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### Introduction

For animals, ostracism from the group is often the first step toward starvation and early death (Goodall, 1986). In humans, ostracism, exclusion and rejection by others (Williams, 2001), is a ubiquitous phenomenon, occurring around the world and throughout history. In the present paper, we suggest that evolutionary pressures, which favored group and cooperative living, shaped an ostracism detection system in humans that is sensitive to rejection from groups and close others. As such, humans are acutely sensitive to actual rejection, as well as the threat of rejection. After ostracism has occurred, the system works to cope with the rejection and, in many situations, obtain reacceptance into the group.

Our discussion of ostracism from an evolutionary perspective draws on Williams's (1997; 2001) model of ostracism. We elaborate on this model and discuss the ways in which evolution may have shaped the development of this system. This model, as well as supportive evidence, has been well reviewed elsewhere (e.g., Williams, 2001). Thus, in the current paper, we focus on those aspects of the model most influenced by evolutionary pressures. We begin by briefly outlining some general principles in evolutionary psychology that provide a framework for understanding the adaptive significance of the ostracism detection system. We then review Williams' model, with special attention to those aspects of the model that may have been shaped by evolutionary pressures. Where appropriate, we discuss illustrative research, with special attention to studies consistent with the evolutionary perspective. We conclude with a discussion

of the implications of the evolutionary perspective on ostracism and some directions for research from this study.

### The Evolutionary Importance of Remaining in Groups

It is a well-accepted axiom that human beings are social animals (Aronson, 1999; Caporael, 2001). Humans' sociality is central to understanding the evolutionary development of human psychological processes (Caporael, Dawes, Orbell, & van de Kragt, 1989). Humans' early evolutionary development occurred in a context in which individuals depended upon each other and group interaction to complete necessary survival functions (Buss & Kenrick, 1998). Consequently, individuals' survival was directly tied to their group's survival (Rossano, 2003). Because of the protection and resources offered by the group, individuals living in groups were better able to survive and propagate their genetic line. Hence, the adaptive value of living in groups likely outweighed the benefits of selfish, solitary living. Brewer and Caporael (Brewer, 1997; Caporael, 1997; Caporael & Brewer, 1991) have argued that because the group environment mediated humans' interaction, the primary adaptive problem for humans was one of coordination: how to coordinate the group's activity to maintain safe and effective functioning. Within this context, humans would benefit from developing strategies to remain within groups, as well as to detect "good" group members. Ostracism may be one such mechanism.

There is ample evidence that humans developed certain cognitive mechanisms that facilitate the maintenance and coordination required for living in groups. In an extensive program of research, Cosmides and Tooby (Cosmides, 1989; Cosmides & Tooby, 2005) have sought to demonstrate that evolutionary pressures shaped humans' ability to reason about dilemmas involving social exchange. As early group interactions expanded to involve social exchange with individuals beyond immediate kin, one recurring problem would be the ability to

detect cheaters, or individuals who did not reciprocate and fulfill their obligation. Thus, Cosmides and Tooby argue that it was adaptive for humans to develop cognitive mechanisms that facilitate reasoning about social exchange. In one intriguing series of studies, Cosmides (1989) had participants complete the Wason selection task, a logical reasoning task in which performance is generally quite low, with only 5% to 30% of participants selecting the logically correct responses. However, when the task is framed in terms of testing whether an individual has paid the cost for taking a benefit, participants' performance improves significantly, to around 70% correct responses. This improved performance is found even on unfamiliar, abstract versions of the social contract. Cosmides has also found that on an unfamiliar switched version of the task, participants' logical errors are in a direction predicted by the adaptive logic of detecting cheaters. Thus, it appears that although humans' logical reasoning may be flawed in many other domains, logical reasoning about cooperation in social dilemmas is very well adapted.

It has recently been argued that group members are likely to have developed strategies to improve coordination of group activity, including affective influences in groups (Spoor & Kelly, 2004) and mimicry (Lakin, Jefferis, Cheng, & Chartrand, 2003). In the present paper, we suggest that ostracism and ostracism detection may also serve a role in improving coordination and predictability within the group. Ostracism allows the group to exert control and maintain cooperation within the group (Ouwerkerk, Kerr, Gallucci, & Van Lange, 2005), while ostracism detection prompts the target to maintain affiliation with a protective group. However, simply being able to detect ostracism is not sufficient for the system to function adaptively. If the system is designed to ensure that individuals remain members of a group, then the system should prompt strategies that facilitate re-acceptance by the group. Ostracism is only one form of negative

social interaction. However, because ostracism threatens group membership, individuals are more likely to be sensitive to ostracism compared to other types of aversive social interaction. MacDonald and Leary (2005) have similarly argued that the evolutionary need to monitor inclusion predicts why pain should be associated with threats to inclusion.

