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An Update of the Empirical Case for the Need to Belong

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Abstract

Since Baumeister and Leary (1995) published a seminal paper on the need to belong, research in this area has proliferated. We review the current state of the literature, highlighting inconsistencies in findings, and suggesting future avenues of research. We focus on research findings on immediate cognitive, emotional, and behavioral reactions to social rejection and acceptance, the processes that underlie responses to threats to belonging, some possible biological underpinnings of the need to belong, the role of individual differences in reactions to threats to belonging, and long term consequences of an unmet need to belong. A more complex picture of the need to belong is emerging, but greater focus on underlying processes and the influence of individual differences is needed.

An Update of the Empirical Case for the Need to Belong

Alfred Adler (1930; Ferguson, 1989) formulated that humans have a fundamental need to belong. As Adler stated (1930, p. 11), "social feeling is the crucial and deciding factor in normal development." However, this important formulation did not have a major impact on psychological research until, in a landmark paper, Baumeister and Leary (1995) presented a litany of evidence supporting the argument that belongingness is a fundamental human need. However, because the studies they reviewed were not designed to directly evaluate the belongingness hypothesis, most of the evidence they presented provided only indirect support for their arguments. Since then, empirical research on the need to belong has expanded rapidly. The last few years, in particular, have seen a focus of research attention on immediate reactions to experimental manipulations of social exclusion and, to a lesser extent, social acceptance. This work has provided a fledging body of knowledge on the processes underlying short-term reactions to fluctuations in belonging, biological responses to belongingness status, individual differences in reactions to exclusion threats as well as subsequent coping efforts, and the long-term consequences of a thwarted need to belong. This paper reviews the current state of research in these areas and suggests avenues for future research in an effort to point interested researchers and thinkers to questions that have not yet been adequately resolved.

Immediate Reactions to Belongingness-Relevant Events

Baumeister and Leary (1995) argued that if belongingness is a fundamental need, then threats of social exclusion should affect individuals' cognition, affective reactions, and behaviors. Just as hunger or thirst disrupts normal patterns of thought, feeling, and behavior in order to facilitate satisfaction of unmet needs for food and water, so should unmet belongingness

needs influence human functioning. In this section, we will review the research evidence pertaining to short-term reactions to threats to belonging and signs of acceptance.

Cognitive Reactions

Baumeister and Leary (1995) argued that threats to belonging should lead to increased cognitive focus on relationships and social connections, which, by consuming limited cognitive resources, may lead to impairments in processing in other domains. Research conducted with individuals either randomly assigned to experience social exclusion or high on measures of chronically unmet belonging needs has shown that unmet belongingness is associated with better memory for interpersonal and social events, greater attention to and processing of vocal tone in speech, greater accuracy in indentifying emotions in faces, and more accuracy in understanding others' thoughts and feelings (Gardner, Pickett, Jefferis, & Knowles, 2005; Pickett, Gardner, & Knowles, 2004). These studies suggest that threats to belongingness and chronic unmet belonging needs are associated with greater attention to and processing of socially relevant information.

Relatedly, when participants' belongingness was threatened by delivery of false feedback that they would suffer a future alone, performance on a variety of complex cognitive tasks that were framed as diagnostic of social skills was improved relative to participants who either received feedback of future acceptance by others or no feedback (DeWall, Baumeister, Vohs, 2008). That is, participants whose belongingness was threatened appeared to focus cognitive energies on tasks that could demonstrate improved social prospects. Furthermore, after recalling an episode of rejection, the salience of social groups appears to increase. Following a belongingness threat, individuals have been shown to complete more word fragments with group-relevant words, to identify group identity words faster, to describe themselves in reference

to groups, and to rate their own groups as more important and cohesive than participants who recalled an episode of acceptance, physical distress, or academic failure (Knowles & Gardner, 2008). Participants whose need to belong is threatened by feedback of a future alone or by watching a movie clip that induces loneliness also report stronger beliefs in supernatural agents and describe pets with more social-connection traits than participants who received future acceptance feedback or watched a neutral or a fear-inducing movie clip (Epley, Akalis, Waytz, & Cacioppo, 2008). Thus, belongingness-deprived individuals appear to anthropomorphize non-human agents, perhaps to provide a social outlet.

Research has also demonstrated that when the need to belong is threatened, cognitive processing of non-social, complex stimuli appears to suffer, consistent with Baumesiter and Leary's (1995) suggestion that belongingness threats may tax cognitive resources. For example, participants who received false feedback that they would have a lonely future subsequently performed worse on an intelligence test, on recalling complex passages, and on answering complex analytical questions compared to participants who received future acceptance or future non-social misfortune feedback (Baumeister, Twenge, & Nuss, 2002). Participants who relived an episode of betrayal have also been shown to perform worse on complex cognitive tasks than participants who relived an experience of severe physical injury (Chen, Williams, Fitness, & Newton, 2008). However, participants' performance on easy tasks or on simple recall in these studies was not affected by rejection experiences (Baumesiter et al., 2002; Chen et al., 2008). These findings suggest that threats to belonging lead to impairments on complex, higher-order cognitive processing, but more basic cognitive processing is not affected.

