IMPLICIT MOTIVES

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Implicit motives are motivational dispositions that are based on affective responses to rewards and punishments, that operate outside of a person's conscious awareness, and that promote attainment of certain classes of incentives and avoidance of certain classes of disincentives. In this chapter, we discuss three major implicit motives, review the assessment of motive dispositions, and survey the affective, cognitive, physiological, and behavioral functions of implicit motives. We also provide a conceptual framework to account for some key differences between implicit motives and conscious (i.e., explicit) modes of goal striving.

PROFILES OF IMPLICIT MOTIVES

Over the past 60 years, most implicit motive research has focused on the motivational needs for achievement, affiliation, and power (usually abbreviated *n* Achievement, *n* Affiliation, *n* Power; cf. Murray, 1938). Achievement-motivated individuals get a kick out of doing something well or improving on a task; affiliation-motivated individuals experience close, harmonious contact with other people as satisfying; and power-motivated individuals derive pleasure from having an impact on and dominating others (e.g., McClelland, 1987; Schultheiss & Brunstein, 2010). In the following sections, we provide short profiles of these three motives and briefly discuss the hope and fear aspects of implicit motives.

The Achievement Motive

The psychological core of *n* Achievement is the *capacity to derive satisfaction from the autonomous mastery of challenging tasks* (McClelland, Atkinson, Clark, & Lowell, 1953;

Schultheiss & Brunstein, 2005). Achievement-motivated individuals prefer to work on challenging (but not overly difficult) tasks that demand their full concentration and effort (McClelland, 1987; Pang, 2010a). If they cannot choose and solve such tasks on their own terms, but instead are given explicit direction on how to do it, they are likely to leave the context and invest no effort in the task (Spangler, 1992). Individuals low in *n* Achievement, in contrast, typically avoid challenging tasks, because they require effort, and success is neither likely to come quickly nor guaranteed in the first place. So why do achievement-motivated people like to tackle challenges and why are they so independent-minded about it?

As suggested by Schultheiss and Brunstein (2005), achievement-motivated individuals have a generalized expectation of mastery whenever they encounter cues associated with task difficulty. More specifically, they have learned to associate the originally unpleasant experience of investing effort into a task with the subsequent pleasure of mastery, thus turning perceived difficulty into an attractive challenge and something that they even seek out (see McClelland et al., 1953). This characterization of *n* Achievement is consistent with the observation that achievement-motivated individuals have been raised by parents who set age-appropriate challenging tasks and rewarded their children's autonomous task mastery with affection, but also punished their children when they failed to master such tasks on their own (for a summary, see Heckhausen & Heckhausen, 2018). The parental emphasis on self-directed mastery may explain why individuals high in *n* Achievement prefer to solve challenges independently and quit if they are not allowed to do so (Schultheiss & Brunstein, 2005). The characterization of *n* Achievement as an automatic expectation of mastery when difficulty is encountered is also supported by recent research. Compared to others, achievement-motivated individuals show less of a stress response when engaging in competitions or having to prove themselves under trying circumstances (Schultheiss, Wiemers, & Wolf, 2014) and instead show more signs of active, coping-oriented

physiological and behavioral engagement with challenging tasks (Brunstein & Maier, 2005; Brunstein & Schmitt, 2010; Mazeres, Brinkmann, & Richter, 2019).

However, achievement-motivated individuals only show serious task engagement when they can get feedback about how well they are doing and will only step up their efforts if the feedback suggests that the task is challenging (Brunstein & Maier, 2005). Without feedback, there would be no way of recognizing a challenge and, consequently, experiencing pleasurable mastery. Moreover, if there is feedback, but it indicates a lack of difficulty or an insurmountable obstacle, the task is likewise unattractive and will not engage achievement-motivated individuals' effort. Finally, achievement-motivated individuals prefer feedback that indicates how they are doing individually, and show little interest in how they are doing compared to others (Brunstein & Maier, 2005).

Achievement-motivated individuals' Pavlovian attraction to challenges ensures that they are emotionally less vulnerable to difficulty. To them, setbacks only signal that the eventual mastery experience will be particularly pleasurable. As a consequence, people high in *n* Achievement are less likely to suffer from depression and other symptoms of psycho-pathology (see Neumann & Schultheiss, 2015, for a review and findings) and more likely to experience elevated well-being and adjustment (McAdams & Vaillant, 1980; Veroff, 1982).

Another consequence is their preference for careers that provide them with frequent opportunities to come up with and master challenging tasks. Entrepreneurial business is one line of work in which achievement-motivated individuals frequently excel, as long as they have full control over how the business is run and can monitor how well it is doing by, for instance, checking the daily cash flow (Collins, Hanges, & Locke, 2004; McClelland, 1961; Winter, 2010). Their performance fizzles, however, when they work in jobs that require managerial or “people” skills (Spreier, Fontaine, & Malloy, 2006; Winter, 2010). In these jobs, the focus is no longer on what the achievement-motivated person may perceive as the

best possible goal, the best possible way to achieve it, and having full control over the process. Rather, managerial positions require the delegation of work to others, finding compromises between conflicting views and interests, and making personnel decisions—none of which has any strong appeal for achievement-motivated individuals.

The Affiliation Motive

At *n* Affiliation's core is a *capacity to derive satisfaction from establishing, maintaining, and restoring positive relationships with others and to experience separation as aversive* (Atkinson, Heyns, & Veroff, 1958; Weinberger, Cotler, & Fishman, 2010). Individuals high in *n* Affiliation enjoy spending time with people, get more relaxation and satisfaction out of their intimate relationships, and are more likely to seek social support when faced with stressful situations than those low in Affiliation (Dufner, Arslan, Hagemeyer, Schönbrodt, & Denissen, 2015; Job, Bernecker, & Dweck, 2012; Hagemeyer & Neyer, 2012, Schoch, Noser, & Ehlert, 2018; Zygar, Hagemeyer, Pusch, & Schönbrodt, 2018). They respond with approach behavior to nonverbal signals of affiliation, such as facial expressions of joy, but also with vigilance and avoidance behavior to nonverbal signals of rejection and hostility, such as facial expressions of anger (e.g., Schultheiss & Hale, 2007; Schultheiss, Pang, Torges, Wirth, & Treynor, 2005). In other words, they want to be with individuals who are friendly and accepting and distance themselves from people who are not (see Winter, 1996). *n* Affiliation is the only motive for which a gender difference has been found meta-analytically, with women scoring higher than men (Drescher & Schultheiss, 2016). Drescher and Schultheiss (2016) speculated that this difference may be due to differential socialization and/or hormonal differences (see below).

n Affiliation has a dark side (Weinberger et al., 2010) that is particularly likely to surface when affiliative needs are threatened or frustrated. Mason and Blankenship (1987) report that affiliation-motivated women are more likely to psychologically or physically abuse their partners

when their relationship is under stress. Hofer and colleagues found that affiliation-motivated individuals experienced more cynicism (Hofer, Busch, Raihala, Solcova, & Tavel, 2017) and envy and aggression towards others (Hofer & Busch, 2011a) when they felt isolated, but not when they were engaged in meaningful relationships. Boyatzis (1973) argued that *n* Affiliation is characterized mainly by a fear of rejection and that a motive measure tapping more directly into the capacity for love would likely yield different results. Following Boyatzis's suggestion, McAdams (1980) developed a measure for the intimacy motive (*n* Intimacy), defined as a need to experience warm and communicative exchange with other individuals. Initial research on this motive suggested that it indeed represents something different from *n* Affiliation: it correlates only modestly with the *n* Affiliation measure and predicts more positive social outcomes (see McAdams, 1992, and Weinberger et al., 2010, for summaries). However, other studies do not support a strong distinction between *n* Affiliation and *n* Intimacy. For instance, in a large cross-cultural study, Hofer and Busch (2011a) found that the two needs correlated at .67, and that both intimacy-motivated and affiliation-motivated individuals reacted to social isolation with envy and aggression. Moreover, Winter (1991) studied effects of affiliation- and intimacy-inducing situations on affiliative thought content and found their effects to be so similar that he did not see a justification for a distinction at the measurement level.