### Model of Ostracism and Evolutionary Bases

Our approach to studying ostracism has been guided by Williams (Williams, 1997, 2001; Williams & Zadro, 2005) model of social ostracism. This model is primarily concerned with the consequences of ostracism on targets, and the framework of the model is in line with what would be predicted from an evolutionary perspective. The core of the model reflects the reactions that all targets of ostracism are assumed to experience, and the universality of these responses suggests the influence of evolutionary pressures. The periphery of the model focuses on moderators of ostracism, including types of ostracism and types of people.

#### *Core – Threats to Four Fundamental Needs*

For all targets, the model suggests that ostracism threatens four fundamental needs or social motives – belonging, self-esteem, control, and meaningful existence. The importance of each of these needs is not unique to the model, and there is ample evidence for their importance in motivating and sustaining human behavior. However, research on the four needs typically examines the causes and consequences separately. The model assumes that each of the needs is threatened by ostracism. More importantly for the present context, however, these needs are threatened precisely because of the adaptive significance of living in and interacting within group settings. Because ostracism represents a threat or potential loss of membership in a group, ostracism is likely to increase sensitivity to these particular needs.

There is clear evidence that the varieties of interpersonal rejection, including ostracism, negatively impact the need to belong (e.g., Leary, 2005; Williams & Zadro, 2005). The need to belong (Baumeister & Leary, 1995) is an essential need that contributes to individuals' physical and mental well being and functioning. Although belonging needs may be met by acceptance by a few important others (Baumeister & Leary, 1995), the importance of group living in evolutionary history would suggest that even ostracism by strangers will threaten belongingness needs. Ostracism also appears to threaten belongingness needs more strongly than other types of unpleasant interaction, such as verbal disagreement (Zadro, Williams, & Richardson, 2005).

A second fundamental social need that may be threatened by ostracism is the need for self-esteem. In particular, social self-esteem, or how we perceive that others view our goodness and worth (Leary & Baumeister, 2000), is relevant for ostracism detection. Self-esteem serves as a proxy for belonging because it provides a gauge of one's relative inclusion and worth within a group. Ostracism may be especially threatening to self-esteem (Williams & Zadro, 2005) because targets of ostracism are rarely given an explicit reason for the ostracism. Instead, they are left to surmise the perhaps myriad reasons why their own actions may have incited the exclusion.

Ostracism may also threaten the need for control over the environment (Seligman, 1975). In the ancestral environment, living and being a part of a group necessarily required a level of control and predictability (Brewer, 1997), thus ostracism threatens both adaptive inclusion in the group, as well as the sense of control and predictability offered by the group. After being ostracized, one has little control or influence over the course of an interaction or how the group members will react. Particularly if the ostracized target does not know what offense was committed, the ostracized target may not even have a sense of how to regain control.

A final fundamental need that may be threatened by ostracism is the need for meaningful existence. According to terror management theory (Greenberg, Pyszczynski, & Solomon, 1986), humans are strongly motivated to buffer the terror and fear of their own death and insignificance. Social ostracism is one of the most severe forms of punishment in many tribes (Case & Williams, 2004), and the variety of terms for ostracism often translate to a form of social death. Ostracism may increase mortality salience and serve as a reminder of what the world would be like if the target of ostracism did not exist.

*Reactions to Threats to the Four Fundamental Needs*

Ostracism threatens four fundamental needs, thus human beings are acutely sensitive to a threat to these needs. Individuals' responses to ostracism tend to follow a predictable pattern. The immediate response to ostracism is feelings of pain, hurt feelings, and depressed mood. These immediate responses appear to be universal reactions to ostracism. In the short-term, individuals then attempt to reduce the negative impact of the experience by attempting to fortify the thwarted need, with behavior aimed toward fortifying the particular need. Thus, when belonging needs are particularly threatened, then the target is likely to attempt to affiliate (Lakin & Chartrand, 2005). Similarly, if control needs are threatened, then the target is likely to try to exert social control (Williams & Lawson Williams, 2003). However, continued and long-term threats to the needs are likely to deplete a person's ability to cope and fortify the needs. Consequently, individuals may resort to acceptance and resignation that these needs will not be met. Thus, targets of continued ostracism are likely to experience despair, depression, and feelings of helplessness. Unlike immediate reactions of pain and hurt feelings, the short-term and long-term reactions are more likely to be moderated by situational and individual factors.

