defense, and mating. Grandiosity deceptively increases one's social value; somatic delusions deceptively indicate that one is sick and therefore deserving of aid; paranoia deceptively indicates an external threat that could increase group cohesion and increase one's value as a provider of information about enemies and as a defender; and erotomania deceptively indicates a relationship with a high status individual that could be traded on to increase one's own status. Jealous delusions represent increased vigilance, not deception. See table 1 for a summary of the deceptive or vigilant functions proposed for each delusional theme.

If delusions are to effectively deceive others, delusional individuals must act in accordance with their delusions. Importantly, most do. Wessely et al. (1993) found that 60% of their sample of deluded individuals[2] reported at least

[2]Sample included individuals diagnosed with schizophrenia and affective psychosis.

Delusional theme	Hypothesized function
Grandiose: Individuals are convinced they possess important information, have a special relationship with a very important person, or have some great (but unrecognized) talent or insight.	**Deception**: Individuals are presenting themselves as highly valuable social partners in order to gain friends, allies, and other social benefits.
Persecutory: Individuals believe that they are threatened by powerful others. These are the most common type of delusions (Bentall et al., 2001). Individuals with these delusions can give very convincing accounts of the reputed threat, behave consistently with the delusion (Wessely et al., 1993), and give cues of genuine fear and distress (Kennedy et al., 1992).	**Vigilance**: Socially threatened individuals need to greatly increase their vigilance towards the social environment to prevent further harm. **Deception**: Belief in an external threat provides a very strong impetus for cooperation among members of the same group, especially those living in small, autonomous bands with real enemies. These delusions exploit the willingness of others to cooperate in mutual defense, decreasing threatening internal conflicts, and increasing the mutual value of all group members.
Erotomanic: Individuals believe that another person, usually of high status, is in love with them. Males with erotomanic delusions often attempt to rescue females from some imagined danger (APA, 1994). Note that the delusional person does not necessarily claim to be in love with the target.	**Deception**: Individuals that are highly valued by, and have an important connection with, a high status individual have higher value themselves. Claims of sexual relationships may have been particularly difficult for others to disprove because even when such relationships exist individuals often deny them. Males falsely claiming to offer defensive benefits to females are probably attempting to obtain both social and sexual benefits.
Somatic: Individuals with somatic delusions, which are often difficult to distinguish from Hypochondriasis (APA, 1994), are preoccupied with the fear or idea that they have a serious disease based on a misinterpretation of one or more bodily signs or symptoms. The fear persists despite medical reassurance.	**Vigilance**: Socially threatened individuals need to be particularly concerned about falling ill because of the uncertainty that others will care for them. **Deception**: Group members are tricked into providing care under the assumption that they are helping a seriously ill person (who might then return the favor in the future). Social norms may also dictate providing assistance to those who appear in need.
Jealous: Individuals believe their mate to be unfaithful.	**Vigilance**: Socially threatened individuals are likely at greater risk for losing their mates. Jealous delusions are therefore not examples of exploitative deception, but are simply a greatly increased form of normal jealousy.

Table 1: The five non-bizarre delusional themes according to DSM-IV, and their possible functions.

one action based on delusion; third-party informants reported that 52% of the sample probably or definitely acted on delusions. Persecutory delusions were significantly more likely to be acted upon than other beliefs. In a sample of patients with DD who were being supervised by a forensic psychiatric service after violent or threatening acts, Kennedy et al. (1992) similarly found that 80% of the acts were related to the delusion. Other actions, such as fleeing or barricading to avoid delusional persecutors were also consistent with the delusion.

For delusions to be a universal psychological adaptation, they must be found in all cultures. That appears to be the case (Ndetei and Vadher, 1984; Westermeyer, 1988). Westermeyer (1988), relying on a review of the literature, four years of field work in Asia, 15 years at an International clinic at the University of Minnesota Hospitals and Clinics, and several studies of culture and psychopathology conducted in the United States, makes the following cross-cultural generalizations about delusions: Delusional themes (e.g., grandiose, persecutory) vary little, if any, across cultures, whereas the specific content may be influenced by culture; culture-bound (e.g., persecution by hekura spirits) and secular (e.g., persecution by political enemies) delusional content are not mutually exclusive, but may coexist in the same individual; and delusional content can be quite etic, or secular, and yet still give rise to behaviors that are highly culture bound or emic (such as building a religious shrine or undertaking amok-type violence).