Little is known about the developmental precursors of *n* Affiliation. In a longitudinal study, high *n* Affiliation in adulthood could be traced back to more parental use of praise as a socialization technique, but also to the mother being less responsive to the child's crying (McClelland & Pilon, 1983). These findings suggest that *n* Affiliation may be rooted at least partly in early separation anxiety or an avoidant attachment, but unfortunately the link between affiliation motivation and patterns of early attachment is largely unexplored (see Edelstein, Stanton, Henderson, & Sanders, 2010).

n Affiliation also affects people's behavior outside of obviously affiliative situations. In

achievement contexts, affiliation-motivated individuals excel at tasks that require cooperation with others (Atkinson & O'Connor, 1966; French, 1958) or bring them social approval (Atkinson & O'Connor, 1966), but show inferior performance on competitive tasks (Koestner & McClelland, 1992). Past research on management success indicated that high *n* Affiliation may be at odds with the typical requirements of management, such as making tough personnel decisions and holding everyone accountable to the same standards (McClelland & Boyatzis, 1982; McClelland & Burnham, 2003). However, recent research suggests that *n* Affiliation has become a necessary ingredient for effective management, presumably because contemporary work contexts require managers to be more socially attentive (Steinmann, Dörr, Schultheiss, & Maier, 2015; Steinmann, Ötting & Maier, 2016).

Scholarship on the effectiveness of political leaders similarly illustrates the complexities inherent in affiliation-motivated behavior in the real world. Some studies show that *n* Affiliation may predispose individuals to surrounding themselves with like-minded individuals who they feel bound to in loyalty and cannot let go of even if circumstances demand it. In the political arena, this leads to bunker mentality and scandal (Winter, 2010). But *n* Affiliation is also a positive predictor of arms-limitation treaties and the peaceful resolution of crises (Winter, 2010), which suggests that even within the same general context, a motive can be a vulnerability or an asset, depending on the specific incentives and contingencies prevalent in the situation.

The Power Motive

Individuals high in *n* Power have a *capacity to derive pleasure from having physical, mental, or emotional impact on other individuals or groups of individuals and to experience the impact of others on themselves as aversive* (Schultheiss, Wirth, Torges, Pang, Villcorta, & Welsh, 2005; Winter, 1973). Although the ultimate goal of *n* Power may be dominance over others, the canonical definition of this motive focuses on an intermediate step toward

dominance, namely, having *impact* on others, which is *not* synonymous with being dominant. This is an important distinction, because the stereotypical picture associated with power is a kind of in-your-face aggressive and domineering behavior. Yet, among many mammalian species, particularly primates (cf. de Waal, 1998), this type of behavior is rarely a sustainable strategy for attaining and maintaining dominance, and it is not what typically characterizes individuals high in *n* Power. Although they can be aggressive, irresponsible, and uncooperative (e.g., Hofer, Busch, Bond, Campos, Li, & Law, 2010; Rawolle, Schultheiss, Strasser, & Kehr, 2017), more often they have been found to be clever and intelligent in their quest for impact experiences (McClelland & Burnham, 2003). For instance, Ditlmann, Purdie-Vaughns, Dovidio and Naft (2017) found that in members of an oppressed minority, when talking to members of the majority group, high *n* Power leads to the adoption of communication strategies characterized not by self-assertion or demands, but by a socially engaging, warm style. This in turn helps power-motivated minority members to have a greater impact on their audience, who finds such messages to be particularly memorable.

Recent research has started to take a closer look at how power-motivated individuals succeed at having social impact. Power-motivated individuals are generally quick at detecting (Donhauser, Rösch, & Schultheiss, 2015) and correctly classifying others' facial expressions of emotion (Vongas & Hajj, 2017); they show enhanced cortical processing of, attentional orienting towards, and memory for such emotional signals, even if they are presented below the threshold of conscious recognition (Schultheiss & Hale, 2007; Wang, Liu, & Yan, 2014; Wang, Liu, Yang, Zhang, & Yan, 2017); and they efficiently learn behaviors reinforced by signals of others' low power and inhibit behaviors leading to signals of others' high power (Schultheiss, Pang, et al., 2005; Schultheiss, Wirth, et al., 2005; Stoeckart, Strick, Bijleveld, & Aarts, 2017, 2018). In short, they have a highly sensitive social-impact detection system that enables them to optimize their behavior for exerting influence on others (Schultheiss &

Schiepe-Tiska, 2013).

Consistent with their knack for interpersonal sensitivity and influence, power-motivated individuals are more likely to ascend to the highest levels of management in hierarchically organized corporations (McClelland & Boyatzis, 1982; McClelland & Burnham, 2003), to be more effective once they are in management positions (Steinmann et al., 2015), and, more generally, to have productive and successful careers (McClelland & Franz, 1992; Peterson & Stewart, 1993). However, when working in leadership positions, power-motivated individuals become vulnerable to ingratiating behavior by subordinates and favor an autocratic style of decision making that leaves little room for subordinates' input (Fodor, 2010). Another way for power-motivated individuals to have impact is to "make a splash," to do something that will increase their social visibility by attracting others' attention, such as placing risky gambling bets (McClelland & Watson, 1973). Finally, *n* Power is also involved in generative behavior (e.g., Peterson & Stewart, 1996). This is reflected to some extent already in the *n* Power measure, which treats themes of unsolicited help as indicators of the need for social impact (Winter, 1991). It is also reflected in power-motivated individuals' articulated desire to contribute something to the well-being of others or the next generation (e.g., Peterson & Stewart, 1993; Winter, 2016). But power-motivated individuals' sociality has boundaries. As a study of couples by Hagemeyer, Schönbrodt, Neyer, Neberich, and Asendorpf (2015) shows, power-motivated men showed signs of impaired relationship functioning when they lived in one household with their partner, but not if they lived apart.

In the political arena, *n* Power is associated with the proactive initiation of armed conflicts, as has been observed in U.S. presidents and South African leaders during the apartheid regime (Winter, 2010). U.S. presidents high in *n* Power have a higher risk of being assassinated (e.g., Kennedy, Lincoln), but are also held in greater esteem by historians than low-power presidents (Winter, 2010). Winter (2016) suggests that the potentially aggressive

stance of power-motivated politicians can be mitigated by other factors, such as a generative historical awareness that involves an acceptance of one's own limited role and importance (see also Winter & Leclerc, 2019).

In many studies (e.g., McClelland & Boyatzis, 1982; Steinmann et al., 2015), the effects of *n* Power on behavior depend on individuals' level of activity inhibition, the tendency to use negations in spoken or written language (Schultheiss, Riebel, & Jones, 2009). In general, high-power individuals show more sophisticated, context-sensitive power behavior when they are high in activity inhibition, and more self-centered manifestations of their need for impact when they are low in this variable (Langens, 2010; Schultheiss, 2018; Schultheiss et al, 2009).

Developmentally, research has identified prenatal and early-socialization factors that are associated with adult *n* Power levels. Schultheiss and Zimni (2015) and Schultheiss and colleagues (2018) have shown that the ratio between the second and the fourth digit, which reflects fetal hormone exposure during the first pregnancy trimester, is associated with *n* Power in young adults (see also Janson, Bleck, Fenkl, Riegl, Jägel, & Köllner, 2018). McClelland and Pilon (1983) reported that parental permissiveness for aggressive and sexual behavior assessed at the age of five positively predicts *n* Power in middle adulthood. Jointly, these findings suggest a growth-and-prune model of *n* Power development (see Köllner, Janson, & Bleck, 2019) according to which prenatal hormone exposure determines initial *n* Power strength, and then the child's need for social impact is either tolerated or scaled back by more or less punitive parental socialization practices, respectively. Even if parents do not curtail their children's power motivation, further development is necessary to refine the impulsive self-assertion characteristic of young children into the socially more intelligent ways of power-motivated adults. Some contextual factors, such as the presence of both parents (McClelland & Pilon, 1983) or younger siblings (Winter, 1988) during childhood and

adolescence appear to contribute to mature adult *n* Power. However, in-depth research into the more proximal factors and processes shaping *n* Power over the course of development is still missing, and the existence of early developmental precursors should not be misconstrued as evidence that motives do not continue to develop in adolescence and adulthood.

