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Implicit motives: Current topics and future directions

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Implicit motives: Current topics and future directions

1. Introduction

Implicit motives are capacities to experience specific types of incentives as rewarding and specific types of disincentives as aversive (Atkinson, 1957; Schultheiss, 2008). Because implicit motives determine which stimuli are affectively "hot", they also *orient* the person's behavior towards those stimuli, *energize* behavior aimed at attaining (or avoiding) them, and *select* stimuli that predict their proximity and behaviors that are instrumental for attaining (or avoiding) them (McClelland, 1987).

Research since the 1950s has focused on three major motivational needs: the need for achievement (n Achievement), the need for power (n Power) and the need for affiliation (n Affiliation). Individuals high in n Achievement derive pleasure from mastering challenging tasks on their own and experience a failure to master such tasks autonomously as unpleasant. Individuals high in n Power get a kick out of having impact (physically, emotionally, socially) on others or the world at large and are averse to social defeats. Individuals high in n Affiliation cherish close, affectionate relationships with others and experience signals of rejection and hostility as alarming and unpleasant (McClelland, 1987; Schultheiss, 2008; Winter, 1996).

These motives are termed "implicit" because they operate nonconsciously. This assumption has guided the field from the very beginning and provides the rationale for why Atkinson and McClelland (1948; for other examples see Smith, 1992) used variants of Morgan and Murray's (1935) Thematic Apperception Test (TAT), a projective measure of needs, to assess motivational dispositions in humans. However, their approach differed from Morgan and Murray's in two crucial regards (Winter, 1999). First, instead of relying on psychodynamic theory to determine which aspects of a story are indicative of a motivational

need, Atkinson and McClelland (1948) experimentally aroused a need to study its effects on thought content as revealed in the stories participants wrote. Motivational imagery that occurred more often in the aroused group than in a non-aroused control group was considered to reflect the motivational need under study and codified into a scoring system. McClelland and Atkinson (e.g., Atkinson & McClelland, 1948; McClelland, Atkinson, Clark, & Lowell, 1953) furthermore reasoned that a high level of such imagery, if it occurs in the absence of experimentally induced motivational arousal, is an indicator of a chronically aroused need. Individual differences in motivational imagery obtained in stories written under neutral conditions were thus assumed to represent differences in motivational need strength. Many scoring systems that were developed based on this approach have undergone considerable revision and refinement over the years, and most of them have been extensively validated (see Smith, 1992, for original and revised coding systems and summaries of validation research).

The second difference from Morgan and Murray's (1935) approach lies in the assessment procedure itself. Implicit motive researchers usually use picture stimuli (usually 4 to 8) other than the original TAT cards and obtain written stories, often collected in group testing situations. This approach has been termed the Picture Story Exercise (PSE; McClelland, Koestner, & Weinberger, 1989). Today, the acronym PSE is frequently used to denote both this assessment procedure and its use with the content-coding systems derived from McClelland and Atkinson's experimental-arousal approach to the development of content coding systems, although these systems can also be applied to spoken or written text from other sources (e.g., political speeches; see Winter, 1991).

Research using the PSE approach has borne out the validity of its underlying premise: Motive scores derived from the PSE do not substantially correlate with scores from self-report measures designed to measure the same motivational needs (also called *explicit*

motives; e.g., Pang & Schultheiss, 2005; Schultheiss & Brunstein, 2001; Spangler, 1992), even if the self-report measures are made as similar as possible to the PSE procedure and content coding systems employed (Schultheiss, Yankova, Dirlikov, & Schad, 2009). On average, the variance overlap between PSE and self-report measures of motives is less than 1% (Spangler, 1992).