The hypothesis, in sum, is that individuals facing severe social threats developed powerful delusional systems. These caused them to unconsciously deceive their fellow group members in order to receive social benefits that they had lost or been unable to obtain. For example, an individual experiencing a persecutory delusion – the Bongo-Bongo are trying to kill me – would display very convincing signs of fear and distress and be able to cite evidence of the truth of their claims. In a small, somewhat isolated band with genuinely hostile Bongo-Bongo neighbors, such a display could be convincing enough that fellow group members would cooperate with this individual against the Bongo-Bongo, a common enemy. Indeed, it is difficult to see why an otherwise normal individual displaying convincing, culturally consistent fear towards a known enemy would not be believed at least some of the time. And if they were believed, it is difficult to see why they wouldn't at least occasionally obtain social benefits. On this view, delusions are a protective response to social problems, including those that result from brain damage, substance use, etc.

Because only a tiny fraction of the world's population currently lives in small, isolated communities with hostile neighbors, delusions, even if they are adaptations, will often fail to elicit benefits. Citizens of industrial societies live in large communities with extensive police and military forces, and have access to many sources of information. Since external attacks are unlikely and exaggerated fears are often easy to disprove in these contexts, delusional displays of persecution have little chance of success and in fact are usually maladaptive – tragically, they tend to intensify social isolation rather than mitigate it. Although social problems should cause delusions in all societies, delusions would usually provide

social benefits only in the now rare small, kin-based societies.

5 Social problems cause delusions

Delusions are strongly associated with social problems. In the 'social selection' hypothesis, this is attributed to the delusions themselves: delusions, it is claimed, prevent people from forming and maintaining social relationships. Alternatively, in the 'social causation' hypothesis, severe social problems cause delusions in otherwise healthy individuals. If delusions are adaptations to severe social problems, then social problems should cause delusions. Several lines of evidence indicate that otherwise healthy individuals first suffer severe social problems, and then suffer delusions.

5.1 Psychiatric populations

Cameron (1943) was among the first to explicitly locate the genesis of delusional systems in the social arena. He identified the importance of social isolation and lack of social communication in the development of a delusional framework, noting that paranoic attitudes and actions grow out of a breakdown in the machinery of social cooperation. Cameron, however, felt that isolation from the community was only the final outcome of a process that led the delusional individual to act detrimentally on his environment. Interestingly, he, too, recognized that delusional behavior may occasionally make an individual a distinguished person and, rarely, a leader of men.

In contrast to Cameron, Lemert (1962) found strong evidence for the causal role of social exclusion in paranoia. He retrospectively studied eight cases of persons with "prominent paranoid characteristics." Four cases involved persons admitted to the state hospital at Napa, California, with diagnoses of Paranoid Schizophrenia. The lack of any history or evidence of hallucinations or intellectual impairment, however, excludes schizophrenia as a likely diagnosis for these cases. The others involved persons admitted to hospitals, involved with the law, or having chronic job difficulties. One case resembled Paranoid Personality Disorder.

Lemert spent as much as 200 hours per case collecting data from anyone who played a significant role in the life of the person involved, attempting to establish the order in which delusions and social exclusion occurred. He found that:

> [t]he paranoid process begins with persistent interpersonal difficulties between the individual and his family, or his work associates and superiors, or neighbors, or other persons in the community. These frequently or even typically arise out of bona fide or recognizable issues centering upon some actual or threatened loss of status for the individual. This is related to such things as the death of relatives, loss of a position, loss of professional certification, failure to be

> promoted, age and physiological life cycle changes, mutilations, and changes in family and marital relationships. The status changes are distinguished by the fact that they leave no alternative acceptable to the individual, from whence comes their "intolerable" or "unendurable" quality. For example: the man trained to be a teacher who loses his certificate, which means he can never teach; or the man of 50 years of age who is faced with loss of a promotion which is a regular order of upward mobility in an organization, who knows that he can't "start over"; or the wife undergoing hysterectomy, which mutilates her image as a woman.