MEASUREMENT OF IMPLICIT MOTIVES

A defining feature of motive research in the tradition of McClelland and his collaborators is the experimental arousal of motivational states to derive and validate motive measures (see Fig. XX.1). This feature precedes the implicitness aspect of motives, which emerged as an empirical by-product of accumulating research findings over the years (see McClelland, Koestner, & Weinberger, 1989). For instance, McClelland et al (1953) experimentally manipulated whether research participants wrote imaginative stories in response to pictures after achievement-arousing conditions (including the encounter of success, failure, or both) or in a control condition under motivationally neutral circumstances. Winter (1973) contrasted the effects of charismatic speeches versus motivationally neutral travel reports to study effects of power motivation arousal on picture-story content. McAdams (1980) collected stories written by individuals in various intimacy-arousal conditions, such as being initiated to a sorority or fraternity or attending a party, and stories written under neutral conditions, in a classroom. In each of these studies, picture stories were later scrutinized for identifiable and recurring narrative imagery that could be coded with high inter-rater reliability and that differentiated between arousal and control conditions. For each motive, rules for the reliable coding of valid imagery were defined in coding manuals that could then be applied in other studies, to picture stories collected from participants whose motivational state had not been experimentally manipulated. If a participant's stories featured a high amount of imagery, this was interpreted as an indicator for the person's high dispositional motivational need; if the stories were low on imagery, then this was interpreted as a sign of a low dispositional motive.

McClelland (1958; see also McClelland, 1987) termed the covariation between an experimentally manipulated attribute and its measure *sensitivity* and accorded it central importance for a measure's validity. Modern validity theory now takes a similar position. Borsboom, Mellenbergh, and van Heerden (2004) propose as a necessary criterion for validity that there be a *causal relationship* between an attribute and its measure, such that the attribute must exist and that experimental manipulations in the attribute lead to corresponding changes in its measure. In that sense, motive measures derived in the McClelland tradition fulfilled a key criterion of validity – that of a causal relationship between motives and their measures – from the very beginning.

In principle, the experimental-arousal approach for validating motive measures can be applied to any kind of outcome measure susceptible to motivational arousal effects, such as perceptual thresholds (McClelland & Atkinson, 1948) or implicit association tests (Slabbinck, de Houwer, & van Kenhove, 2011). Over the past six decades, however, story-writing measures like the Picture Story Exercise (PSE; McClelland et al., 1989), a descendant of the Thematic Apperception Test (Morgan & Murray, 1935), have been the method of choice for assessing implicit motives. The PSE requires research participants to write short imaginative stories about four to eight pictures showing people in various social situations (e.g., a captain talking to a passenger, two women working in a laboratory). These stories are then scored with content-coding systems derived from the experimental-arousal approach described above (see Schultheiss & Pang, 2007, for further details).

Coding systems for the assessment of *n* Power, *n* Affiliation, and *n* Achievement from PSE stories have been revised and refined considerably over time, and a compilation of most existing coding systems for implicit motives was published by Smith (1992). Winter (1991) developed an integrated coding system that allows researchers to code all three major motives simultaneously and that can be applied to PSE stories as well as other types of verbal material

(e.g., political speeches, diaries). More recently, Pang (2010b) and Schultheiss and Pang (2007) published general guidelines for motive assessment based on PSE story coding.

Reliability of PSE-based motive measures is good in terms of inter-coder agreement, with Pearson *r*s typically > .75, and acceptable in terms of retest stability, with Pearson coefficients of .71 after 1 day, .60 after 1 week, .52 after 1 month, and .37 after 1 year (Schultheiss & Pang, 2007). Internal consistency estimates (e.g., Cronbach's alpha), computed across stimuli (i.e., pictures), are typically much lower (e.g., Schultheiss, 2013a). However, most researchers agree that internal consistency is not an appropriate indicator of the reliability of PSE-based motive measures. For example, Atkinson and Birch's (1970) dynamics of action theory holds that a motivational need, once aroused and expressed in behavior, wanes and does not affect behavior in a subsequent time interval until it is sufficiently aroused again by external cues to resurface. Consequently, if a motive is expressed in response to a previous picture cue, it is less likely to be expressed in response to a subsequent picture. Research on the waxing-and-waning account of inconsistent responding across pictures has yielded inconsistent results (Atkinson, 1981; Lang, 2014; Tuerlinckx, de Boeck, & Lens, 2002).

Schultheiss, Liening, and Schad (2008) proposed an alternative explanation of motive score inconsistency based on Mischel and Shoda's (1995) *if-then* account of personality. According to their explanation, PSE picture cues represent prototypical situational contexts that have become more or less associated with a given motivational incentive (such as having impact) and therefore elicit more or less motivational imagery in a person's story. In support of this account, Schultheiss, Liening, and Schad (2008) showed that motive profiles representing reactions to the individual pictures remained moderately stable across two weeks, even though picture sequence was randomized at each measurement. Busch and Hofer (2012) replicated this result in two larger samples and with an 18-month retest interval. These

findings suggest that the PSE represents an *if-then* measure of motivational needs, providing information both about the overall strength of a person's motives and about the specific situational contexts in which motives are expressed (Schultheiss & Schultheiss, 2014).

The last decade has seen increased scrutiny of non-PSE measures claiming to assess implicit motivational needs, primarily the Multi-Motive Grid (MMG; Sokolowski, Schmalt, Langens, & Puca, 2000; see also Johnston, 1957) and the Operant Motive Test (OMT; Baumann, Kazen, & Kuhl, 2010). So far, these measures have not been validated by motivational-arousal studies, and neither measure converges with PSE motive measures (Schüler, Brandstätter, Wegner, & Baumann, 2015). Moreover, the MMG, which combines picture cues with self-report items, features striking similarities with measures of self-attributed (i.e., explicit) motives and traits based on similar picture-item test strategies (Paunonen, Ashton, & Jackson, 2001; Schultheiss, Yankova, Dirlikov, & Schad, 2009), suggesting that this instrument assesses explicit aspects of personality, not implicit motives (Schultheiss, Yankova, et al., 2009).

Hope and Fear Aspects of Implicit Motives

Almost from the start, researchers suspected that each motive may represent two complementary motivational orientations, one directed toward attaining a motive-specific incentive (approach or hope motivation) and one directed toward avoiding a motive-specific disincentive (avoidance or fear motivation) (e.g., Boyatzis, 1973; Heckhausen, 1963; McClelland et al., 1953; Veroff & Veroff, 1972). Others argued that some people may fear a positive incentive itself because of the negative social consequences its attainment may bring (e.g., Horner, 1972; Winter, 1973). These ideas stuck, so much so that the previous version of this chapter even dedicated a detailed theoretical analysis to this issue (Schultheiss, 2008).

Ten years later, we have become more skeptical about the validity of the distinction between incentive-approach and disincentive-avoidance in implicit motive research and

conclude that it rests on a weak empirical foundation. The distinction was initially based on theoretical considerations (e.g., Boyatzis, 1973; Heckhausen, 1963; Veroff & Veroff, 1972), and subsequent experimental work has largely failed to demonstrate the expected differences between arousal of incentive-approach and disincentive-avoidance states (Wirth & Schultheiss, 2006) or any motive arousal effect at all (see Hofer, Busch, Bender, Ming, & Hagemeyer's, 2010, failure to validate Heckhausen's, 1963, coding system). In one notable exception, results pointed towards greater functional similarity between the two motivational modes than originally anticipated (Pang, 2010a). Another reason for caution is the observation that when measures that are presumed to assess hope and fear components of a given motive are used simultaneously in the same study, they typically show substantial variance overlap and predict either the same outcomes or, when they predict different outcomes, are difficult to map onto approach/avoidance concepts in a clear-cut manner (e.g., Hofer & Busch, 2011a; Veroff, 1982).

What *does* appear to be valid is the distinction between hope and fear of an *incentive* (and, conversely, fear and hope of a disincentive). Many experimental studies in which motivational incentives and disincentives were experimentally manipulated show disordinal interactions between experimental factors and implicit motive measures in their predictive effects on outcomes. Rather than an indifference towards both incentives and disincentives at very low motive levels, the opposite of what happens at very high motive levels is observed. For instance, Schultheiss, Wirth et al (2005) reported that whereas individuals high in *n* Power showed better learning of behavior that was instrumental for beating an opponent (power incentive) and worse learning for behavior that was associated with being beaten (power disincentive), individuals low in *n* Power showed the opposite effect: worse learning after beating an opponent and better learning after being beaten. Similar disordinal effects were found in other studies involving other motivational needs (e.g., Brunstein & Maier,

2005; Kordik, Eska, & Schultheiss, 2012). Low scores on a given motive measure predicting the opposite of what high scores predict strongly suggest that motive measures based on picture-story methods represent a continuum from incentive avoidance, based on *fear and disliking*, at very low scores, through a neutral midpoint at medium scores, to incentive approach, based on *approach and liking*, at high scores.