Some research has also examined cognitive reactions to events that suggest the possibility of future acceptance, offering fulfillment of one's need to belong. For example, in a

study of the effects of minimal belonging cues, participants told they shared a birthday with a high achiever in math persisted more on unsolvable math puzzles and expected greater feelings of belongingness in a university math department (Walton & Cohen, 2009). Mediation analyses suggested that greater feelings of math-related belonging led to persistence on the math tasks. Furthermore, being randomly assigned to work alone on math problems after being designated as part of a math group (rather than as an individual "math person") increased persistence on math puzzles. Finally, when the math department was portrayed as encouraging social relationships, participants again persisted more on math problems and also reported greater motivation for math than participants to whom the department was portrayed as encouraging individual achievement. These findings suggest that even subtle cues that suggest the possibility of future acceptance is enough to motivate better performance and higher persistence in an achievement domain.

Analogous to other motivational drives, Baumeister and Leary (1995) argue that the need to belong should be subject to satiation, meaning that once the need is satisfied, the motivation to pursue additional social relationships should be diminished. For example, participants told they would have a future full of good social relationships performed worse on subsequent cognitive tasks that were framed as diagnostic of social skills compared to participants who received future alone or no feedback, suggesting that participants with adequate levels of belonging were less willing to work for evidence of further social success (DeWall et al., 2008). However, when these same tasks were not framed as evidence of social skill, the performance of participants who received the acceptance feedback did not decline. These findings suggest that the need to belong is indeed subject to satiation and perceptions of opportunities to fulfill this need only lead to social effort when the need is threatened or unfulfilled. A corollary of the satiation hypothesis is

that opportunities for social connection should only be motivating when belonging needs are not satisfied. In one study, participants who expected to meet a fellow university student rated the potential for social reward (i.e., meaningful connection) they saw in the interaction, then recorded a video greeting for their interaction partner (MacDonald, Tackett, & Borsook, 2009). Among participants randomly assigned to a control condition, opportunities for social reward were unrelated to prosocial video greetings. Only among participants who had just relived a past social exclusion experience did perceived opportunity for social reward predict more positive social greetings. These data suggest that only when deficits in belongingness are experienced do social opportunities motivate efforts at social connection.

Emotional Reactions

Baumeister and Leary (1995) argued that threats to the need to belong should have profound consequences for one's emotions because such threats to one's social connections signal danger to one's survival. Many studies have assessed emotional reactions to threats to belonging, but the evidence for negative emotional reactions to social exclusion has been mixed. Some researchers have found no differences in emotions between participants whose need to belong has been threatened and those who have not received such threats (Baumesiter et al., 2002; DeWall & Baumeister, 2006; Maner, DeWall, Baumeister, & Schaller, 2007; Twenge, Baumeister, Tice, & Stucke, 2001). However, in a number of studies, effects of threats to belonging on emotional responses have been found. For example, some studies have found evidence for higher levels of negative affect among excluded participants (Baumesiter et al., 2002; Blackhart, Eckel, & Tice, 2007; Maner et al., 2007; Murray, Derrick, Leder, & Holmes, 2008; Reijntjes, Stegge, Terwogt, Kamphuis, & Telch, 2006; Twenge et al., 2001), whereas others have found evidence for lower levels of positive mood (Blackhart et al., 2007; Mendes,

Major, McCoy, & Blascovich, 2008; Twenge et al., 2001, study 5; van Beest & Williams, 2006).

Indeed, mixed evidence has been found not just across studies but across participants within a

single study. For example, in one study, only 38% of participants showed a reliable worsening of

mood after an experience of rejection. Further, whereas many of the aforementioned studies have

examined emotion by grouping together various feeling states, studies in which specific

emotions have been examined have shown socially threatened participants to report more anger

(Chow, Tiedens, & Govan, 2008; Mendes et al., 2008), sadness (Chow et al., 2008), and self-

conscious emotions such as shame and embarrassment (Dickerson, Mycek, & Zaldivar, 2008;

Gruenewald, Kemeny, Aziz, & Fahey, 2004).

These contradictory findings have not been resolved and it remains unclear why some

studies have found differences in emotion and others have not. A resolution of these

contradictions will likely require a greater understanding of the processes that underlie responses

to threats to belonging and a greater understanding of individual differences that influence how

people interpret and react to threats to belonging. For example, individuals' propensity to

experience positive emotions (extroversion) and negative emotions (neuroticism) in general may

be important in determining emotional responses.

Behavioral Reactions

Perhaps the most straightforward prediction of behavior following threats to

belongingness is that excluded individuals should want to seek reparative sources of connection

(Baumeister & Leary, 1995). The data, however, are not nearly as straightforward as the

prediction. The results of some experiments show that participants whose need to belong is

threatened respond to others in an antisocial manner that seems more likely to drive people away

than to create opportunities for connection. In particular, many studies have found behavioral

responses to threats to belonging that suggest that rejected participants are more motivated to retaliate against the person who has rejected them than to seek connection with others (for a review, see Leary, Twenge, & Quinlivan, 2006). For example, when participants received false feedback of a future alone (instead of feedback of future acceptance or misfortune) and were then provoked by receiving a negative evaluation from a confederate, rejected participants provided more negative job evaluations of the confederate (Twenge et al., 2001). Also, participants who were told that no fellow participants wanted to work with them and received a negative evaluation from a confederate subsequently delivered more intense noise blasts to the confederate (Twenge et al., 2001).