Lemert concluded that it is this process of exclusion and isolation that leads to the development of the delusional framework and not the converse. He notes that paranoia emerges in situations where "the goals of the individual can be reached only through cooperation from particular others, and in which the ends held by others are realizable if cooperation is forthcoming from ego," precisely the conditions that pertained in hunter-gatherer groups during human evolutionary history, and precisely the conditions predicted by the exploitative deception hypothesis.

In another retrospective study, this one of a group of 34 individuals with DD (DSM-III Paranoid Disorder), Kaffman (1981) found that in every case there was a clear and realistic connection between paranoid premises and facts and events in the patients' life. He also found that authentic past and current interpersonal transactions play a dominant role in generating and activating the paranoid beliefs. From the case studies presented, these transactions appear to have involved isolation and rejection.

Kendler (1982) argues that DD is distinguished from schizophrenia by low rates of psychiatric illness among family members of patients with DD, and the fact that environmental factors look to be more etiologically important than do than genetic-constitutional ones. Several lines of evidence support the hypothesis that these 'environmental factors' are social problems. Principle among them are case control studies of DD vs. schizophrenia. Because the symptoms of DD are less disabling than those of schizophrenia, social selection theory would predict that DD will be associated with fewer social problems than will schizophrenia. Several studies, two of which are described here, show just the opposite: DD, the less severe syndrome, is associated with more social problems than schizophrenia, supporting a social causation theory of DD.

Based on an analysis of case notes and follow-up interviews, Retterstöl's retrospective/case-control study of 301 first-admission psychiatric patients with paranoid and paranoic symptoms (Retterstöl, 1966) found that 100% of paranoid psychoses were caused by an event that "provokes the insecurity of the individual," i.e. those that tended to isolate the individual and make him feel an outsider, either by making him unpopular within his own group, or by transplanting him to new and strange surroundings. This was true of only 54% of cases diagnosed with schizophrenia.

Kay et al. (1976) conducted a case-control study between psychiatric patients

diagnosed with either paranoid psychosis (n=54), or with affective psychosis (n=57). A minority of the paranoid patients were diagnosed as schizophrenic. Before the onset of the illness, paranoid patients were found to have had more difficulty than affective patients in forming and maintaining satisfactory interpersonal relationships, and had been more solitary, shy, reserved, and suspicious, and less able to display sympathy or emotion. At the onset of illness, the following features distinguished the paranoid group from the affective group: low social class, having few or no surviving children, living alone, and social deafness. All of these indicate an increased likelihood of social problems. Kay et al. conclude that their data support a multifactorial hypothesis where various adverse circumstances, especially in combination, such as being unmarried, having few close relatives, belonging to lower social class groups, or becoming deaf, increase the chances of hardship, insecurity and loneliness in later life. The accumulated sense of deprivation and injustice is conducive to paranoid illness. Because socially impaired personalities were not associated with low social position, they disfavor downward social drift as an explanation for the correlation of social problems with paranoid illness.

5.2 Longitudinal population surveys

The causal role of social problems in delusion formation is also strongly indicated by recent longitudinal studies that assessed various types of social problems at time 1 in large samples of the general population and then found high rates of delusions at time 2 among those who suffered severe social problems at time 1 (screening out, or controlling for, individuals with a history of psychotic symptoms at time 1).

A large (7076) random sample of members of the Dutch population (all fluent Dutch speakers), for example, was screened for a three-year longitudinal study (Janssen et al., 2003). Individuals with any history or evidence of psychotic symptoms (or psychosis-like experiences) at the initial interview were excluded from the study. Individuals who experience discrimination based on ethnicity, sex, sexual orientation, age, disability, or appearance are at increased risk for social problems. Perceived discrimination reported during the initial interview in one domain (e.g., skin color) was associated with a near doubling of the rate of delusional ideation found at the final interview three years later, relative to those who reported no discrimination. Perceived discrimination reported in multiple domains (e.g., skin color plus sexual orientation) was associated with a more than five-fold increase in the rate of delusional ideation found three years later. These associations remained after adjustment for variables measured at the initial interview like employment status, marital status and education level, non-psychotic DSM-III-R diagnosis, indicators of premorbid social adjustment, and personality measures of neuroticism, self-esteem and locus of control. Interestingly, no association was found between discrimination and onset of hallucinatory experiences, suggesting that discrimination increases risk for delusions, and not psychotic symptoms per se.