Other Motives

The research focus on the needs for achievement, power, and affiliation is due, in part, to serendipity and should not be taken to suggest an exclusive status of these needs in motivation science. Other motivational needs have been studied, too (see Atkinson, 1958, and Smith, 1992). However, because these forays into other motivational domains have so far not generated substantive bodies of research, we will not discuss them here.

HOW IMPLICIT MOTIVES DIFFER FROM SELF-ATTRIBUTED NEEDS AND GOALS

One of the most striking and pervasive findings emerging from more than 60 years of research on implicit motives is that the correlation between story-telling and self-report measures of motivational needs is close to zero. Results from a sample of 309 participants reported by Rawolle, Schultheiss, and Schultheiss (2013; see Table XX.1) illustrates a typical finding: Explicit measures of motivation, like individuals' sense of commitment to personal goals or motivation questionnaire scores, converge with each other, but not substantially with the PSE. A meta-analysis by Spangler (1992) yielded an average variance overlap of less than 1% between PSE and questionnaire measures of the achievement motive. This finding was replicated and extended to other motive domains in a recent meta-analysis (Köllner & Schultheiss, 2014). Here, average correlations between implicit and explicit motive measures were small for achievement (.14) and affiliation (.12) and did not reliably differ from zero for power (.04). Moreover, Köllner and Schultheiss found that these small correlations decrease

to zero in more recent publications. They explain this observation with a substantial file-drawer problem in earlier research.

Schultheiss, Yankova, et al (2009) pointed out that low correlations between PSE and self-report measures may be due in part to the fact that implicit and explicit motive measures are not commensurable – the former record participants' responses to specific contextual cues (e.g., pictures) and use specific content categories, the latter present largely context-free response options that moreover do not systematically overlap with the content categories used by the former. So, is the lack of association between implicit and explicit motive measures only a methodological artifact masking more substantial relationships between the two forms of measurement? To test this idea, Schultheiss, Yankova, et al (2009) devised a picture-story-exercise questionnaire (PSE-Q) with the same pictures as the PSE and items reflecting the content of each of Winter's (1991) PSE coding categories. In this and subsequent studies (Neumann & Schultheiss, 2015; Schultheiss, Patalakh, Rawolle, Liening, & MacInnes, 2011), PSE and PSE-Q scores for the same motives did not reliably converge, suggesting that the independence of the two forms of measurement is real. Schultheiss, Yankova, et al (2009) found that the PSE-Q converged with a standard questionnaire measure of motivational needs, as would be expected based on the interrelationships of explicit measures reported by Rawolle and colleagues (2013). The stubborn lack of substantial between-measures correlations suggests that, in general, *people do not have conscious access to the strength of their motives, as assessed with the PSE, and that the motivational needs and goals they ascribe to themselves cannot be interpreted as valid indicators of their underlying motive dispositions*. For this reason, McClelland and colleagues (1989) labeled motivational constructs assessed with the PSE *implicit motives* and motivational constructs assessed through self-report methods *explicit motives* or *self-attributed needs* (abbreviated *san*).

Implicit and Explicit Motives Predict Different Types of Behavior

Perhaps even more important than the finding that implicit and explicit motives do not correlate substantially is the observation that the two types of constructs respond to different kinds of stimuli and predict different kinds of outcomes. In an early study of the differences between implicit and explicit achievement motives, deCharms, Morrison, Reitman, and McClelland (1955) found that high *san* Achievement, but not high *n* Achievement, predicted research participants' likelihood of adjusting their ratings of artworks and persons. Conversely, high *n* Achievement, but not high *san* Achievement, predicted episodic memory and performance on a scrambled-word test. Consistent with these early observations, Biernat (1989) found that *n* Achievement predicted good performance on an arithmetic task, but not volunteering for a task group leadership position, whereas *san* Achievement did not predict arithmetic task performance but instead predicted participants' inclination to be a task group leader. Similarly, Brunstein and Hoyer (2002; see also Brunstein & Maier, 2005) reported that *n* Achievement predicted performance on an attention task, but not participants' choice of whether to continue with the task or do something else, whereas *san* Achievement positively predicted the choice to continue, but not the actual performance on the task.

Differences between implicit and explicit measures of motivation have also been reported for other motives (e.g., Craig, Koestner, & Zuroff, 1994; Koestner, Weinberger, & McClelland, 1991; Schultheiss & Brunstein, 1999). For instance, Hagemeyer, Dufner, and Denissen (2016) videotaped participants, whose *n* and *san* Affiliation they had assessed, in a standardized social-interaction situation with the experimenter. Videotapes were coded for verbal and nonverbal affiliative behaviors, such as self-disclosure and smiling, respectively. Hagemeyer and colleagues found *n* Affiliation to predict nonverbal, but not verbal affiliative behaviors, and *san* affiliation to predict verbal, but not nonverbal affiliative behaviors.

Taken together, these studies suggest a double dissociation between implicit and explicit

motives and their behavioral correlates, such that implicit motives are more likely to predict nonverbal performance indicators, and explicit motives are more likely to predict choices, judgments, and verbal declarations. This characterization of the differences in predictive validity between implicit and explicit motives is probably too coarse to apply across the board (see, e.g., Brunstein & Maier, 2005, and Brunstein & Schmitt, 2010, for examples of implicit and explicit achievement motives additively or interactively influencing the same performance measures). However, it is broadly consistent with meta-analytic findings (Spangler, 1992) and can serve as a useful heuristic for predicting which type of measure will perform well for which outcome type.

Implicit and Explicit Motives Respond to Different Types of Cues

Implicit motives are more aroused by nonverbal than verbal cues. Klinger (1967) observed that individuals showed increases in PSE affiliation and achievement imagery after watching an affiliation-oriented or achievement-oriented experimenter, even when they could not hear his verbal instructions. Similarly, Shantz and Latham (2009) found nonverbal achievement priming to increase *n* Achievement. Schultheiss and Brunstein (1999, 2002) demonstrated that experimenters who verbally assigned a power-related goal failed to arouse their participants' *n* Power. Only after participants had had an opportunity to translate the assigned goal into an experiential format through a goal imagery exercise did their implicit power motive predict goal commitment and task performance.

In recent years, incentive effects of nonverbal cues for implicit motives have been studied extensively through the lens of motivational field theory (MFT; Stanton, Hall, & Schultheiss, 2010). Building on earlier interpersonal-theory work (e.g., Wiggins & Trobst, 1999), MFT holds that nonverbal signals of emotion can be classified along the orthogonal axes of dominance and affiliation. According to MFT, dominant emotional signals, such as anger, represent disincentives for perceivers, particularly if their own *n* Power is high, and,

conversely, submissive signals, such as surprise or fear, represent incentives for such perceivers. Affiliative emotional signals, such as social smiles, represent incentives for perceivers, particularly if their own *n* Affiliation is high, whereas hostile signals, such as disgust, represent disincentives for affiliation-motivated perceivers. Research focusing on facial expressions of emotion provides support for these predictions. Compared to others, individuals high in *n* Power are particularly sensitive to signals of dominance (e.g., anger) and submission (e.g., surprise) in studies on perceptual sensitivity (Donhauser et al., 2015), attentional orienting (Schultheiss & Hale, 2007), event-related brain potentials (Wang et al., 2014, 2017), instrumental learning (Schultheiss, Pang et al, 2005; Stoeckart et al., 2016, 2018) and brain activation (Schultheiss, Wirth, et al, 2008). Individuals high in *n* Affiliation are particularly sensitive to facial expressions signaling affiliative intent (joy), but also to expressions signaling rejection and hostility (e.g., anger, disgust) in studies on facial muscle activation (Kordik et al, 2012), attentional orienting (Schultheiss & Hale, 2007), implicit learning (Schultheiss, Pang et al, 2005), and valence evaluations (Rösch, Stanton, & Schultheiss, 2013). In sum, research provides mounting evidence for implicit motives' sensitivity to nonverbal signals.

Explicit motives, in contrast, respond preferentially to verbal cues. In a meta-analysis, Spangler (1992) found that high *san* Achievement predicted achievement-related behaviors particularly well in the presence of achievement-focused instructions, but failed to predict behavior in the absence of such verbal cues, or in the presence of strong task-intrinsic cues, such as task-based feedback about one's performance increases or decreases. Similarly, Engeser and Baumann (2014) provided experimental evidence that achievement-related words activate the explicit need to achieve, but have no effect on *n* Achievement.