Comprehensive reviews of research exploring the validity of the implicit motive construct have been provided by McClelland (1987), Winter (1996), and, more recently, by Schultheiss (2008) and Schultheiss and Brunstein (in press). An up-to-date account of motive assessment with the PSE can be found in Schultheiss and Pang (2007). Our focus here will be on recent developments in this research field that we consider particularly important for advancing our knowledge about the construct validity of implicit motives and some of the ways in which this work could be taken further. We will first review recent advances in theory and research on the fundamental role of cognition in the operation of implicit motives, their relation to explicit needs and goals, and their orienting and selecting functions. We will then present work conducted over the past decade that has helped illuminate the hormonal and brain correlates of implicit motives, discuss the role of affect in implicit motive satisfaction and frustration, provide an overview of research on the role of nonverbal signals as motivational incentives, and review studies that deal with the causes and consequences of the independence between implicit and explicit motives and approaches for increasing congruence between them. Last but not least, we will take a look at recent efforts to evaluate and refine motive assessment.

2. Motives, information processing, and cognition

The pervasive finding of independence between self-report and PSE-based measures of motives, coupled with advances in cognitive psychology over the past three decades, has given rise to theoretical models that focus on the role of implicit motives in information-

processing and cognitive functions such as attention, learning and memory. These models can be traced back to the work of McClelland et al (1989; see also Weinberger & McClelland, 1990), who proposed a two-systems model of motivation according to which implicit motives respond to task-intrinsic incentives (e.g., the pleasure of mastering a difficult task), and influence spontaneously occurring, operant behaviors. In contrast, explicit motives respond to social-extrinsic incentives (e.g., a parent's demand to complete one's homework) and shape behaviors that respond to specific demands and stimuli in a given situation. McClelland et al.'s (1989) model was the first that integrated several decades of research using PSE and self-report measures of motivation and provided a coherent framework for explaining why implicit and explicit motives predicted different kinds of behavior.

Schultheiss (2001, 2008) further refined this model by tying it to theorizing and research in cognitive psychology. According to his information-processing model (see Figure 1), implicit motives are aroused by nonverbal incentives (e.g., facial expressions) and influence non-declarative behavior (i.e., emotional reactions and motivated actions generated by brain systems dedicated to evaluating incentives and acting on conditioned incentive cues; see section 3). In contrast, explicit motives are activated by verbal incentives (i.e., verbal cues that are consistent with the person's explicit motives and present an opportunity to put them into action) and influence declarative behavior, that is, verbally represented decisions, judgments, choices etc. that are based on the person's sense of self. Building on work by Paivio (1986) and Bucci (1984), Schultheiss (2001, 2008) furthermore proposed that the implicit and the explicit system can be made more congruent through referential processing, that is, the active translation of nonverbal stimuli into a verbal representation format and vice versa. Conversely, a lack of referential processing should promote the functional dissociation of the two motivation systems.

The information-processing model of motivation proposed by Schultheiss is supported by past and current research on implicit motives (for reviews of this work, see Schultheiss, 2001, 2008). For instance, Klinger (1967) found that experimenters acting in an affiliation- or achievement-oriented way elicit in their participants increases in affiliation or achievement imagery scored in PSEs – even if participants could not hear his words but only saw him on a video screen, a finding that is consistent with implicit motives' hypothesized bias for nonverbal incentives. This point is also reinforced by research on implicit motives' responsiveness to facial expressions of emotion, described in more detail below. Schultheiss (2007a) pointed out that recasting the functional properties of implicit motives in language and concepts of current research on declarative and nondeclarative memory systems and their neural underpinnings could help realign the field of motive research with mainstream research on mental processes and open new avenues for testing for effects of implicit motives on cognitive and behavioral phenomena, an issue to which we now turn.

With the advent of more sophisticated models of information processing in cognitive psychology, research on the orienting and selecting functions of implicit motives has expanded considerably in recent years and provided new insights into the effects of implicit motives on behavior. Specifically, researchers have focused on the role of implicit motives in attention to incentive cues, implicit learning of behavior associated with incentive attainment and non-attainment, and memory for motive-related episodes.