In a similar study (Spauwen et al., 2006), 2524 adolescents aged 14-24 years

provided self-reports at time 1 of lifetime exposure to trauma, including physical threats, rape, sexual abuse, and serious accidents. They were also assessed for psychotic symptoms, and potential confounds like psychosis-proneness, socioeconomic status, urbanicity, cannabis use, major depression, bipolar disorder, anxiety disorder, and hypomanic episode. At time 2, an average of 42 months later, participants were interviewed for presence of psychotic symptoms (11 delusion items and 4 hallucination items), major depression, and bipolar disorder. Controlling for the aforementioned confounds, the odds ratio for the association between experiencing any trauma and psychosis narrowly defined (i.e., 3 psychotic symptoms) was 1.89 (results were not reported separately for delusions and hallucinations). When trauma categories were inspected separately, all were significantly associated with psychosis except 'other' and 'serious accident', indicating that psychosis is not caused by trauma in general, but rather social trauma ('Natural catastrophe' might or might not be an exception). Trauma was also not associated with new cases of major depression or bipolar disorder at time 2, indicating that trauma was a risk factor specifically for psychotic symptoms, not psychopathology in general.

5.3 Immigrants and refugees

Immigrants and refugees are quite likely to suffer social problems since they have often left family, friends, and other important social ties behind, and will face increased difficulties competing for social benefits in a foreign, and perhaps hostile, society. The successful formation of new social ties in the adopted country is far from assured. Tellingly, numerous studies have found extremely high rates of delusional and paranoid symptoms among immigrant and refugee populations (Carpenter and Brockington, 1980; Chiu and Rimón, 1987; Ettinger, 1959, 1960; Kendler, 1982; Ødegaard, 1932; Westermeyer, 1989). Two studies show rates of DD among immigrants be 40-50 times that of the indigenous population (Ettinger, 1960; Westermeyer, 1989), compared to only a 3 1/2-fold increase for schizophrenia (Ettinger, 1960). Kendler (1982) found rates of DD among the foreign born to greatly exceed rates of either schizophrenia or affective illness. DD clearly has a particular association with immigrant/refugee status.

In an attempt to resolve whether these results are best explained by social selection theory, social causation theory, or other factors, Westermeyer (1989) conducted a careful study of paranoid symptoms and disorders among 100 Hmong refugees living in the United States. In six of nine cases (66%), no pre-emigration factors could be found, supporting social causation theory. His study indicates that successful acculturation, assessed in several ways, is associated with low paranoid symptoms. Chiu and Rimón (1987) report that 56% of the paranoid immigrants in their study had no history of psychiatric treatment prior to immigration, again supporting social causation theory.[3] Social causation appears

[3] 22% of these patients had a DSM-III Paranoid Disorder while 61% were classified as Paranoid Schizophrenic.

to contribute to the high prevalence of delusional symptoms among immigrants, although social selection is probably a factor as well.

5.4 Low socioeconomic status

DD is associated with poor social and economic standing, as is mental illness in general (Robins et al., 1991). This association, however, is particularly strong in the case of DD. In a review of the demographics of DD, Kendler (1982) found that patients with DD were more likely to come from poor economic backgrounds and to be more poorly educated than either patients with affective illness or (in most cases) schizophrenia. Kendler argues that this pattern speaks against the hypothesis that disabling symptomes alone are the cause of downward social drift. Because schizophrenia produces more disabling symptoms than DD, it should produce greater psychosocial disability and, therefore, more downward social drift. The fact that DD was, nevertheless, associated with lower SES suggests that low SES is a precursor of DD, rather than a consequence of disabling symptoms. Kay et al. (1976) also found paranoid patients to be significantly associated with low social class as compared to patients with affective disorders. They, too, disfavor the social selection hypothesis.