Although the aforementioned studies involved not only rejection, but also subsequent provocation, other studies that included an experience of exclusion by other participants, but no further provocation, have found similar results. For example, participants who played a computer ball-toss game with two others and were excluded selected more undesirable snacks for the other players (Chow et al., 2008). Even when participants are financially rewarded for being excluded, participants who are excluded are more likely to desire retaliation against the other players than those who are included (van Beest, & Williams, 2006). Participants who were rejected based on a video greeting they recorded for another participant evaluated the rejecting person as less sociable, more negative, and more hostile compared to participants who were not rejected (Maner et al., 2007). There is also some evidence that feeling a lack of belongingness in the workplace is associated with more harmful and less helpful behaviors, as rated by supervisors (Thau, Aquino, & Poortvliet, 2007). Furthermore, research has also shown that participants who were rejected by someone who was perceived to be a member of a group were willing to aggress against the entire group (and not just the individual group member responsible for the rejection)

by administering higher noise blasts to all members of the group relative to participants who were not rejected by the group (Gaertner, Iuzzini, & O'Mara, 2008). However, participants did not retaliate against the person who rejected them when administering a noise blast would have affected others who were not seen to belong to the same group as the person who did the rejecting (Gaertner et al., 2008).

Although these examples of antisocial behavior in response to exclusion may be seen as resulting from some degree of rejection and/or provocation by other participants or confederates, there is evidence of aggression against innocent bystanders following exclusion. In one such study, participants who were told that nobody wanted to work with them delivered more intense noise blasts to an unseen participant who had not behaved negatively in any way (Twenge et al., 2001). In another example, excluded participants donated less money to a charity than included participants (van Beest & Williams, 2006). Such ungenerous and antisocial behaviors are unlikely to help people re-establish social connections to others in order to restore feelings of belonging, and seem contrary to what Baumeister and Leary (1995) suggested people should be trying to do in response to rejection. However, it is possible that the existing research does not capture some of the important dynamics of real-world reactions to social exclusion. In addition to any desires for retaliation or retribution resulting from exclusion in these studies, an added, somewhat artificial source of frustration may arise because participants are not given an opportunity for meaningful social connection. As Dreikurs (1947; Dreikurs, Cassel, & Ferguson, 2004) pointed out, children or adults may have a mistaken goal to hurt others as they themselves have been hurt. Thus, Dreikurs and other Adlerians have found repeatedly what the above research literature revealed, that following rejection a person may indeed retaliate against rejection with revenge rather than prosocial behavior.

Attachment theory suggests that a primary coping mechanism for emotional distress is appeals to attachment figures (Bowlby, 1969; Mikulincer & Shaver, 2007). Thus, one way one can think of alleviating revenge is to provide situations that permit such appeals. In terms of laboratory situations, such appeals have not been made possible for participants. Tests need to be made in real-world contexts to assess whether in the normal life of individuals vengeful behavior or prosocial actions to enhance connection with valued others would be taken following experiences of exclusion.

Indeed, despite many findings of antisocial responses to rejection, some researchers have found evidence of desires for reconnection after a threat to belonging. For example, compared to participants who received feedback of future acceptance or future misfortune, participants who received feedback of a future alone preferred to work with others on a subsequent task instead of working alone (Maner et al., 2007). Further, when participants received positive interpersonal evaluations after the future alone feedback, they evaluated a confederate positively (Twenge et al., 2001). Participants who wrote about a previous experience of exclusion expressed greater interest in using a student service for making new friends; participants who were told that nobody wanted to work with them evaluated new people as more attractive and sociable (Maner et al., 2007). Additionally, participants who were rejected based on their video greetings assigned more money to a new partner with whom they expected to interact (Maner et al., 2007). Also, women who were slowly rejected by two other women throughout a conversation still indicated that they were willing to affiliate with these others midway through the interaction (Zwolinski, 2008). Together, these findings suggest that in some instances participants whose belongingness has been threatened do seek social connection with others.

It is still unclear when and why people respond to threats to belonging in antisocial ways and when they respond in a more prosocial manner. Researchers have tried to offer explanations to reconcile these contradictory findings, although the explanations are somewhat tentative and need to be tested in future research. Some have argued that people are more likely to respond to threats to belonging in antisocial ways when they feel anger towards those who reject them (Chow et al., 2008). Responding in antisocial ways may also be more likely when individuals are unable or unwilling to regulate their responses to threats to belongingness. However, there may be situations when people do make an effort to self-regulate and redirect their efforts to fulfilling the threatened need. Specifically, when individuals are given a chance to connect with someone other than their rejecter, they will make an effort to do so (although this effect was found only for individuals relatively low in social anxiety; Maner et al., 2007). However, when no opportunity to restore belongingness is available, individuals may see no payoffs in regulating their urge to reciprocate the antisocial behavior directed at them and they may lash out at others – in many cases at those who rejected them – in order to retaliate.