Although the power of motivational incentives to grab and hold one's attention is well-documented in research on motivation in general and clinically relevant disorders of emotion and motivation in particular (e.g., Mogg & Bradley, 1999), only a few studies have explored the role of implicit motives in attentional orienting to incentive cues. A study by Atkinson and Walker (1958) on the effects of motives on perceptual thresholds for motive-related incentives suggested that implicit motives make people more vigilant for incentive

cues. Schultheiss and Hale (2007) provided a more systematic test of motives effects on attention. Using a task that assessed visuospatial orienting of attention and nonverbal stimuli (facial expressions of emotion) as incentive cues, they found replicable evidence across two studies that individuals high in n Power or n Affiliation pay more attention to motivational incentives than do individuals low in these motives. Stanton, Wirth and Schultheiss (2006) replicated and extended these findings by demonstrating that n Power determines how much attention individuals pay to formerly neutral stimuli (abstract shapes) that have been paired with facial expressions of emotion through Pavlovian conditioning.

Recent research has provided evidence for the role of implicit motives in implicit learning, that is, learning that occurs in the absence of an intention to learn or an awareness of what is being learned. Using tasks that required participants to learn complex visuomotor sequences, Schultheiss and colleagues (Schultheiss & Rohde, 2002; Schultheiss, Wirth, Pang, Torges, Welsh, & Villacorta, 2005) found that individuals high in n Power showed enhanced learning if performance on the task led to a victory in a contest against another person and impaired learning if task performance led to a defeat. Individuals low in n Power did not show these learning responses to victory and defeat. In another study, Schultheiss, Pang, Torges, Wirth, and Traynor (2005) compared learning on visuomotor sequences that were followed by emotional facial expressions with control sequences that were followed by neutral expressions or no stimulus. Individuals high in n Affiliation or n Power showed better implicit learning on sequences followed by motivationally relevant expressions than on control sequences, whereas individuals low in these motives did not show these differences. This research therefore provides strong support for a fundamental but hitherto untested assumption, namely that implicit motives select behavior through their effects on instrumental conditioning (see McClelland, 1987; Winter, 1996). They demonstrate that implicitly learned behaviors that are followed by motive-specific rewards and punishments

are subsequently executed more or less efficiently, respectively, depending on the strength of the person's implicit motives and hence his or her capacity to experience rewards and punishments as affectively pleasant or aversive.

Implicit motives also exert well-documented effects on episodic memory. Earlier research by McAdams (e.g., McAdams, 1982) already documented that individuals high in a given implicit motive remember motive-related episodes from their lives as peak experiences. Replicating and extending this line of research, Woike and colleagues studied the effects of agentic (achievement and power) and communal (affiliation and intimacy) motives on individuals' memory for agentic and communal episodes in their lives (see Woike, 2008, for a summary). Across studies, participants high in agentic motivation recalled more agentic episodes and participants high in communal motivation recalled more communal episodes. Woike (1995) and Woike, McLeod and Goggin (2003) further differentiated this motive-congruent memory effect by showing that it emerges only for emotional or specific, but not for non-emotional or generalized autobiographical memories.

Although episodic memory represents a declarative process (after all, participants *can* report on their memories), the finding that implicit motives affect episodic memory does not necessarily run counter to the idea that implicit motives influence non-declarative but not declarative measures of behavior. Memory for events, although mediated by brain systems supporting declarative processing, is modulated by emotion and thus by brain systems involved in non-declarative processes (Cahill, 2000). As Woike (2008) has shown, implicit motives influence memory only for emotionally charged episodes, and it appears plausible that they do so indirectly, through their effects on emotional brain systems.

Future directions

Research on the effects of implicit motives on cognitive phenomena and processes holds the promise of a detailed functional analysis of how motives influence behavior. For

instance, the finding that implicit motives are involved in implicit learning of behavior that is reinforced by motive-related incentives could lead to a better understanding of how implicit motives contribute to social and life success. Implicit learning contributes to the development and fine-tuning of social intuition (Lieberman, 2000) and thereby to skills that individuals high in a given implicit motive acquire rapidly and employ automatically to maximize motive satisfaction in everyday life. Perhaps this kind of intuitive behavior is what McClelland (1980) had in mind when he claimed that implicit motives manifest themselves in operant behavior.