But, is low SES associated with social problems of the kind hypothesized to cause delusions? Mirowsky and Ross (1983), using data on 463 individuals collected during a community mental health survey in El Paso, Texas, and Juarez, Mexico, found that low socioeconomic status together with belief in external locus of control – the expectation that "outcomes of situations are determined by forces external to one's self, such as powerful others, luck, fate, or chance," – was strongly associated with "mistrust", the feeling that it is safer to trust no one. Mistrust, in turn, was associated with "paranoia" ("paranoia" being determined by responses to four questions similar to diagnostic criteria for DSM-IV Paranoid Personality Disorder). Mirowsky and Ross conclude that powerlessness, victimization and exploitation were the causative factors of mistrust and thus paranoia.

Intuitively, severe social failure would seem to be a consequence of suffering delusions. The facts, however, strongly suggest the opposite: severe social problems both precede, and signficantly increase the risk for, the onset of delusions, an association that persists even after controlling for numerous confounds. This is compelling evidence that social problems cause delusions.

6 Delusions "work" in small scale societies

If delusions function to alleviate social problems, then delusional individuals must (1) convince others to share their delusions, and (2) garner social benefits as a consequence. There is strong evidence for (1), and a fair amount of evidence for (2).

Psychiatry recognizes that in most societies, including Western societies,

delusional individuals can at least occasionally convince others to share their delusional framework, reifying the phenomenon as Shared Psychosis (Folie à Deux). According to DSM-IV (APA, 1994):

> The essential feature of Shared Psychotic Disorder is a delusion that develops in an individual involved in a close relationship with another person (sometimes termed the "inducer" or "the primary case") who already has a Psychotic Disorder with prominent delusions....The [secondary] individual comes to share the delusional beliefs of the primary case in whole or in part....Usually the primary case in Shared Psychotic Disorder is dominant in the relationship and gradually imposes the delusional system on the more passive and initially healthy second person. Individuals who come to share delusional beliefs are often related by blood or marriage and have lived together for a long time, sometimes in relative isolation. If the relationship with the primary case is interrupted, the delusional beliefs of the other individual usually diminish or disappear. Although most commonly seen in relationships of only two people, Shared Psychotic Disorder can occur among a larger number of individuals, especially in family situations....

Shared Psychosis is labeled a disorder, but it appears to simply describe situations in which the delusions of a stronger personality are believed by weaker personalities. In Western societies, secondaries are often vulnerable individuals who may have a preexisting psychiatric disturbance or physical disability (Soni and Rockley, 1974). In traditional societies, however, this is not necessarily the case. There are a number of examples in the ethnographic record where social conflict is associated with delusions, which, in turn, are believed by fellow group members, eliciting benefits.

Ethnopsychiatrist Burton-Bradley worked among the diverse indigenous Papua New Guinea (PNG) population, including remote highland groups, from the late 1950's to the early 1970's. His observations of cargo cults provide compelling evidence that delusions are frequently believed, garnering social benefits. There is a vast literature on cargo cults, which arose in colonial Melanesia in response to rapid and disruptive social and cultural change. Burton-Bradley describes them as follows (Burton-Bradley, 1975, p. 12):

> A prophet, leader, or messiah emerges. He is often a mediocrity, as measured by different culture standards, and one who is not averse to the use, or threatened use, of sorcery in bringing dissidents into line, although recourse to this action is seldom necessary. He has a fantasy solution to offer his followers initiated by a revelation which may take the form of a dream or visual hallucination, both powerful agents in effecting conversion. He proclaims a great future event, or a millenium, and may even provide the specific date. Preparations are made to deal with the expected changes. Airstrips, wharves, or helipads are constructed to receive the ancestral spirits who bear the

> much-valued cargo. An iconoclastic contraculture may develop, and new social mores may be adopted. Money is destroyed, food gardens are neglected, and livestock killed on the theory that they will no longer be needed. When prophecy fails, the cult wanes and becomes latent.