Other researchers have also suggested qualitative differences in belongingness threats that can influence individuals' reactions (Molden, Lucas, Gartner, Dean, & Knowles, 2009). For example, when people are explicitly rejected, a resulting focus on prevention of further loss appears to prompt behaviors aimed at guarding against additional damage, such as social withdrawal. However, when the failure to attain social gains is made salient, such as when one is ignored, a resulting focus on promoting gains appears to lead to efforts to re-establish social contact (Molden et al., 2009). Therefore, it appears important to be mindful that rejection differs not only in degree, but also in kind (Leary, 2005). In sum, research on behavioral reactions to threats to belongingness suggests that people often react to rejection in antisocial ways,

particularly when they are provoked and do not have the opportunity to reconnect with others. In contrast, when socially non-anxious individuals are given an opportunity to reconnect with others, they have been found to respond to threats to belongingness in more prosocial ways.

Processes Underlying Immediate Responses to Belongingness-Relevant Events

There is currently disagreement among researchers about what can account for the demonstrated cognitive, emotional, and behavioral reactions to social exclusion threats. Some researchers argue that after experiencing threats to belongingness, self-regulatory capacity decreases (Baumesiter et al., 2002; DeWall et al., 2008). These researchers argue that in response to threats to belonging, efforts to dampen emotional responses drain limited willpower resources, leading to a failure of self-regulation on subsequent tasks. This process of dampening emotion may explain why many studies find no change in emotional reaction following exclusion. Self-regulation deficits would also provide an explanation for why people are unable to perform complex tasks that require cognitive resources and why people might react in antisocial ways that are unlikely to facilitate future chances of gaining belonging. In some cases, deficits in self-regulation may be eliminated when individuals see opportunities to restore their sense of connection. Such opportunities may provide sufficient motivation to overcome exhausted willpower, leading to a strong effort to regulate reactions and thus more prosocial behaviors (DeWall et al., 2008).

In contrast, researchers have also argued that threats to belonging lead to a temporary numbing or stunning of the emotional system such that the ability to experience emotions becomes blunted (DeWall & Baumeister, 2006). The basis of this argument is the hypothesis that the physical pain system provides part of the physiological basis for regulating reactions to social exclusion (Eisenberger, Lieberman, & Williams, 2003; MacDonald & Leary, 2005; Panksepp,

1998). If physical and social pain rely on overlapping physiological mechanisms, then just as physical injury causes temporary numbing of pain perception, social injury may also lead to a temporary numbing of the emotional system (DeWall & Baumeister, 2006; MacDonald & Leary, 2005). One implication is that if the emotional system is not functioning properly in response to threats to belongingness, then people will become less able to be empathetic to the feelings of others and will be temporarily unable to predict the emotional consequences of their own actions, which could lead to antisocial behavior (DeWall & Baumeister, 2006).

These two contrasting views have not yet been adequately tested as explanations for the range of phenomena outlined in this review, and no study conducted so far has tried to pit the two theories against each other or to test how they might be integrated. For example, self-regulation may be facilitated once the temporary numbing of the emotional system has passed. If this is the case, evidence for emotionally blunted, antisocial responses should be found when reactions to social exclusion are measured immediately after rejection, and evidence for more controlled, prosocial responses should be found when post-manipulation measures are administered after a longer time delay. Furthermore, efforts should also be made to try to determine under what circumstances people will overcome spent willpower to try to regulate their responses and when people will not.

<div align="center">Biological Underpinnings of the Need to Belong</div>

If the need to belong is a basic motivational drive, it should have an evolutionary basis and biological mechanisms that regulate social behaviors (Baumeister & Leary, 1995). Some researchers have argued that one physiological mechanism involved in the regulation of threats to belonging is physical pain affect, or the sense of emotional unpleasantness that accompanies physical injury (Eisenberger et al., 2003; MacDonald & Leary, 2005; Panksepp, 1998). The need

to avoid physical injury is an evolutionarily ancient problem. Pre-human animals had developed

systems, including physical pain, for avoiding physical injury long before the regulation of social

behavior became important. Once the regulation of social behavior became a matter of life and

death for social animals, social pain mechanisms may have piggybacked on the physical pain

system, taking advantage of an already developed system to respond quickly to crucial threats to

survival (MacDonald & Leary, 2005). Much of the literature regarding the biological

underpinnings of the need to belong has been conducted from this framework (see Zhong &

Leonardelli, 2008 for a related perspective) and has sought to establish the connection between

the physical and social pain systems (for a comprehensive review, see MacDonald & Jensen-

Campbell, in press). In this section we will review recent evidence addressing this hypothesis,

then we will turn to research that has examined other possible biological mechanisms that may

play a role in regulating responses related to the need to belong.