An Information-Processing Model of Implicit and Explicit Motives

Schultheiss (2001; 2008) has presented an information-processing account of implicit

and explicit motives that aims at integrating these sets of findings. In a nutshell, the model states that implicit motives preferentially respond to *nonverbal cues and incentives* and, after arousal, are particularly likely to have an impact on *nondeclarative measures of motivation*, that is, measures of behaviors and processes that are not accessible to, or controlled by, a person's self-concept or verbally represented intentions. Nondeclarative measures include physiological responses aimed at promoting biologically rooted needs (e.g., changes in blood pressure and heart rate, hormone release, muscle tone), acquisition of new stimulus–stimulus associations and goal-directed behaviors through processes of Pavlovian and instrumental learning, and utilization of such learned stimulus connections and behaviors in the appropriate contexts. Explicit motives, on the other hand, preferentially respond to *verbal–symbolic cues* and influence *declarative measures of motivation*, that is, measures that tap into a person's verbally represented sense of self and the attitudes, judgments, decisions, and goals associated with it. Evaluative judgments, choice behavior, assessments of self-regulatory control, and idiographic personal goal descriptions are all examples of declarative measures of motivation.

The model also specifies a mechanism by which verbal cues can interact with implicit motives to influence both declarative and nondeclarative measures of motivation: *Referential processing*, the process through which words are assigned to nonverbal experience and, conversely, mental images are generated in response to words (Schultheiss & Strasser, 2012; Paivio, 1986). One way to employ referential processing is through the strategic translation of verbally communicated goals into experience-like mental imagery. In a series of studies by Schultheiss and Brunstein (1999, 2002), participants were assigned power- or affiliation-related goals and then either had an opportunity to translate these verbally represented goals into an experiential, nonverbal format through guided goal imagery procedures (goal imagery group) or not (control group). The authors found that declarative and nondeclarative

measures of motivation were contingent on participants' implicit motives in the goal-imagery groups, but were independent of their implicit motives in the control groups (for a replication, see Rawolle et al., 2017). Recent research shows that in addition to such strategic use of referential processing, dispositional differences in the ability to quickly translate between verbal and nonverbal representations also moderate the degree to which individuals' goal choices fit their implicit motivational needs (Schultheiss et al., 2011). In summary, these findings show that referential processing allows implicit motives to "understand" and respond to verbal stimuli, which would otherwise bypass them.

Other proposed moderators of the relationship between implicit and explicit motives include self-determination (Hofer et al., 2010; Thrash & Elliot, 2002), the ability to quickly down-regulate negative affect (Brunstein, 2001), private body consciousness, self-monitoring, and preference for consistency (Thrash, Elliot, & Schultheiss, 2007), and the hemispheric decoupling effects of progesterone (Schultheiss, Patalakh, & Rösch, 2012). It remains to be determined whether these moderators reliably influence the convergence between implicit and explicit motives and how they relate to each other as well as to referential processing.

BIOPSYCHOLOGICAL ASPECTS OF IMPLICIT MOTIVES

A central idea in motivation science is that basic motivational needs represent phylogenetically evolved, neurobiologically anchored systems dealing with recurrent problems and requirements of survival, such as finding food, mating, caring for offspring, or, among socially living organisms, affiliating with others and finding one's place in the pecking order (e.g., Panksepp & Biven, 2012, Rolls, 2005; Toates, 1994). Ontogenetically, these systems are fine-tuned through interactions with the environment throughout pre- and postnatal development (see our previous discussion of the association of n Power and digit length as a marker of prenatal brain development), giving rise to individual differences in

motive strength and style. But at their core, all of them are built around fundamental affective-emotional responses to primal stimuli and situations (such as eating, orgasm, having impact, but also social rejection and threat) and the cues predicting them (Cabanac, 2014; Panksepp & Biven, 2012; Schultheiss & Wirth, 2018). As a functional consequence, implicit motives are closely coupled to physiological and endocrine manifestations of these responses, such as sympathetic and parasympathetic changes, and their effects on the immune system (see Jemmott, 1987; McClelland, 1989). The hypothalamus represents a central interface between motive-relevant stimulus processing and the autonomic nervous system (ANS) governing these changes (Iversen, Iversen, & Saper, 2000; Schultheiss, 2013b). But the biopsychological substrates of implicit motives also encompass other brain structures that interact with the hypothalamus: the amygdala, which is critical for learning of predictive cues through Pavlovian conditioning; the striatum, which supports instrumental learning and habit formation; the orbitofrontal cortex (OFC), which represents the hedonic value of rewards and punishers in a need-dependent way; and the hippocampus, which provides relevant contextual information to motivational learning processes, but is also influenced by the amygdala in its emotion-dependent creation of episodic memories (Hall, Stanton & Schultheiss, 2010; Schultheiss & Köllner, 2014; Schultheiss & Wirth, 2018). In the following sections, we review evidence for the involvement of specific brain, endocrine, and physiological systems in implicit motives, and also highlight some implications for physical health.

The Biopsychology of the Power Motive

The endocrinology of *n* Power is characterized by the interplay between situational factors, the hormonal stress responses they elicit, and gonadal steroid changes that partly depend, in turn, on stress hormone changes. Summarizing the state of research, Stanton and Schultheiss (2009; Schultheiss, 2013b) describe this complex dynamic for individuals with high *n* Power as follows: Situational arousal of *n* Power leads to primary activation of the

sympathetic nervous system (SNS), manifested in the release of adrenaline and noradrenaline. In men, adrenaline has a stimulating effect on the testes, leading to increased testosterone, a hormone involved in physical strength and male dominance across many species. If the individual prevails and wins a dominance contest, testosterone levels also remain elevated and appear to be involved in the consolidation of instrumental learning (see Schultheiss & Schiepe-Tiska, 2013). If the individual is defeated, on the other hand, another type of stress response, mediated by the hypothalamic-pituitary-adrenal (HPA) system, is primarily activated, leading to increased cortisol. In men, cortisol has an inhibiting effect on the testes, leading to a drop in testosterone after a defeat (see also Vongas & Hajj, 2017).

While studies show that *n* Power also predicts testosterone increases in response to dominance contests in women, there is evidence for a more critical role of estradiol in women, with *n* Power predicting increased estradiol after winning and decreased estradiol after losing (cf. Oxford, Tiedtke, Ossmann, Özbe, & Schultheiss, 2017; Stanton & Schultheiss, 2007). Stanton and Schultheiss (2007) therefore speculated that estradiol may represent a female dominance hormone, similar to the role testosterone fulfills in males. Transiently elevated testosterone or estradiol after a victory may help reinforce successful behavior and keep the individual motivated for another fight, just as transiently depressed levels of these hormones after a defeat inhibit unsuccessful behavior and help avoid another costly fight (Mazur, 2015; Stanton & Schultheiss, 2009).

Situational power challenges or stressors with their effects on SNS arousal and stress hormone release make power-motivated individuals more susceptible to cardiovascular problems, immune system changes, and illness (Jemmott, 1987; McClelland, 1989). Power stress has been shown to lead to elevated and prolonged SNS activation and suppressed immunocompetence in power-motivated individuals and, as a consequence, to more frequent and severe illness in these individuals (for a summary, see McClelland, 1989).

n Power also predicts brain activation responses to power-related incentives. Schultheiss, Wirth et al (2008; see also Hall et al., 2010) used high- and low-dominance facial expressions of emotion as stimuli in a functional magnetic resonance imaging (fMRI) study. Individuals high in *n* Power showed increased brain activation in the striatum, the OFC, and the insula (a cortical area involved in subjective emotional experience), particularly in response to high-dominance anger faces. Hall and colleagues (2010), in a reanalysis of this study, also found that *n* Power predicted increased amygdala responses to such faces. These findings suggest that *n* Power is tied to several key areas of the motivational brain involved in incentive prediction and evaluation as well as in instrumental learning.