Research utilizing cognitive concepts and models can also help to shed more light on the functional differences between implicit and explicit motives. Let's take attention for example. Posner and colleagues (e.g., Posner, Snyder, & Davidson, 1980) have argued that attention is not a unitary process but features three distinct components: alerting, orienting, and executive control, with the first two representing bottom-up influences of external stimuli and the last representing the top-down influence of internal goals and intentions on behavior. We believe it might be informative to compare the influence of implicit and explicit motives on these attentional functions. Do implicit motives affect only bottom-up attentional processes or can they also impact executive control? Are explicit motives predominantly associated with top-down control of attention? What happens to attentional functions if a person's implicit motives and explicit intentions are at odds, what if they are well-aligned? Studies addressing such questions are likely to yield substantially new insights into how implicit motives shape cognition and behavior.

3. The biological underpinnings of implicit motives

Scattered reports of a link between implicit motives and physiological processes appeared as early as the 1950s (e.g., Bäumler, 1975; Mueller & Beimann, 1969; Mücher & Heckhausen, 1962; Raphelson, 1957), but research on the biological correlates of motives really took off only in the 1980s with McClelland and colleagues' work on n Power, n

Affiliation and catecholamine excretion (see McClelland, 1989, for a review). Their studies provided evidence that n Power is associated with increased physiological stress responses and impaired immune system function, whereas n Affiliation is associated with dampened stress responses and robust immune function.

In recent years, this line of work was further extended by studies on the role of gonadal steroids (testosterone and estradiol) and cortisol in implicit power motivation. Schultheiss and colleagues have conducted studies in which participants competed against each other in a contest (Schultheiss, Campbell, & McClelland, 1999; Schultheiss & Rohde, 2002; Schultheiss, Wirth et al., 2005; Stanton & Schultheiss, 2007; Wirth, Welsh, & Schultheiss, 2006). Feedback during the competition was manipulated so that one participant in each dyad won and the other lost decisively. Across studies, n Power interacted with contest outcome to determine gonadal steroid changes. In men, n Power predicted testosterone increases among winners and decreases in losers. These changes also mediated the effect on n Power on implicit learning of a visuomotor sequence inherent in the contest task. In women, n Power determined whether estradiol increased (in winners) or decreased (in losers), an effect that was still detectable 24 hours after the contest (Stanton & Schultheiss, 2007). In some studies, n Power was also positively associated with baseline testosterone in men (Schultheiss, Dargel, & Rohde, 2003) and estradiol levels in women (Schultheiss et al., 2003; Schultheiss, Wirth et al., 2005; Stanton & Schultheiss, 2007), suggesting that gonadal steroids not only change as a function of rewarded or frustrated power motivation but may also represent a stable hormonal component of the disposition to seek an impact on others. Finally, Wirth et al. (2006) provided evidence from two studies that losing a contest leads to elevated levels of the stress hormone cortisol in high-power, but not in low-power individuals.

Schultheiss (2007 b; Stanton & Schultheiss, in press) has integrated these findings with McClelland and colleagues' earlier work on the role of n Power in the excretion of the

sympathetic catecholamines adrenaline and noradrenaline into a biopsychological model of power motivation. The model states that power-related challenges and successful coping with them lead to increases of sympathetic catecholamines, whereas power stress (such as in a defeat) leads to an increase in cortisol. Because in men sympathetic catecholamines stimulate and cortisol inhibits the release of testosterone into the blood stream (Sapolsky, 1987), testosterone increases in power-motivated winners and decreases in power-motivated losers represent the net effect of these changes in stress hormones on testosterone production. It is presently unknown whether this mechanism could also account for the estradiol changes observed in power-motivated women after winning or losing a contest.