Connections to Physical Pain

   Physical pain and emotional responding. Some researchers have examined the relation of

the physical and the social pain systems by measuring pain sensitivity in response to threats to

belonging. If physical and social pain share some of the same mechanisms, then threats to

belonging should also affect responses to physical pain (DeWall & Baumeister, 2006;

Eisenberger, Jarcho, Lieberman, & Naliboff, 2006; MacDonald & Leary, 2005). In a series of

studies DeWall and Baumeister (2006) found evidence that threats to belonging lead to both

emotional and physical numbing. For example, participants who were told that they would have

a future alone subsequently showed increased pain tolerance (the time an individual can

withstand a painful stimulus) and pain threshold (the point at which an aversive stimulus is first

experienced as painful) relative to participants who did not receive such feedback. Emotional

numbing was also evident in these studies. Participants who received feedback of a future alone predicted blunted emotional reactions to both negative and positive future events, and also showed less empathy toward others who experienced either a social rejection or a physical injury. These results suggest that physical sensation and emotional sensitivity become dulled after threats to belonging (DeWall & Baumeister, 2006). Similarly, decreased pain sensitivity has been shown in response to relived experiences of social betrayal (Chen & Williams, in press) and interactions with unfriendly others (Borsook & MacDonald, 2009).

In contrast, in one study, when participants were excluded from a virtual ball toss game and were then exposed to a pain stimulus, they did not report lower unpleasantness of the pain stimulus than participants who were included in the game, which suggests that participants' pain sensitivity was not blunted in response to exclusion from the game (Eisenberger et al., 2006; see also MacDonald, 2008). In sum, although there is some mixed evidence, exclusion has been shown to lead to decreased sensitivity to physical pain across multiple studies. More work needs to be done to clarify the remaining discrepancies, such as work examining the relative effects of various forms of rejection on pain sensitivity.

Brain activation in response to rejection. Recently, researchers have also started to examine brain areas related to processing information relevant to the need to belong. In past research, it has been established that the anterior cingulate cortex (ACC) is involved in processing the affective component of the pain response (e.g., Rainville, Carrier, Hofbauer, Bushnell, & Duncan, 1999) and that the right ventral prefrontal cortex (RVPFC) may regulate the affective responses to physical pain (Petrovic, Kalso, Petersson, & Ingvar, 2002). Nonhuman animal studies have also suggested that the periaqueductal gray (PAG) plays a role in processing

pain-relevant stimuli, receiving input from both the ACC (An, Bandler, Öngür, & Price, 1998)

and the body's injury detection system (Craig & Dostrovsky, 1999).

Some studies have examined whether these same areas also play a role in responses to

threats to belonging. For example, exclusion from an online ball tossing game has been shown to

relate to greater activity in both the dorsal ACC and the RVPFC (Eisenberger et al., 2003).

Further, activity in these two regions was negatively correlated, suggesting that the RVPFC may

serve to down-regulate responses in the dorsal ACC. However, the dorsal ACC was also more

active when participants just watched other players play, which may indicate that the dorsal ACC

may be active regardless of whether exclusion is intentional or unintentional (Eisenberger et al.,

2003). The effect of exclusion on dorsal ACC activity has since been replicated, with this work

also revealing activation of the left amygdala and the left PAG (Eisenberger, Gable, &

Lieberman, 2007; Eisenberger, Way, Taylor, Welch, & Lieberman, 2007). Of these three brain

regions, only activity in the dorsal ACC was statistically related to greater self-reported social

distress in response to exclusion. However, higher activity in all three regions during the

laboratory social exclusion experience was associated with higher momentary social distress

ratings following real-life social experience, providing evidence for the validity of the

experimental findings.

In contrast to these studies, a number of researchers have failed to find connections with

the dorsal ACC or have found relations to rejection that are opposite in direction to the above

findings. It is noteworthy that all of the above studies that have found the dorsal ACC to be

active during rejection have used the virtual ball toss game to threaten participants' need to

belong. Because one can reasonably expect to be included in such a game, some researchers have

argued that the effects of rejection and expectancy violation are confounded and any dorsal ACC

activity may be attributable more to violated expectations than to feelings of rejection (Somerville, Heatherton, & Kelley, 2006). In one study attempting to separate the effects of expectancy violation and rejection, the dorsal ACC appeared to be more active when participants' expectations were violated regarding whether a target person would accept or reject them, whereas the ventral ACC was sensitive to the social implications of the feedback (i.e., acceptance or rejection, per se; Somerville et al., 2006).

Another fMRI study manipulated belongingness threat via paintings with acceptance, rejection, non-social positive, and non-social negative themes (Kross, Egner, Ochsner, Hirsch, & Downey, 2007). Replicating the previous studies, activity in the dorsal ACC was higher when viewing rejection than acceptance paintings. However, such dorsal ACC activity was negatively related to social distress ratings, contradicting this aspect of Eisenberger and colleagues' findings. In the Kross et al. (2007) study, distress ratings were also negatively related to activity in the precentral gyrus, the left prefrontal cortex, the right dorsal superior frontal gyrus, and were positively related to activity in the left ventral prefrontal cortex. The authors argued that these results indicate that the ACC may function as a general purpose alarm system (cf. Eisenberger & Lieberman, 2004), which becomes activated when expectancies are violated leading to activation of the dorsal left prefrontal cortex to interpret events and regulate emotional responses.