The Biopsychology of the Affiliation Motive

Research on the biological aspects of *n* Affiliation suggests an association of this motivational disposition with indicators of parasympathetic nervous system (PNS) activity, better cardiovascular health and better immune system functioning (for summaries, see Jemmott, 1987; McClelland, 1989; for a recent finding, see Prestele, Gerstenberg, Hagemeyer, & Geisler, 2016). Another line of research points to a link between *n* Affiliation and the steroid hormone progesterone (see Schultheiss, 2013b, for an overview). For instance, women who take oral contraceptives, which contain progesterone, have higher *n* Affiliation scores than women not taking the pill or men (Schultheiss, Dargel, & Rohde, 2003; Schultheiss & Zimni, 2015). Also, higher *n* Affiliation scores are preceded by greater increases of progesterone in the course of women's menstrual cycle (Schultheiss et al., 2003). In an attempt to synthesize findings on the link between progesterone and *n* Affiliation, Wirth (2011) has suggested that progesterone, through its effects on GABA receptors in the brain, may help to downregulate HPA axis activation once it has been triggered by stressors. This account fits the more general idea that social affiliation acts as a buffer against stress (Taylor, 2006), but also with the idea that, conversely, overwhelming stress may disrupt one's ability

to affiliate with others (Sandi & Haller, 2015). Although research on *n* Affiliation has only focused on progesterone as a specific marker so far, it may also be associated with other hormones and transmitters, such as oxytocin and opioids (see Gangestad & Grebe, 2017).

The Biopsychology of the Achievement Motive

The biological correlates of *n* Achievement have received the least attention so far, despite the fact that clues to such correlates emerged almost from the beginning of *n* Achievement research (e.g., Mücher & Heckhausen, 1962). For instance, Bäumler (1975; cf. Schultheiss & Brunstein, 2005) showed that administration of a drug that increases central dopamine, a key transmitter in reward prediction and reinforcement processes in the midbrain and the striatum, leads to increased *n* Achievement, whereas administration of a drug that decreases dopamine leads to reduced levels of this motive. Other research suggests a link between *n* Achievement and the peptide hormone arginine-vasopressin (AVP), which regulates water retention in the body and memory processes in the brain. McClelland (1995) reported evidence that individuals high in *n* Achievement urinate less and have better story recall after achievement arousal. Although these findings support the *n* Achievement–AVP hypothesis, it has not been tested directly yet.

Finally, recent research strongly points to a role of *n* Achievement in stress-response regulation. Individuals high in *n* Achievement show an attenuated HPA stress response to one-on-one competitions, to stressful social-evaluations tasks (Schultheiss et al., 2014), and to negative performance feedback (Yang, Ramsay, Schultheiss, & Pang, 2015). They also exhibit greater SNS activation in response to challenging, but not to easy or impossibly difficult tasks (Brunstein & Schmitt, 2010). Consistent with the characterization of *n* Achievement as a preference for challenges outlined above, these findings suggest that achievement-motivated individuals view difficult tasks not as threats, which would preferentially lead to HPA activation, but as challenges, which engage the SNS.

CORE MOTIVATIONAL FUNCTIONS OF IMPLICIT MOTIVES

Current theorizing in motivation science emphasizes the role of affective responses to incentives and disincentives as the prime mover of motivation (see Schultheiss & Wirth, 2018, for a review). According to Berridge (1996; Berridge & Robinson, 2003), the motivational process consists of two consecutive, functionally interdependent phases, termed *wanting* and *liking*. Liking denotes the primal affective response to rewards (pleasure) and punishments (pain); that is, to what learning theory has termed *unconditioned stimuli*. Cabanac (2014) holds that such hedonic responses signal the usefulness, or harmfulness, of a stimulus, event, or situation for an organism's survival, depending on the organism's current needs. They thus represent a common currency for evaluating the utility of outcomes that can otherwise be very diverse (e.g., food, safety) along one dimension. How much pleasure or pain an unconditioned stimulus generates – how much it is liked or disliked – has consequences for how much it is wanted in the future; that is, how emotionally compelled an organism will feel to pursue it, how much energy it is willing to invest in its attainment or avoidance, how much attention to predictive cues (conditioned stimuli) and their situational contexts it will pay, and how well it will retain (or inhibit) behaviors that have brought about the reward (or punishment). Of course, the relationship between wanting and liking is an iterative process which after every motivational episode needs to recalibrate, through the outcome evaluation represented by liking, whether less, the same, or more wanting will be appropriate in the future (see Rescorla & Wagner, 1972). In the following, we will present a model of implicit motives that anchors them in the liking phase of motivation, as generators of hedonic responses to motive-specific incentives and disincentives, and that describes their effects on components of the wanting phase as consequences of this fundamental function (see Fig. XX.2 for an overview).

Motives are about Liking: Hedonic Responses to Incentives and Disincentives

Atkinson (1957) argued that a motive represents a capacity to have a strong affective response to motive-specific (dis)incentives – this is the basis of the motive definitions we gave at the beginning. Thus, the strength of an implicit motive determines the strength of individuals' affective responses to a motive-specific unconditioned stimulus, turning incentives into something pleasurable and rewarding and disincentives into something painful and aversive. Without a motive, there is no hedonic response to such stimuli.

Evidence for an affect-scaling function of implicit motives comes from studies of facial expressions, which represent a prime indicator of the hedonic impact of goal attainment (cf. Berridge, 2000). In humans, spontaneous smiles reflect a positive hedonic response and frowns reflect a negative hedonic response to a wide variety of stimuli and situations (Larsen, Norris, & Cacioppo, 2003). There is growing evidence that facial hedonic responses to motive-specific stimuli are stronger in high-motive individuals and weaker or absent in low-motive individuals. For *n* Affiliation, Dufner and colleagues (2015) used electromyography (EMG) of muscle activity over the *corrugator supercilii*, activated in a frown, and the *zygomaticus major*, activated in a smile, to assess individuals' hedonic responses to pictures with positive affiliative content (e.g., a family going for a walk together). They found that the greater participants' positive hedonic response was to such stimuli (but not to achievement- or power-related pictures), as reflected in more activation of the *zygomaticus* and less activation of the *corrugator*, the higher their affiliation scores were on the PSE. Research by Kordik et al (2012) had similarly shown that *n* Affiliation predicted more *corrugator* activation when research participants interacted with a non-smiling, reserved experimenter than when they interacted with a smiling, friendly experimenter. In studies using observational coding measures, individuals high in *n* Affiliation responded with more smiles to friendly encounters with other people (Dufner, Arslan,& Denissen, 2018; Hagemeyer et al, 2016), but also with

more frowns to an interaction partner whom they expected to disagree with them (Schultheiss, 1996).

Facial EMG studies of affect have also been reported for *n* Power. Relative to individuals low in this motive, power-motivated people frown more when faced with a dominant-acting, but not when encountering a submissive-acting person (Fodor, Wick, & Conroy, 2012). Similar findings emerge when power-motivated individuals encounter negative audience reactions when giving a speech (Fodor & Wick, 2009).

Another line of evidence in support of implicit motives' affect-scaling function comes from research on the interplay between implicit motives and the personal goals people pursue in their daily lives. Across four studies with six large samples from the US and Germany, individuals' reports of hedonic well-being strongly depended on the progress they made towards their personal goals, with feelings of satisfaction being associated with high progress and feelings of frustration and dejection being associated with low progress (Brunstein, Schultheiss, & Grässmann, 1998; Pueschel, Schulte, & Michalak, 2011; Schultheiss, Jones, Davis, & Kley, 2008; Schultheiss, 2013a). However, this finding holds only for those individuals who have strong implicit motives to support their personal goal pursuits. In individuals with low implicit motives, on the other hand, hedonic well-being and goal progress were uncorrelated (for parallel results looking at "universal" relatedness and competence goals, see Hofer & Busch, 2011b; for results looking at job characteristics, see Brandstätter, Job, & Schulze, 2016). Put differently, progress towards one's personal goals does not generate hedonic well-being by itself. It only contributes to well-being to the extent that a strong implicit motive gets an opportunity to reap pleasure (liking) from motive-specific rewards or avoid the displeasure of motive-specific punishments (Brunstein, 2010).

Using experience-sampling McAdams and Constantian (1983) observed that individuals high, compared to those low, in *n* Intimacy experienced more positive affect during

interactions with others in their everyday lives (see Craig et al., 1994, for a replication). Research on *n* Achievement suggests that motives also influence the expectation of hedonic reward (i.e., predicted liking) associated with incentive attainment, another critical feature of motivational processes (cf. Berridge, 2004). Brunstein and Maier (2005) observed that high-achievement individuals expect to get more pleasure out of mastering a challenging task and less pleasure out of mastering an easy task than do low-achievement individuals.