Another line of work has examined the role of progesterone in implicit affiliation motivation. Schultheiss et al (2003) observed that in women the use of oral contraceptives containing progestins was associated with higher n Affiliation. Moreover, in normally cycling women high levels of progesterone around ovulation predicted high levels of n Affiliation in the subsequent phase of the menstrual cycle. Schultheiss, Wirth, and Stanton (2004) provided evidence for a causal link between n Affiliation and progesterone by demonstrating that watching an affiliation-arousing movie leads to subsequent increases in progesterone. Wirth and Schultheiss (2006), although not able to replicate the specific progesterone-increasing effect of a romantic movie, found that increases in n Affiliation are generally associated with increases in salivary progesterone levels. Brown et al. (2009) recently reported that experimental induction of social closeness is followed by increased progesterone. Although these authors did not assess n Affiliation, their work is based on the earlier studies on n Affiliation and progesterone, and it appears very likely that their social closeness task was suitable for arousing n Affiliation. Wirth and Schultheiss (2006) speculated that progesterone's sedating and soothing effects may be at the root of n Affiliation's stress-relieving and health-promoting effects (see McClelland, 1989).

Research on the biological underpinnings of implicit motives has also started to trace motives in the brain. Schultheiss and Wirth (2008) argued that motivation is closely tied to three functionally distinct but closely interacting brain areas: the amygdala, which responds to conditioned cues that signal the proximity of an incentive; the striatum, which mediates the recruitment and energization of suitable instrumental behaviors for incentive pursuit; and the orbitofrontal cortex, which evaluates the hedonic value of an incentive upon its attainment. A recent study by Schultheiss, Wirth, Waugh, Stanton, Meier and Reuter-Lorenz (2008) illustrates the validity of the motivational-brain concept proposed by Schultheiss and Wirth (2008). While they underwent functional magnetic resonance imaging, individuals high or low in n Power watched facial expressions signaling high or low dominance. Compared to low-power individuals, participants high in n Power showed stronger brain activation responses to these stimuli in the striatum, the amygdala and the insula, an area of the brain that represents somatic responses to emotional stimuli, and the orbitofrontal cortex. An explorative reanalysis of participants' PSEs for n Achievement revealed similar brain activation responses for this motive, whereas n Affiliation was associated with increased activation in the amygdala only and reduced activation in all other motivational-brain areas tested (Hall, Stanton, & Schultheiss, in press). The latter effect may have been due to the socially aversive nature of some of the stimuli (e.g., anger faces).

Future directions

Studies that anchor implicit motives in the brain and link it to neuroendocrine processes are critical for bolstering the validity of the implicit motive concept, because they identify implicit motives with a continuum of evolved motivational systems that humans share with other mammals. More research on the hormonal and neural underpinnings of implicit motives is therefore not just an intellectually stimulating objective, but a scientific necessity. For n Achievement, in particular, little is known about its hormonal underpinnings,

although McClelland's (1995) hypothesis that this need is linked to the hormone arginine-vasopressin, whose physiological function is to keep water in the body and which also influences memory processes, merits further exploration. n Affiliation's hormonal correlates have received more research attention, but the precise mechanism by which progesterone promotes social closeness remains to be explored. The same is true for the role of this motive, and perhaps its more reward-oriented intimacy motivation component, in the release of oxytocin, which has become known as a "cuddle hormone" in recent years (Insel & Young, 2001). Finally, the ties of implicit motives to key sites of the motivational brain deserve more systematic study using tasks that highlight the role of motives in each site's specific function (e.g., learning and execution of instrumental behavior mediated by the striatum, emotional responses to Pavlovian-conditioned stimuli mediated by the amygdala, hedonic responses to incentives mediated by the OFC, etc).

4. The affective basis of implicit motives

Modern theories of motivation view affective responses to incentives and incentive cues as a key feature of the motivational process (Berridge, 2004). According to this view, motivated behavior is set in motion through the prospect of the pleasure associated with a reward or the pain (bodily or psychological) associated with a punishment. Earlier, behaviorist accounts of animal behavior eschewed affect as a key concept of motivation, because affect was conceived of as an unobservable, intervening variable and therefore rendered explanations of motivation based on affect circular. But more recent accounts consider hormonal and physiological changes associated with emotion and particularly the nonverbal expression of affect in face, voice, or movement as valid, objective, and independent indicators of affect in the context of motivation (Berridge, 2004). For instance, Berridge (2000) has demonstrated that all higher mammals show specific affective responses

to sweet, tasty food (lip licking) and to unpalatable food (nose wrinkle, tongue protrusion) and that the intensity of these responses closely tracks variations in (dis)liking for the food.