In sum, the findings regarding which brain areas are involved in processing information relevant to the need to belong generally point to areas that have also been found to be involved in the processing of physical pain affect. However, the findings addressing the role of these brain areas in processing belonging-relevant information have been inconsistent in some ways, and it is unclear exactly what function each area carries out. The greatest controversy seems to be around the role of the dorsal ACC in processing threats to belonging and whether this brain area

is sensitive more specifically to rejection or more generally to expectancy violations. Future research should attempt to address these questions using a wide range of threats to belonging because it seems possible that the virtual ball toss game as a manipulation produces results that differ from other types of manipulations.

Other Potential Physical Mechanisms

Cortisol is released in times of stress and helps mobilize energy resources for response to stressful situations. Cortisol has been shown to be released in response to social threat, in particular (Blackhart et al., 2007; Tops, Riese, Oldenhinkel, Rijskijk, & Ormel, 2008; Zwolinski, 2008). Some studies have found evidence of increases in cortisol release in response to threats to belonging (for a review, see Dickerson & Kemeny, 2004). For example, participants who were told that nobody chose to work with them had higher cortisol levels than participants in the control and acceptance conditions, which did not differ from each other (Blackhart et al., 2007). Another study, including only female participants, showed that only women who had high levels of relational victimization (i.e., experiences of relational aggression, including rejection, by peers) and who were in the luteal phase of their menstrual cycle showed increased cortisol levels in response to being rejected by two other female confederates, compared to participants who were not rejected by the other participants (Zwolinski, 2008). Women who were low in levels of victimization and women who had high levels of victimization but were not in the luteal phase did not show increases in cortisol levels from baseline (Zwolinski, 2008). A third study found that participants who were most sensitive to signs of rejection (i.e., detected cues of rejection faster) also showed the highest release of cortisol in response to criticism (Dandeneau, Baldwin, Baccus, Sakellaropoulo, & Pruessner, 2008). In contrast to findings of increases in levels of cortisol in response to threats to belonging, one study found that individual differences in fear of

negative evaluation were negatively related to cortisol release in the morning (Tops et al., 2008).

Overall, the results of various studies appear to converge on the suggestion that cortisol release is

related to responses to threats to belonging. However, this work suggests that the relation is not

necessarily straightforward, with a number of moderators worthy of consideration. Furthermore,

the timing of cortisol measurement has varied considerably across studies, an issue of particular

importance given the tendency of cortisol levels to vary throughout the day. These different

times of measurement are likely to contribute to the discrepancies in the findings.

Some researchers have also begun investigations of genetic markers that may be related

to sensitivity to threats to belonging. For example, genetic polymorphisms related to monoamine

oxidase-A (MAOA), an enzyme that degrades serotonin, dopamine, and norepinephrine, has

been linked to aggressive behaviour and hypersensitivity to threats to belongingness

(Eisenberger, Way et al., 2007). In one study, participants who had the MAOA-L genetic marker

(related to heightened aggressiveness) also showed greater activity in the dorsal ACC in response

to exclusion from a virtual ball toss game (Eisenberger, Way et al., 2007). These findings

suggest that further work linking genetics to the need to belong may well prove fruitful (Way &

Taylor, in press).

Another physiological marker that has received research attention is resting heart-rate

variability, or respiratory sinus arrhythmia (RSA). RSA has been associated with better

situational regulation of responses under threat (Gyurak & Ayduk, 2008). Among individuals

with low RSA, rejection sensitivity is related negatively to the effective regulation of emotional

reactions and positively to exhibiting hostility in relationship conflicts. No such relations are

found among individuals with high RSA (Gyurak & Ayduk, 2008). For people who are easily

threatened by relationship events, such as people high in rejection sensitivity, high RSA may

provide an important buffer aiding in healthy regulation of emotions (Gyurak & Ayduk, 2008). In fact, the likelihood of being in a romantic relationship for people high in rejection sensitivity increases with their level of RSA (Gyurak & Ayduk, 2008).

One study examining nonhuman social animals investigated neuroendocrine reactivity to stress in rhesus monkeys reared by rejecting mothers (Maestripieri et al., 2006). In particular, these researchers examined levels of 5-HIAA, a serotonin metabolite, and HVA levels, a dopamine metabolite. The findings indicated that monkeys rejected by their mothers had lower concentrations of both of these metabolites. Furthermore, rejected monkeys who became abusive mothers themselves, including cross-fostered monkeys not reared by their biological mothers, had lower 5-HIAA levels than abused monkeys who did not become abusive mothers. These findings point to the importance of early experiences on neuroendocrine functioning, especially since the results cannot be attributed to genetic similarity. Examination of how experiences affect physiological processes will be increasingly important for researchers in the future.

In sum, research on biological mechanisms related to the need to belong, although nascent, has pointed to a number of important factors that may play a role in how people respond to threats to belonging. Such biological mechanisms are also likely to contribute to stable individual differences in responding to threats and can provide clues to how the body responds to such threats. In essence, identifying biological mechanisms will allow researchers to understand more clearly the processes that underlie responses to threats to belonging.

The Role of Individual Differences in Reactions to Threats to Belonging

Given the inconsistent findings in many areas of the literature on the need to belong, strategies for gaining increased analytical resolution appear needed. One potentially useful strategy is careful consideration of the influence of individual differences. In this section, we will

review research that has examined individual difference variables in relation to the need to

belong. In particular, interpersonal sensitivity and self-regulatory capacity are two variables

which seem to be particularly important to consider in future research.