Burton-Bradley approvingly noted that the early view of cargo cults as mere reflections of individual mental disorder had been discredited – current work rightly emphasized social rather than medical causes. But he goes on (Burton-Bradley, 1970, p. 124):

> An unfortunate and unanticipated by-product of this new interpretation is the implicit and occasionally explicit assumption in some quarters that psychotics are never leaders. This latter view is false....

Burton-Bradley presents several case studies from PNG in which the prophet was almost certainly schizophrenic. What is remarkable is that the prophet's grandiose delusions of the imminent arrival of cargo did not merely elicit minor social benefits, but actually catapulted the prophet to a leadership position. This despite the recognition by many of his followers that he was *longlong* (insane).[4] Although some of the prophet's closest followers might themselves be suffering from psychiatric disturbances, "The vast majority of followers prior to and subsequent to overt cult manifestations are almost certainly in a state of good mental health" (Burton-Bradley, 1975, p. 24). Sharp, a medical officer who worked in the same area in the late 1970's, also described a movement where the principal prophet had paranoid schizophrenia. He concluded that "If the distinguishing feature of crisis movement leaders is mental disorder, then that part of human behaviour and experience we call mental disturbance or madness can play a far more significant role in our affairs than we generally admit" (Sharp, 1990, p. 119). In these examples, grandiose delusions appear to be protective against the social problems that are often caused by the other symptoms of schizophrenia (e.g., Murphy, 1976).

Stevens and Price (2000) investigate cult phenomena from an evolutionary perspective as well. They provide numerous examples of delusional individuals gaining cult leadership positions and the attendant social benefits. Their thesis, however, differs significantly from that presented here. They mainly argue that schizoid traits evolved to facilitate group fissioning when resources were scarce: charismatic, often schizoid, cult leaders lead a subgroup to a new 'promised land.' In contrast, I focus solely on the deceptive functions of non-bizarre delusions, which can occur alone, or as one symptom of a psychiatric syndrome like schizophrenia or affective psychosis; I claim no evolved function for any variant of these syndromes as a whole. Further, gaining cult leadership status via grandiose delusions is not the only benefit that accrues to delusional individuals in small-scale societies. Paranoid delusions appear to deliver social benefits of a different sort, namely, increased solidarity with the group.

[4]Hallucinations are not part of the exploitative deception hypothesis, but they appear to play a role in some of these cases.

In a psychiatric survey of isolated groups of Australian Aboriginals who had only recently abandoned hunting and gathering, Eastwell (1976, 1977, 1982) found that, in a total population of 10,500, 57 were suffering from reactive psychosis, or fear-of-sorcery syndrome. This syndrome is characterized as an anxiety state with paranoid features magnified to psychotic proportions. The patient fears imminent death from the sorcery of a traditional enemy. According to Eastwell, sorcery in this population is thought to be directed towards the clan as a whole rather one member alone. Fellow clan members believed delusions of enemy sorcery, so much so that Eastwell often found multiple members of a family suffering psychotic episodes in reaction to the same or closely related event. Following the DSM definition of Shared Psychosis, he termed these delusional episodes 'associative' or 'identificatory' illness. Eastwell observed that members of the clan closed ranks with the patient in indignation against the putative enemy sorcerers, exactly the outcome predicted by the exploitative deception hypothesis.

There are other similar accounts of delusions being taken seriously by family and community members. El-Islam (1980), for example, studied the remission of delusions among a group of deluded psychotics from the Arab Gulf states. The existence of traditionally shared beliefs in the family and community set the stage for remission. The patient often attributed the remission of his delusions to relatives dealing with the object of delusion through prayer or through traditional healers, or the delusion was "absorbed" into the cultural belief system and lost its force. El Sendiony (1976) and Murphy (1967, cited in Westermeyer 1988) also note the phenomenon of relatives accepting an individual's delusional framework. Finally, the internet study of delusional beliefs discussed earlier (Bell et al., 2006b) shows that online communities form around web sites devoted to these beliefs and that not all participants are themselves delusional.