*Periphery – Taxonomy of Dimensions*

Four dimensions are thought to capture the variety of – modality, motives, causal clarity, and quantity. The first three dimensions are most relevant to the current discussion.

*Modality.* Physical ostracism occurs when the target is actually removed from the physical presence of others, such as with exile, banishment, and “time out” as a punishment for children. Social ostracism, commonly referred to as the silent treatment, occurs when the target is ignored or excluded but remains in physical proximity to others. Physical ostracism likely formed the foundation of ostracism in prehistoric groups, as the physical absence provides readily accessible information that the target has committed an offense. As humans’ language and communication skills became more complex, it became easier for group members to communicate how and why a particular group member was being ostracized (e.g., gossip: Dunbar, 1993), social ostracism may have become a more efficient and easier to implement form of ostracism. With social ostracism, it may have also been easier for targets to rectify their transgressions and obtain re-acceptance by the group. Rapidly changing technology has introduced a new form of ostracism, cyberostracism, which occurs outside of face-to-face interactions (e.g., Internet chat rooms, text messaging, etc.). It is likely that the ostracism detection system will respond to cyberostracism in a similar fashion as the more traditional forms of physical and social ostracism.

*Motives.* Motives refer to the labels that the target of ostracism gives to the experience. That two motives interpret ostracism as a form of punishment may be particularly important from an evolutionary perspective. Defensive ostracism results from pre-emptive or self-protective motives, so that the target is not punished or ostracized in the same way as the initial target. For example, in prehistoric groups, other group members may ostracize a cheater as a sign



that they themselves conform to the rules of reciprocity. Punitive ostracism occurs to punish the target for some reason, such as failing to reciprocate in a social exchange. These motives for ostracism may facilitate the necessary control and predictability of group members' behaviors (Brewer, 1997).

*Causal Clarity.* Ostracism may be formal and explicit, such that the offending behavior is obvious and clear to the target. Causal clarity is likely to be high when ostracism occurs immediately after the offending behavior. In many cases, however, ostracism occurs informally, with little explication of the cause. Thus, ostracism with low causal clarity is likely to be particularly frustrating.

Evolutionary pressures likely shaped these dimensions that define different types of ostracism. Changes in group size and communication likely affected the development of these different dimensions (e.g., a shift from physical to social ostracism). However, the research reviewed below suggests that individuals' immediate responses to ostracism are relatively unaffected by the type of ostracism. This lack of effect for dimensions makes sense from an evolutionary perspective in which the survival importance of being sensitive to ostracism would compensate for occasional mistakes and strong reactions to even minimal forms of ostracism. However, the various dimensions of ostracism may affect the short- and long-term coping responses.

### *Moderators*

The original model suggested several potential moderators, situational and personality factors, which were expected to moderate the extent to which ostracism threatens the four core needs. Situational factors include attributions for the ostracism (e.g., whether to blame the self for the exclusion), and personality factors relate to dispositional levels of the four needs (e.g.,

trait self-esteem). As with the dimensions of ostracism, research has provided little support for the role of moderators in immediate reactions to ostracism. Again, from an evolutionary perspective, it is not surprising that these moderators have little effect on immediate, physiological reactions to ostracism.

### *Antecedents*

A final aspect of the model addresses the antecedents of ostracism, or why ostracism may be chosen over other, more directly confrontational methods. In terms of how ostracism affects targets, it may be a particularly useful method because of the strong impact on the four needs. Ostracism also conveys the other group members' displeasure, without substantially draining on the group. For example, if a group member has broken a rule or failed in a social exchange, physically ostracizing the offending group member often has few negative consequences in the future, as the group member is no longer taking advantage of group resources. In cases where the physical loss of the group member would be detrimental, social ostracism may be effective in prompting the group member to conform to the group's rules. Ostracism may also be an easier and safer method of punishment for certain group members. A target who is physically strong may easily win in a fight, but ostracism punishes the target with less risk of injury to the group (although ostracism may lead to aggressive behaviors as discussed later).