As we have already pointed out, definitions of implicit motives have always emphasized that motives are based on a capacity to experience motive-specific incentives as pleasurable and disincentives as aversive — that motives act, in short, as affect amplifiers (Atkinson, 1957; Schultheiss, 2008). But given the fundamental role of affect in these definitions, direct evidence for this contention has remained surprisingly scarce. It comes primarily from two sources: research on the effects of motivational gratification or frustration on (a) emotional well-being and (b) nonverbal indicators of positive or negative affect.

Evidence for a role of implicit motives in subjective experiences of well-being has started to accumulate since the 1980s. McAdams and Bryant (1987), for example, found that women high in intimacy motivation experienced more general happiness than women low in intimacy motivation. If they were living alone, however, and therefore lacked opportunities to satisfy their dispositional need for intimacy, women high in intimacy motivation reported more uncertainty and lower levels of gratification than women low in intimacy motivation. More generally, and in line with the notion that implicit motives fuel behavior while explicit motives channel it (McClelland et al., 1989), research on goal striving in everyday lives shows that individuals experience increased emotional well-being to the extent that their personal goals and life contexts give them opportunities to satisfy their implicit needs (see also section 6). One drawback of these studies is that emotion is assessed introspectively as protracted, mood-like experiences, whereas the precise nature of the person-environment transaction triggering the affective episodes that feed more long-lasting subjective experiences of well-being remain unknown.

Another line of work has therefore started to examine such micro-episodes of affect-generating person x situation interactions more closely to document the affect-amplifying

function of motives. Finding ways to measure affect, however, can be rather challenging. The applicability of questionnaires and rating scales is quite limited when dealing with implicit motives since they operate outside of people´s awareness. In a study by Winkielman, Berridge, and Wilbarger (2000), for example, thirsty participants were subliminally exposed to pictures of happy faces. Although this treatment failed to have any influence on people´s ratings of their subjective feelings they subsequently drank more and rated the drink to be more pleasant than did control subjects. Thus, people´s unconscious affective reactions to the pictures were expressed only in the amount of liquid they consumed. Further, the previously mentioned findings by Schultheiss, Wirth et al. (2005), who demonstrated that n Power drives reinforcement effects of social victory and defeat on instrumental learning, are in line with the notion that increases and decreases in goal-directed behavior represent indirect indicators of the affect associated with the goal (e.g., Teitelbaum, 1966)

In the past decades, psychophysiological measures have gained importance as direct, objective measures of affect. Recordings of cardiovascular activity (e.g., heart rate, blood pressure), facial muscle activity recording (also called electromyography, or EMG), or electrodermal activity allow insights into the activation of the nervous system in response to stressors and rewards (e.g., Stern, Ray, & Quigley, 2001). Some of these measures, such as blood pressure and electrodermal activity, are good for gauging overall emotional arousal, whereas others, such as facial EMG and subtle changes in heart rate, even allow researchers to differentiate between positive and negative valence of incentives (Bradley, 2000). Peterson (1907), a student of Jung, realized early on that physiological measures track emotional responses to affectively charged stimuli. He described the role of electrodermal activity changes (then still called “galvanic responses”) in his word-association experiments as follows: “It is like fishing in the sea of the unconscious, and the fish that likes the bait the best jumps to the hook [...] Every stimulus accompanied by an emotion produced a deviation

of the galvanometer to a degree of direct proportion to the liveliness and actuality of the emotion aroused" (p. 805).