7 Social benefits and the remission of delusions

According to the exploitative deception hypotheses, delusions and persecutory fears should remit in individuals who receive sufficient social benefits. Jørgensen and Aagaard (1988) studied the relationship of a number of social variables to impairment, remission, and relapse. They found that being married, living with others, having frequent social contacts, working full-time, and belonging to high status social groups were important predictors of good outcome. Living alone, having few social contacts, and not working prior to admission, on the other hand, were by far the best predictors of poor outcome for this group of patients.

Jørgensen and Aagaard conclude that social variables like having social contacts and useful work are more valuable than any of the clinical variables in predicting outcome. Because they are correlations, the results presented by these researchers do not favor social causation over social selection theories, but they do demonstrate the strong and *necessary* association of positive social variables with the remission of DD. Finally, even patients who attributed their delusions to biological disease nonetheless stressed the importance of strong, supportive

social environments to dispelling delusions (Stanton and David, 2000).

8 Detecting exploitative deception

Over evolutionary time, could individuals suffering severe social problems lie and get away with it? After all, why not just ignore anything said by an individual suffering severe social problems? The fact is that delusions are often believed (e.g., Bell et al., 2006b). Although I have emphasized the effectiveness of delusions in small-scale societies, cults with grandiose leaders thrive in Western societies, and large segments of the public believe things that closely resemble common delusional themes. They believe in conspiracy theories, UFO's, and that certain people, such as psychics and astrologers, have special powers and abilities.

The evolution of an adaptation to unconsciously lie in dire social circumstances does not seem out of the question, especially since individuals facing social failure needn't change everyone's opinion of them, they only need to manipulate the social calculus of a few group members in their favor. The question then becomes, why are humans so gullible?

At the theoretical level, there are several factors that favor exploitative deceivers. As Hölldobler (1977) has argued for social mimics among ants, individuals who evolve to successfully discriminate against exploitative deceivers risk inadvertently discriminating against real cooperators. Because the benefits received through cooperative signaling are so valuable, individuals may evolve to tolerate some exploitation rather than risk losing the benefits obtained from the far more common genuine cooperator. Additionally, because social failure was a deadly threat, whereas being exploited was likely a less-than-deadly threat, the selection pressure on adaptations for exploitative deception was stronger than it was on detection mechanisms. Exploitative deception adaptations can then be expected to outperform detection mechanisms as a consequence of this asymmetrical, intraspecific arms race (Dawkins and Krebs, 1979).

Further, exploiters may attempt to target individuals who have little or no information concerning the social status of the exploiter. These could include individuals from other groups, or individuals from competing factions within the group. Many known hunter-gatherers lived in fission-fusion societies. Group size fluctuated dramatically with season, with smaller foraging bands aggregating into much larger groups to participate in communal hunts (Kelly, 1995). This periodic aggregation and dispersal would have enhanced the opportunities for successful deception. Information transfer would have been slowed during times of dispersion, hindering the detection of deception by naïve individuals during aggregations.

Another powerful argument in favor of social failures successfully employing exploitative deception is that it is very difficult to identify complete social failures – those who are not valued by anyone. In order to detect individuals who are not valued by anyone, one must track the entire social network. For even modestly sized groups, the time and effort required are high and possibly

prohibitive, growing quadratically with group size. Estimates are that ancestral hunter-gatherers may often have lived in groups ranging in size from 25 to 150 individuals (Kelly, 1995; Dunbar, 1993). Tracking how everyone felt about everyone in a medium-sized group of 50 would have required 2450 different assessments, a considerable, and probably impossible, undertaking.[5] In sum, in the high-stakes game of relationship formation and maintenance, there would have occasionally been an odd man out. Identifying him may not have been trivial, improving his chances of deceptively exploiting others.

9 Delusions with other symptoms

Delusions commonly occur with other psychiatric symptoms and conditions like depression, auditory hallucinations, the (non-delusional) symptoms of schizophrenia, brain injury, and substance use (Manschreck, 1989). One population survey found, for example, that 4.1% of individuals suffering depressive symptoms also had delusions (Ohayon and Schatzberg, 2002). Another found an approximately 0.7% prevalence of delusions with auditory hallucinations in the general population (Robins and Regier, 1991).