### Reactions to Ostracism

In the next section we elaborate on some of the ways that ostracism has been studied using experimental methods, as well as how people respond to ostracism. There is mounting evidence that individuals respond quickly to even relatively minor and short episodes of ostracism (Williams & Zadro, 2005). A number of studies using different manipulations of ostracism have demonstrated the quick and powerful effects, including negative moods and

decreases in the four core needs, which are observed after only short exposure to ostracism. We briefly review two of the most commonly used methods of ostracism, the ball-toss paradigm and Cyberball. We then review research examining how people immediately respond to and eventually cope with ostracism.

### *Ball-Toss Paradigm and Cyberball*

The early experimental studies of ostracism (e.g., Williams, 1997; Williams & Sommer, 1997) involved one real participant engaged in a ball-toss game with two confederates. This ball-toss game was ostensibly unrelated to the rest of the experiment. Participants were randomly assigned to either be included and were tossed the ball about one-third of the time, or excluded and were only thrown the ball a few times during the beginning of the game. All included participants were happy and enjoyed the game. However, after only 5 minutes of the game, participants who had been excluded slumped and appeared dejected. Thus, even brief ostracism by two strangers was sufficient to provoke quick and powerful negative consequences for the target.

More recently, Williams, Cheung, and Choi (2000; Williams & Jarvis, in press) developed Cyberball, an Internet version of the ball-toss game. Participants logged onto an Internet website ostensibly to participate in a study of mental visualization, including a virtual game of ball toss with players at other locations. Rather than attend to the number of times they received the ball, participants were asked to mentally visualize the other players, imagining where they were playing, the weather, and other features that would bring the experience to life. In reality, the other players were all computer-generated, and participants were randomly assigned to be included or ostracized. The overall results of the initial studies using Cyberball indicated that for ostracized participants, the experience was quite negative.

In more recent studies, Cyberball has been primarily used in laboratory studies with experiment participants (Williams & Jarvis, in press). However, the game is presented in a similar fashion as the true Internet version. Cyberball has many benefits over the face-to-face version of the ball-toss game as it does not require trained confederates, the extent of inclusion/exclusion can be easily manipulated, and the nature of the relationship of the other players can easily be manipulated by changing the computer icons representing the players.

It should also be noted that the negative effects of ostracism occur because of being excluded and not from knowing that the perpetrators are being included and interacting with each other. Smith and Williams (2004) recently conducted a study using cell phone text messages, in which excluded participants initially received messages and then did not receive any additional messages. Thus, participants were left to imagine that they were being ostracized, and it was impossible to determine whether the other participants were communicating with each other. Smith and Williams found effects for negative mood and reductions in the four needs that were consistent with other manipulations of ostracism.

#### *Immediate Physiological Reactions to Ostracism*

Evidence for the evolutionary significance of ostracism detection can be obtained by examining the physiological reactions of humans who are ostracized. As discussed previously, the immediate reaction to ostracism is that the exclusion is experienced as aversive and painful. In humans, physical pain signals threats or problems in the environment, and there is evidence for overlap in the physiological and neurological systems that regulate both physical and social pain (Eisenberger & Lieberman, 2005; MacDonald, Kingsbury, & Shaw, 2005; MacDonald & Leary, 2005). Social pain refers to the emotional reaction that results from realizing that one is being excluded from important relationships or groups (MacDonald & Leary, 2005), and

ostracism leads to social pain, and pain affect in particular. Pain affect (Price, 2000) draws attention to the injury or experience as unpleasant and aversive, and it also elicits the emotional reactions that motivate actions to end the negative experience.

For the present purposes, it is important to note that ostracism is a form of social pain, and there is evidence that ostracism triggers the physiological and neurological mechanisms for responding to social pain. For example, Eisenberger, Lieberman, and Williams (2003) had participants play Cyberball while in an fMRI chamber. Participants who were in the exclusion condition showed significant activity in their dorsal anterior cingulate cortex, the area of the brain associated with both physical and social pain. Ostracism also triggers a generalized threat response system (MacDonald et al., 2005), which produces an analgesic effect of increased pain tolerance. This analgesia allows the individual to temporarily ignore the pain and effectively react to the threat. McDonald et al. review research that this analgesic effect occurs in both animals and humans who experience isolation and ostracism. Memories of being ostracized result in presently-experienced pain levels exceeding dental pain, and on par with back pain and labor pain (Williams, Fitness, Newton, & Cheng, 2006).