Thus, studies using objective measures of hedonic responses, such as facial EMG, and subjective measures, such as rating one's current happiness or dejection, consistently support Atkinson's (1957) hypothesis that implicit motives represent a capacity for hedonic responses – liking and disliking in Berridge's (1996) conceptual framework – to motive-specific incentives and disincentives. This has consequences for the contexts, cues, and behaviors that preceded contact with the (dis)incentive, issues to which we turn next.

Motives Shape Incentive-Driven Learning Processes

Implicit motives, in interaction with motive-specific (dis)incentives, influence the degree to which individuals show evidence of (1) Pavlovian conditioning in response to incentive cues, (2) learning of behavior that is instrumental for incentive attainment (including inhibition of behavior that precedes an encounter with a disincentive), and (3) memory for the episodic context in which a (dis)incentive occurs (Schultheiss & Köllner, 2014).

Pavlovian conditioning mechanisms have been assumed to be at the core of implicit motives from the outset. McClelland and colleagues (1953) theorized that *n* Achievement is aroused by cues that have become associated with, and thus predict, a surge of positive affect accompanying the mastery of challenging tasks, similar to Ivan Pavlov’s canine subjects whose appetite was aroused by the sound of a metronome that predicted the arrival of pleasant food. In support of a role of Pavlovian learning in implicit motives, Stanton, Wirth, and Schultheiss (2006) reported that power-motivated individuals show attentional avoidance

of salient abstract cues that have been conditioned to high-dominance facial expressions of emotion (joy, anger) , a finding that parallels high-power individuals' attentional avoidance of high-dominance faces (Schultheiss & Hale, 2007; see below). Although these results support the idea that Pavlovian conditioning plays a role in motive-driven learning of (dis)incentive-predictive cues, more research on this fundamental issue is long overdue.

There is considerably more evidence for a role of instrumental learning in implicit motives. Using implicit learning tasks, Schultheiss and colleagues found replicable evidence across several experiments that high-power individuals show superior performance on visuomotor sequences whose execution has become associated with winning a dominance contest, but impaired performance on sequences whose execution was followed by defeat (Schultheiss & Rohde, 2002; Schultheiss, Wirth, et al., 2005). In another line of research, Schultheiss and colleagues used facial expressions of emotion as reinforcers and found that the *n* Power and *n* Affiliation influence instrumental learning in response to nonverbal dominance and affiliation signals (Schultheiss, Pang, et al., 2005). For instance, relative to low-power individuals, high-power individuals showed enhanced learning of a visuomotor sequence whose execution was rewarded by the presentation of surprise, a low-dominance signal. Recently, Stoeckart et al (2017, 2018) presented additional evidence for *n* Power's influence on instrumental conditioning using a decision-outcome task. In two studies, participants could freely decide to press one of two keys while simultaneously performing an unrelated task. One key was always associated with the presentation of dominant faces (a power disincentive) and the other one with submissive faces (a power incentive). Across trials, *n* Power predicted key presses favoring submissive faces and avoiding dominant faces. Schultheiss and Schiepe-Tiska (2013) argued that the findings related to *n* Power-dependent instrumental learning point to a crucial role of the anterior striatum in motive-driven acquisition of behavior instrumental for obtaining incentives and avoiding disincentives.

Evidence for a role of implicit motives in episodic memory, including autobiographical memory is strong and has been summarized by Woike (2008; Bender & Woike, 2010) as follows: Implicit motives specifically predict encoding and detailed, vivid memories for emotionally arousing events, both good and bad, associated with the respective motive. Thus, individuals high in *n* Power have superior recall for situations in which they were particularly powerful or powerless; individuals high in *n* Achievement have excellent recall of situations in which they mastered a challenge or failed at it; and individuals high in *n* Affiliation are prone to remember experiences both of blissful social contact and of loss and rejection. On the other hand, individuals high in a given implicit motive are not better than others at encoding and recalling mundane, unspecific, or everyday experiences. The latter type of memory is more frequently the domain of explicit motives, especially if the remembered events are relevant for a person's self-concept and the goals derived from it.

In summary, there is substantial evidence for a role of implicit motives in functions related to the wanting phase of motivation, particularly in conjunction with emotionally arousing material—that is, encounters with motive-specific (dis)incentives. These functions do not operate independently of each other but instead represent complex competencies only partially accessible to introspection that integrate the automatic recognition of relevant cues (Pavlovian conditioning) embedded in an emotionally charged situational context (episodic memory) with properly timed and executed goal-directed behaviors (instrumental learning) in the service of obtaining a cherished reward or avoiding a dreaded punishment (Schultheiss & Köllner, 2014). We believe that such competencies are behind many of the successful life outcomes associated with implicit motives reviewed earlier in this chapter.

Motives Direct Attention toward Incentive Cues

According to McClelland (1987), implicit motives sensitize a person to cues predicting motive-specific (dis)incentives. Such cues are particularly salient stimuli that automatically

attract the person's attention. Early evidence for an attention-directing function of implicit motives came from a study documenting an influence of *n* Affiliation on the detection of human faces under conditions of impaired visibility (Atkinson & Walker, 1958). More recent research has yielded similar results for *n* Power: Power-motivated individuals are faster than others to detect unfolding facial emotional expressions in dynamic displays (Donhauser et al., 2015) and are more likely to correctly identify low-intensity anger expressions in the latter (Wang et al., 2014). Schultheiss and Hale (2007) found that power motivated individuals oriented their attention toward surprised faces (low dominance) but away from happy or angry faces (both high dominance; see Stanton et al., 2010), whereas affiliation motivated individuals oriented their attention toward happy faces, but also toward hostile, angry faces, perhaps reflecting their heightened sensitivity to rejection cues. Recent research using event-related potential (ERP) measures provided further evidence for the particular salience of anger faces to power-motivated individuals (Wang et al., 2014, 2017).

In sum, these studies provide evidence for a role of *n* Power and *n* Affiliation in bottom-up, stimulus-driven attentional processing. Despite some clues for an involvement of *n* Achievement in attentional orienting to emotional stimuli (Stanton et al., 2010), the broader role of this motive in attentional processes remains to be explored.

Motives Energize Behavior Aimed at Incentive Attainment

After a motive has become aroused by the presence of cues signaling a possible encounter with a (dis)incentive, behavior directed at attaining the incentive or avoiding the disincentive – a core characteristic of wanting (Berridge, 1996) – becomes highly energized, as reflected by the recruitment of physiological systems supporting active behavioral engagement with the environment (e.g., SNS activation) and quicker onset as well as more effective (e.g., faster, more frequent, more forceful) execution of instrumental behavior (e.g., Ikemoto & Panksepp, 1999; McClelland, 1987; Wright & Brehm, 1989). Evidence for an

energizing function has been obtained for all three frequently studied motives.

Bäumler's (1975) previously mentioned finding that dopamine agonists increase, and antagonists decrease, PSE achievement imagery suggests that *n* Achievement engages the dopamine system, which invigorates responding (Ikemoto & Panksepp, 1999). Furthermore, high-achievement individuals show greater SNS activation when faced with a recall task of medium difficulty compared to individuals low in this motive (Brunstein & Schmitt, 2010; see also Mazeres et al., 2019).

Behavioral studies using measures of response speed, persistence, and performance output also suggest that *n* Achievement energizes behavior aimed at the mastery of challenges. For instance, compared to others high-achievement individuals show shorter response latencies on mental concentration tasks, particularly in response to negative feedback (Brunstein & Maier, 2005, Rawolle et al., 2017); persist longer on challenging arithmetic tasks (Wendt, 1955); and solve more items on word-puzzle (Brunstein & Schmitt, 2010) and arithmetic (Biernat, 1989) tasks in a fixed amount of time.

Energizing effects have also been documented for *n* Power. Individuals high in this motivational need, relative to others, show signs of increased SNS activation when confronted with power challenges (see Fodor, 2010, for a review of relevant studies). For instance, individuals whose *n* Power is aroused show an increase in salivary alpha amylase, a marker of SNS activation (Wiemers et al, 2015). Steele (1977) found that power-arousing speeches lead to greater subjective activation in high-power individuals as compared to low power-individuals or high-power individuals in a neutral speech control condition. Schultheiss and Brunstein (1999) observed that power-motivated individuals felt more activated, and performed better, while playing a competitive computer game.