The association of depressive symptoms and delusions is clearly consistent with the hypothesis explored here. Individuals suffering a loss of social standing sufficient to trigger delusions would obviously be vulnerable to depression as well. The association of brain injury with delusions is also consistent. If a brain injury or other neurological deficit causes individuals to lose their social relationships, then delusions would, under the hypothesis, be an adaptive response to the loss of social relationships, not to the brain injury per se. Interestingly, two studies found extremely high rates of delusions following brain injury (Achte et al., 1969; Koponen et al., 2002), but in 42% and 66% of the cases the delusions onset more than 10 years after the injury. This long delay suggests that delusions might have been caused by the social consequences of the injury rather than the brain injury itself.

If the non-delusional symptoms of schizophrenia cause a loss of social relationships then, again, delusions could be seen as an adaptive response to the loss of social relationships, explaining the association of delusions with other schizophrenic symptoms. Speculatively, given that a large fraction of individuals in most societies believe in supernatural agents or powers (Boyer, 1994; Brown, 1991), auditory hallucinations, a prominent feature of schizophrenia, may not have interfered significantly with the deceptive function proposed for delusions. Burton-Bradley, in his observation of cult leaders, noted that hallucinations and dreams were important agents in effecting conversions (Burton-Bradley, 1975).

[5] The costs of tracking the entire social network might be reduced by gossiping, yet there are reasons why individuals wouldn't want to readily advertise their valuation of others. When circumstances change, valuations can change dramatically. If one discovers, for example, that a low-valued person is a relative of a highly desired potential mate (and could therefore facilitate a marriage), their social value to an individual might well skyrocket. But, if the previously low-valued person knew that an individual had spoken disparagingly of them, they would be much less likely to be cooperative.

10 Conclusion

Social systems that rely on cheap signals for the exchange of substantial benefits, like those of ants and humans, are very susceptible to exploitative deception. For humans, exploitative deceivers should often be individuals facing severe social failure because in these circumstances there is little downside to lying and potentially a huge upside.

The pervasive conception of delusions as some kind of illness or dysfunction is perfectly compatible with evolutionary theory, and a number of cognitive differences between delusional and non-delusional individuals have been discovered. Yet cognitive differences are predicted by both dysfunctional and functional hypotheses, and so, in and of themselves, are not proof of an underlying pathology. Most of the cognitive differences that have been found suggest that individuals with paranoid delusions are especially sensitive to threats and are particularly likely to attribute successes to themselves and failures and mal-intent to others, consistent with the functional hypothesis explored here.

The exploitative deception hypothesis explains the principal facts about Delusional Disorder. Individuals with DD are cognitively, emotionally, and physically unimpaired, and their only symptom is a non-bizarre delusional framework. Of the entire universe of conceivable false beliefs, delusions comprise only a tiny set of themes that, not coincidentally I argue, generate cues that would have elicited cooperation from others: possession of important information and abilities, fears of external threat, illness, and intimate relations with high status individuals. Each of these situations would have been difficult for others to verify, at least in the short term, making them ideal candidates for exploitative deception. In small, kin-based societies, delusions are believed and garner social benefits. Decades of research have shown that severe social problems precede, and probably cause, DD in otherwise healthy individuals. During our evolutionary history, individuals facing social failure, e.g., those receiving meager to non-existent fitness benefits from their relationships, would have had to monitor their social and physical environment very carefully, and may have had no choice but to unconsciously deceive others in order to obtain badly needed benefits.

Although considerably more evidence is needed that delusions generate enough benefits in small, kin-based societies to outweigh their costs, Szasz' argument that lies and deception are important aspects of what is usually termed mental illness, reframed here as an adaptationist account of delusions, is reasonably well-supported by the available evidence. Given that powerful drugs are regularly used to suppress delusions, drugs that often fail to improve patients' lives yet cause dangerous side-effects, including serious and sometimes irreversible brain damage (Bagnall et al., 2003), and given that more than a century of research on delusions using the illness model has failed to explain them, it is time to rethink our approach to these deeply mysterious cognitive processes.

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