From an evolutionary perspective, it is not surprising that these two pain systems overlap. In the early evolutionary history, humans' social and physical needs likely overlapped much more than today (MacDonald et al., 2005), and the pain systems function to detect physical or social threats and motivate behaviors to resolve the threats. The system of the brain associated with social pain likely co-opted the signal for physical pain to detect social pain and the potential threat of separation from caretakers (Eisenberger & Lieberman, 2005; Nelson & Panskepp, 1998; Panskepp, 1998).

*Short-Term Coping with Ostracism*

Individuals respond to the immediate pain of ostracism by attempting to fortify the core needs. From an evolutionary perspective, the most adaptive response in many cases may be to attempt to gain re-admittance and acceptance by the group. For example, after the ball-toss game, Williams and Sommer (1997) had participants work either collectively or coactively on a brainstorming task. Women who had been included during the ball-toss game were more likely to loaf when working collectively rather than coactively. However, women who had previously been excluded actually contributed more on the collective task. Presumably, these women were attempting to gain approval from the group by demonstrating that they were indeed “good” group members. Similar results were obtained in a study utilizing Cyberball (Williams et al., 2000). Targets believed that they were playing the game with two members of an ingroup (people who used the same computer platform), two members of an outgroup (people who used a different computer platform), or a mixed group. Williams et al. found that ostracized participants were more likely to conform to an obviously incorrect response on a later perceptual judgment task. Conformity was even greater when participants had been ostracized by at least one member of an ingroup. Thus, ostracized targets engage in behaviors that fortify the core needs, and these behaviors simultaneously have the benefit of increasing the likelihood that they will regain acceptance and inclusion in a group.

Lakin and Chartrand (2005) describe a series of studies demonstrating that participants’ attempts to regain inclusion may occur automatically and without conscious awareness. In particular, they find that participants who have been ostracized during Cyberball are more likely to nonconsciously mimic an interaction partner than those who had been included. Mimicry is associated with a desire to affiliate with an interaction partner, and there is evidence that mimicry

increases liking and rapport during the interaction (Lakin & Chartrand, 2003). Thus, Lakin and Chartrand (2005) argued that the ostracized participants' increased mimicry served the goal of reducing their own negative affective state, but also increased affiliation with the interaction partner.

Targets of ostracism do not always respond with positive and affiliation behaviors. There is evidence that in some situations and for some people, ostracism may lead to aggression (e.g., Twenge, Baumeister, Tice, & Stucke, 2001). Targets of ostracism may be more likely to use aggression when control and meaningful existence needs are threatened (Warburton & Williams, 2005; Warburton, Williams, & Cairns, in press; Williams, 2001). Warburton et al. (in press) excluded or included participants using a variation of the ball-toss paradigm. Half of the participants were then given the opportunity to restore control, while the other half received a manipulation that further diminished their control. Participants were then given an opportunity to be aggressive toward another person in the experiment (by allocating an amount of hot sauce that the other participant would have to consume). Only ostracized participants in the diminished control condition showed aggression and allocated significantly more hot sauce.

The immediate, short-term responses to ostracism appear to be universal. However, the intermediate response of restoring the four needs may require more elaborate cognitive appraisal of the situation. From an evolutionary perspective, the survival benefits of remaining in a group increase the likelihood of behaviors that increase affiliation and inclusion. As discussed previously, there is evidence that such behaviors may occur automatically (Lakin & Chartrand, 2005). Affiliation behaviors may also be more likely when the behavior is public and observable (Warburton & Williams, 2005). However, it does make sense that in some situations, aggression and anti-social behaviors may also be a predictable reaction. Aggression may help to increase

control and predictability of the situation. Aggression may also serve as retaliation if the ostracism is perceived as unjustified and without cause. If potential sources expect that targets of ostracism are likely to aggress, they may be less likely to use ostracism in the future (i.e., the costs of aggression to the group outweigh costs of the original offense). Aggression may also have some utility when directed at outgroup members. This negative behavior may help to solidify group boundaries and maintain intergroup hierarchy.