Interpersonal sensitivity

A great deal of research has examined individual difference variables that relate to

interpersonal sensitivity, such as social anxiety, anxious and avoidant attachment, rejection

sensitivity, low self-esteem, and depressive symptoms. In general, researchers have argued that

such insecurities make individuals hypervigilant for signs of rejection, leading to increased

perceptions of rejection in others' behavior, intense reactions in response to these perceptions,

and an unwillingness to take risks in relationships (Dandeneau et al., 2008; Hale, Vander Valk,

Akse, & Meeus, 2008; Lemay & Clark, 2008; Maner et al., 2007; Murray et al., 2008). These

perceptions of rejection and accompanying intense reactions have a variety of negative

consequences that make it harder for these individuals to maintain meaningful relationships and

fulfill their need to belong. For example, both attachment anxiety and low self-esteem are related

to doubting a romantic partner's authenticity. That is, insecure individuals doubt their partners'

expressions of positive regard and believe their partners suppress the expression of negative

feelings (Lemay & Clark, 2008). It has also been found that individuals who are high in fear of

negative evaluation are less likely to try to affiliate after an experience of rejection (Maner et al.,

2007) and expectations of rejection are also associated with increases in social anxiety and

withdrawal (London, Downey, Bonica, & Paltin, 2007). It appears that individuals high in fear of

negative evaluation are less likely to perceive others as a potential source of positive contact and

may prioritize self-protection goals (e.g., avoiding dependence on a romantic partner) over

seeking connection (Maner et al., 2007).

A similar argument has been made regarding people with low self-esteem. According to Murray et al. (2008), people with low self-esteem prioritize self-protection goals in close relationships. Because forming intimate, highly interdependent relationships that fulfill the need to belong requires emotional vulnerability and dependence, these self-protection goals can undermine satisfaction of belongingness needs. Murray et al. (2008) found that low self-esteem people did not let go of self-protection goals even in long, established romantic relationships. Although goals for establishing connections to others are automatically, non-consciously activated in the face of threats to belonging for both high and low self-esteem people, only individuals with high self-esteem displayed a tendency to actually act on these connection goals. In contrast, low self-esteem people did not express a desire to increase connection in the face of threat. Instead, low self-esteem individuals were found to report lower feelings of closeness to their partners after facing social threat. These findings suggest that low self-esteem individuals prioritize self-protection goals in the face of rejection risk, overriding the automatically activated goals for seeking connection. This tendency of low self-esteem individuals to prioritize self-protection goals may result in lower levels of intimacy and strong difficulty fully satisfying the need to belong (Murray et al., 2008).

The theme of research on interpersonal sensitivity can be summarized as follows: sensitive individuals perceive a high degree of threat in relationships that constrains their willingness to take interpersonal risks. However, this work arguably ignores the notion that people regulate social behavior based not just on the potential for threat, but also on the opportunities for social rewards (MacDonald et al., 2009). Research suggests that perceptions of reward (i.e., potential for meaningful connection) and perceptions of threat (i.e., potential for being evaluated negatively) are statistically independent and have separate, reliable links with

attachment insecurity (MacDonald et al., 2009). Specifically, whereas anxious attachment is strongly related to perceptions of high threat in social situations, avoidant attachment is related to perceptions of low opportunity for reward. MacDonald et al. (2009) argue that low reward perception is a defensive strategy of avoidant individuals that allows a consciously tolerable excuse for bypassing social situations that provoke deeper fears of rejection. The cost of such a strategy, however, is likely to be a chronically unfulfilled need to belong.

A related consideration is the nature of individuals' relational goals. The strength of an individual's social approach goals (a focus on acquiring positive relationship outcomes) and avoidance goals (a focus on avoiding negative relationship outcomes) has important implications for success in meeting the need to belong (Elliot, Gable, & Mapes, 2006). The distinction between approach and avoidance goals (as well as relational rewards and threats) is important because the absence of negative relationship events is not the same as the presence of positive relationship events (Elliot et al., 2006). For example, avoiding the dissolution of a relationship (an avoidance goal) does not mean that one is creating an intimate and satisfying connection (an approach goal; Elliot et al., 2006). Research shows that approach goals (e.g., wanting to increase intimacy) are positive predictors of relationship satisfaction in friendships, the frequency of positive relationship events, and subjective well-being, as well as negative predictors of feelings of loneliness and negative relationship events (Elliot et al., 2006). In contrast, avoidance goals (e.g., wanting to avoid losing the partner's interest) are positive predictors of loneliness, physical symptoms, and the frequency and impact of negative relationship events (Elliot et al., 2006). Because executing avoidance goals requires careful attention to signs of negative outcomes, avoidance goals may lead negative relationship events to be highly salient. This may then lead to a number of negative relationship behaviors, such as seeing threat in ambiguous behavior and

overreacting to signs of rejection from the partner, which may undermine relationship quality in the long term (Elliot et al., 2006).