Finally, individuals high in *n* Affiliation seem to engage in behaviors that allow them to connect with other people in positive, friendly ways more frequently or intensively. For

instance, they interact more frequently with others (Craig et al., 1994) and show more lively and warm nonverbal social behavior toward others (Hagemeyer et al., 2016; McAdams et al., 1984; McAdams & Powers, 1981). If the incentives are right, an energizing effect of *n* Affiliation on task performance can also be observed: When male participants were instructed by a female experimenter, their *n* Affiliation predicted superior performance on a challenging digit–letter substitution task (Atkinson & O'Connor, 1966).

Taken together, these findings document that implicit motives predict energized behavior aimed at incentive attainment. The available evidence supports this conclusion for all three motives, based on physiological, performance, and subjective criteria.

CONCLUSION

When revising this chapter, we were impressed by how much ten years of research have added to our understanding of implicit motives. The recent growth of the field is reflected in a broadening of methodological tools, including operant-learning paradigms (Stoeckart et al., 2016, 2018), fMRI (Schultheiss, Wirth, et al., 2008), ERP (Wang et al, 2014, 2017), facial EMG (Dufner et al., 2015) and neuropsychological methods (Schultheiss et al., 2012); sophisticated statistics, such as dyadic analyses (Denzinger, Backes, & Brandstätter, 2018; Hagemayer et al., 2015) and structural-equation modeling (Hagemayer et al., 2016); and a renewed interest in assessment issues (e.g., Slabbinck et al., 2011). The field's growth spurt is due, in part, to new conceptual developments, such as the replacement of McClelland's (1980) problematic suggestion that implicit motives do not respond to identifiable stimuli with accounts that pinpoint the nature of motive-specific stimuli (MFT; Stanton et al., 2010) or the renewed efforts to understand why the PSE, the primary measure of implicit motives, is a reliable and valid instrument (Lang, 2014; Schultheiss & Schultheiss, 2014). With regard to the latter issue, we believe that Borsboom et al.'s (2004) seminal work on the importance of causal relationships between attributes and their measures has helped to vindicate a

foundational validity principle on which implicit motive research has been built. It is an ironic twist in the history of science that the implicit motive approach, which once resided outside of the mainstream of personality psychology with its traditional emphases on classical test theory and construct validity, has suddenly become a poster child for the natural-science type of validity espoused by Borsboom et al (2004). We are certain that this property is ultimately responsible for the long endurance, recent growth, and bright future prospects of the implicit motive concept.

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Table XX.1

Pearson correlations between measures of implicit motives (assessed with the PSE), commitment ratings for self-generated personal goals (reflected by scores on items such as "I fully identify myself with this goal"), and self-attributed motives (assessed with standard questionnaires) across three domains of motivation (from Rawolle et al., 2013, Table 2).

	Implicit motive x personal goal commitment	Implicit motive x self-attributed motive	Personal goal commitment x self-attributed motive
Power	-.12*	.00	.15**
Achievement	.04	-.01	.31***
Affiliation	.10	.02	.26***

Note. N = 309. * $p < .05$, ** $p < .01$, *** $p < .005$

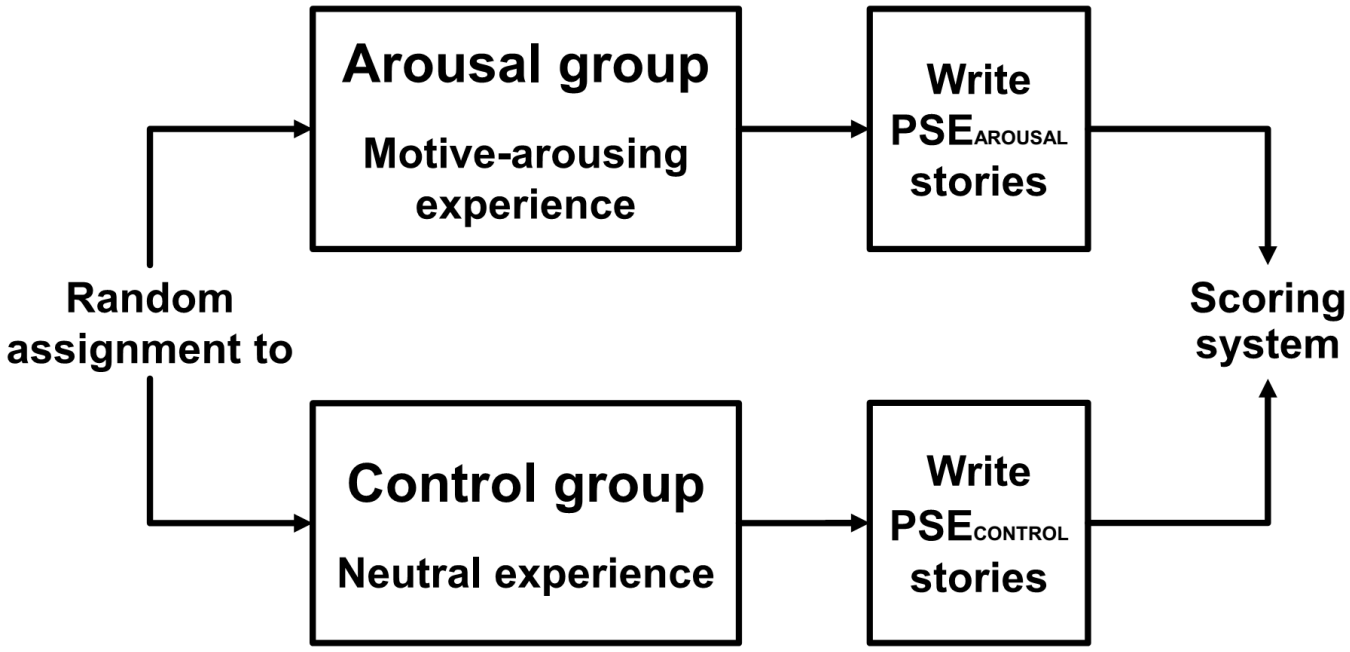

Figure XX.1. The logic of experimental arousal of motivation to derive Picture-Story Exercise (PSE) coding systems (modified from Winter, 1998).

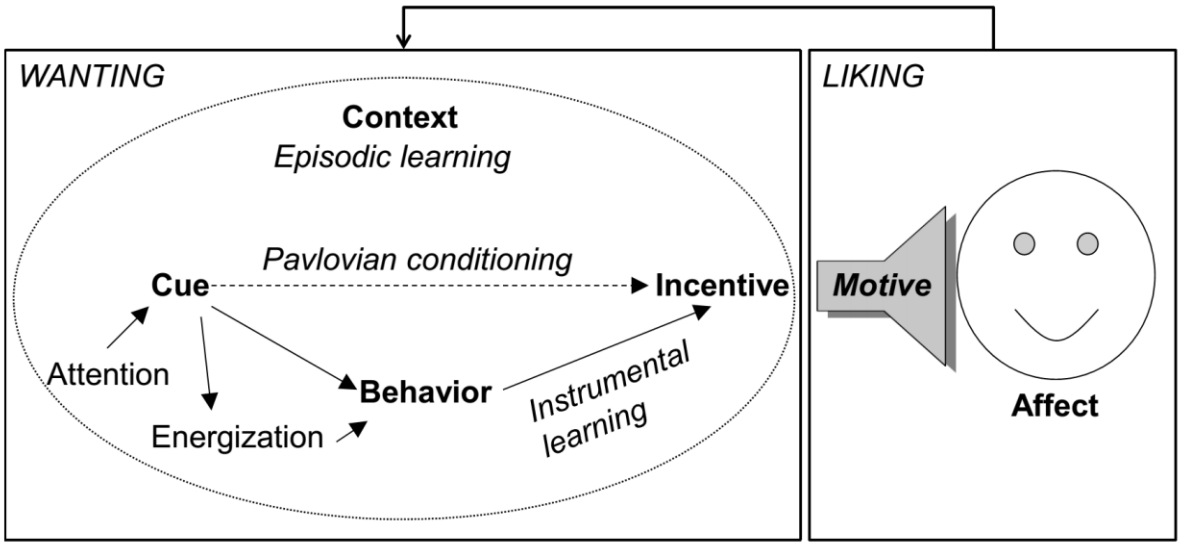

Figure XX.2. Schematic overview of implicit motive effects on affect, learning, attention, and behavioral energization.