#### *The Indiscriminate Ostracism Detection System*

The importance of being sensitive to ostracism also suggests that the system would be adapted to detect ostracism in all forms. Several studies have attempted to find moderators of the effects of ostracism, attempting to delineate the minimal conditions in which exclusion will not have an effect. However, the results of these studies increasingly suggest that the ostracism detection system reacts indiscriminately to ostracism of all sorts, even in those (perhaps rare) situations in which being ostracized may actually be better for the target. For example, Gonsalkorale and Williams (2004) led participants to believe that they were playing Cyberball with members of either an ingroup, a rival outgroup, or a despised group (the Ku Klux Klan). They found that participants responded negatively to being excluded in all conditions, even when the ostracism was perpetrated by a despised outgroup.

Unmitigated reflexive responses to ostracism are further supported by by some recent studies that varied the meaning behind the ball tossing. In a variation on Cyberball, participants virtually toss a bomb (i. e., Cyberbomb), and they respond negatively even when they are excluded in the tossing of the bomb! (van Beest & Williams, 2006). Although this is only symbolic, it suggests that individuals may actually feel bad being excluded from a game of Russian Roulette. Finally, van Beest and Williams found that the needs are threatened even when



receiving the ball means that money is deducted from one's account. Thus, being ostracized by two others in this circumstance means that the other players end up with no money, while the participant ends up with 5 euros. Despite this relative monetary gain, participants feel bad.

Finally, participants respond negatively to ostracism in the Cyberball paradigm, even when they are explicitly informed that they are playing the game with two computer-generated players or that the inclusion/exclusion is a scripted part of the experiment (Zadro, Williams, & Richardson, 2004). It may be that ostracism effects occur to the extent that participants construe the situation in social terms, thinking about other people (Law & Williams, 2005). Law and Williams have found preliminary evidence that using geometric forms (squares and spheres) rather than Cyberboy icons and a ball, combined with giving participants no instructions to mentally visualize the animated screen, results in no impact on the four needs. However, simply instructing participants to create a story around that which they are viewing is sufficient to reduce the four needs and to increase sadness and anger.

*Ostracism and Biological Fitness.* Because research suggests that humans are sensitively tuned to ostracism because of biologically evolved systems that developed to protect early humans from its dire consequences, it would make sense that increasing or reducing the biological fitness of the source of the ostracism should accentuate or attenuate the adverse impact of ostracism, because higher or lower adaptive advantage is yielded from the restoration of the relationship. Sher, Vujic, Locke, and Williams (2006) tested this notion in two studies that examined immediate reactions to Cyberball-induced ostracism. In Study 1, participants were either ostracized or included by two other individuals who were either normally or highly physically attractive, where physical attractiveness was viewed as a proxy for biological fitness. However, only a main effect for ostracism emerged. In Study 2, participants were ostracized or

included by two individuals with or without a facial deformity, where the facial deformity was viewed as a proxy for non-fitness. In this study, whereas ostracism was distressing regardless of source stigmatization, participants appeared to be sensitive to biological fitness when they were included. Specifically, they reported lower satisfaction levels of their needs when they were included by facially deformed individuals (but still higher than when ostracized). These studies once again suggest that immediate reactions to ostracism are so strong as to override other evolutionarily adaptive responses. In addition, Study 2 suggests that perhaps that reactions to factors related to biological fitness may reside in relatively safe inclusion circumstances rather than danger-signaling ostracism circumstances.

### Implications and Conclusions

Reviewing the literature on ostracism and social exclusion, we conclude that it would be evolutionarily adaptive for humans (or any social animal) to readily detect signs of ostracism, because ostracism signaled the potential for death or loss of opportunities to procreate. Because ostracism has dire consequences for individuals, it is best to feel pain first, and ask questions later. As exemplified in the two studies reviewed in the previous paragraph, signals of immediate danger—in the form of ostracism—seem to trump signals of potential biological fitness—in the form of physical appearance of other group members.

The pain of ostracism can direct coping responses that can either help the individual rehabilitate their behaviors so that they can get re-included in the ostracizing group, or that they become attractive for new groups. Thus, following ostracism, individuals have been shown to become more socially attentive, hard-working, conforming, and even gullible.

However, ostracism can also promote seemingly dysfunctional reactions that appear to increase the probability of more ostracism. Under certain circumstances, ostracized individuals

lose the ability to self-regulate, become cognitively impaired, and even lash out at others (the ostracizers and even naïve others who had nothing to do with the ostracism). Our hunch is that this anti-social reaction occurs only when ostracism (or social exclusion) is paired with a severe loss of control, when rehabilitative responses would appear to be fruitless. Whether this type of reaction can be understood from an evolutionary perspective remains to be seen.

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