Given the negative relationship outcomes experienced by individuals who are high in interpersonal sensitivity, researchers have begun to examine interventions that may prevent negative relationship outcomes by reducing perceptions of threat. For example, Walton and Cohen (2007) found that minority students in universities experience particularly strong feelings of uncertainty about whether they belong and are accepted by others. These researchers attempted to normalize minority students' feelings of belonging uncertainty by telling them that such feelings of uncertainty are experienced by all new students, but that these feelings decrease over time. The intervention was successful, and minority students who received the intervention rated their belongingness, self-efficacy, and academic potential more positively, engaged in more achievement behaviors, were affected less by daily experiences of adversity, and showed increases in GPA. These findings suggest that reducing doubts about belongingness can diminish the effects of events that might otherwise threaten one's belonging.

Another study sought to reduce individuals' automatic vigilance for signs of rejection by having participants engage in a visual search task that required active inhibition of attention to rejecting faces (Dandeneau et al., 2008). After training, low self-esteem participants showed a decrease in rejection interference on a Stroop task (i.e., were better able to ignore rejection words) and a decrease in rejection bias in a visual probe task (i.e., were better able to ignore rejecting faces). The training also reduced students' feelings of stress about an upcoming exam regardless of self-esteem. Further, among a sample of telemarketers, rejection-desensitization training over a one week period was associated with increases in self-esteem, decreases in stress levels, and lower cortisol release throughout the workday. These findings suggest that it may be

possible to reduce automatic processing of rejection stimuli, which may be important for people who are high in interpersonal sensitivity.

Self-Regulation

To the extent that insecure individuals detect high levels of rejection, self-regulation may be especially important for these individuals to avoid responding in ways that are harmful for relationships. For example, behavioral distraction seems to be an effective strategy for regulating emotions, whereas passive behavior (not actively doing anything) and cognitive analysis (thinking about the rejection episode in depth) in response to rejection is associated with a worsening of mood (Reijntjes et al., 2006). Unfortunately, however, self-regulatory capacity may be particularly low for interpersonally sensitive people following rejection. For example, research suggests that participants high in social anxiety are slower to recover emotionally from an episode of rejection. Further, socially anxious individuals showed willpower decrements even 45 minutes after being excluded from a ball toss game, eating more unhealthy food and drinking less of a healthy beverage than excluded participants who were not socially anxious (Oaten, Williams, Jones, & Zadro, 2008). Whether individuals can regulate their responses and react to threats to belonging in constructive ways may have profound implications for the long term well-being of their relationships and their ability to fulfill their belongingness needs. In future research, examining individual differences in self-regulatory capacity and strategies used to regulate responses to threats to belong will be important to achieve a greater understanding of the need to belong.

Long-Term Consequences of a Thwarted Need to Belong

Baumesiter and Leary (1995) argued that if belonging is a fundamental need, then ongoing thwarting of the need should lead to long-term negative outcomes. Many researchers

have addressed this question and have found evidence that failure to meet one's need to belong is indeed related to a variety of negative consequences. For example, older adults who report higher levels of negative social interactions, such as rejection by others, have been found to report poorer health, more health conditions, and functional limitations over time (Newsom, Mahan, Rook, & Krause, 2008). In a study of university students, loneliness predicted enhanced sympathetic activity in the nervous system and higher levels of total peripheral resistance (i.e., blood vessels that are less flexible), both of which may contribute to the development of high blood pressure (Hawkley, Burleson, Berntson, & Cacioppo, 2003). Loneliness was also related to higher stress and threat ratings, and predicted lower interaction positivity and higher interaction negativity (Hawkley et al., 2003).

Despite lonely people's greater attention to social cues, it appears that some people who fail to meet their need to belong may have difficulty improving their situation. Loneliness and perceptions of others' behaviour as rejecting have been found to be quite stable over time. For example, in one study 32% of the variance in negative social exchanges, including perceptions of rejection, was stable over a 2-year period (Newsom et al., 2008). Furthermore, the estimate of heritability for loneliness was 48% in a study of monozygotic and dizygotic twins, indicating high stability (Boomsma, Willemsen, Dolan, Hawkley, & Cacioppo, 2005). Therefore, it appears that not being able to meet one's need to belong has a variety of negative consequences that seem to be long term and possibly resistant to change. Future research should focus on identifying factors that contribute to the stability of a thwarted need to belong and what could be done to help individuals fulfill their need to belong.

<center>Conclusion</center>

In sum, research on the need to belong has expanded since the paper written by Baumeister and Leary (1995) was published. The field has grown, and as more and more research is published on the topic, our view of the need to belong is becoming more sophisticated and complex. As some questions are answered, new ones emerge that need to be examined. In its current state, the research on the need to belong has provided some answers but much remains to be done. It has become increasingly clear that belonging may indeed be a fundamental need. Most of the arguments forwarded by Baumeister and Leary (1995) have been confirmed by subsequent research. In particular, it has become clear that the need to belong has strong effects on people's cognitions, emotions, and behaviors, and a chronically unmet need has many negative consequences that can profoundly affect an individual's life. Despite these clear effects, many inconsistencies still remain to be resolved. It is likely that the field will shift its focus to the processes that underlie people's reactions to threats to belonging and to individual differences, such as interpersonal sensitivity and self-regulatory capacity that will ultimately allow for a greater understanding of the need to belong and a more complex and realistic view of human nature.

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