Facial expressions are viewed as particularly sensitive and valid nonverbal indicators of the hedonic impact of incentive attainment (Berridge, 2000). Studies using EMG measures have shown that the processing of unpleasant events is associated with greater corrugator muscle activity (frown muscle) while processing pleasant events leads to greater zygomatic (cheek) and orbicularis (eye) activity (smile muscles; e.g., Bradley, Codispoti, Cuthbert, & Lang, 2001; Tassinary & Cacioppo, 1992). The co-activation of the obicularis oculi with the zygomatic allows to differentiate between an authentic as opposed to an unfelt smile (see also Ekman, Davidson, & Friesen, 1990).

EMG measures of facial expressions have been used to demonstrate the affect-amplifying function of implicit motives. Fodor, Wick, and Hartsen (2006), for example, found that people high in n Power expressed stronger negative affective responses in the form of corrugator muscle activation when confronted with a dominant person than people low in n Power. Fodor and Wick (in press) recently replicated and extended this finding by demonstrating that high-power individuals respond with increased corrugator activity to negative audience feedback while they present a talk.

Fodor and colleagues have not examined whether power-motivated individuals respond with the increased zygomatic and orbicularis activity, indicators of genuine joy, to power successes, and it therefore remains to be seen whether n Power also drives positive facial affect in response to power-specific rewards. But for n Affiliation, such evidence exists. As McAdams, Jackson and Kirshnit (1984) have shown, individuals with a strong affiliation motive react with more frequent smiles to positive social interactions than do people low in affiliation motivation.

Future Directions

While affect-amplifying effects of n Power and n Affiliation have been explored to some extent, empirical evidence of affective indicators of gratified or frustrated n Achievement, like EMG measures, is lacking. Thus, future research leaves room for the systematic documentation of the affect-amplifying function of all motives, including the achievement motive, but also more basic needs such as hunger, curiosity, and sexual motivation using various indicators of affect. Moreover, it might be fruitful to explore potential differences between implicit and explicit motives' capacity to moderate affective responses to incentives. Dimberg, Thunberg, and Grunedal (2002) found evidence supporting the idea that voluntary facial expressions to positive and negative stimuli can interfere with automatically generated reactions indicating that voluntary and involuntary facial actions are controlled by different neuronal pathways. Combining these results with measures of implicit motives and explicit motives or goals could yield promising insights.

5. Motives and nonverbal communication

Implicit motives determine a good deal of our interpersonal behavior (see McClelland, 1987, for a review). As information-processing models of implicit motives suggest (Schultheiss, 2001, 2008), this is particularly true of the social motives n Power and n Affiliation and for nonverbal types of behavior. Recently Stanton, Hall, and Schultheiss (in press) have proposed a motivational field theory (MFT) model of nonverbal communication that integrates earlier interpersonal field approaches to personality with implicit motives as one key determinant of nonverbal communication and behavior.

MFT specifies five basic principles for the organization of nonverbal behavior. Drawing on earlier theories (McClelland et al., 1953; McClelland et al., 1989; Schultheiss, 2001, 2008), it states that people influence the elicitation and perception of each other's (nonverbal) behavior (see also Wiggins & Trobst, 1999). This means that sequences of nonverbal interactions rarely depend on the intentions and needs of only one individual but

emerge from the interdependence of both interactants in a dyad. It further builds on the assumption that interpersonal nonverbal behavior can be described by two orthogonal dimensions: *a) affiliation*, guiding behavior according to the principle of reciprocity (i.e., if you are friendly to me, I will be friendly to you), and *b) dominance*, which forces individuals into the complementary roles of dominance vs. submission (i.e., if I want to be dominant, you can't be, too).

In MFT, these basic assumptions are extended by three additional hypotheses that span a full sender → signal → perceiver model of social communication by introducing the influence of implicit motives into this line of theorizing: (1) *Nonverbal signals depend on a sender's motivational needs*. A person high in n Affiliation, for example, is generally more likely to send positive and friendly nonverbal signals to an interaction partner (e.g., McAdams et al., 1984). (2) *The perceiver's interpretation of nonverbal signals depends on the signal's location on the affiliation and dominance dimensions*. According to the reciprocal nature of the dominance dimension, another person's signals of dominance should be evaluated as more negative by a perceiver because these signals force him or her into a submissive role. The opposite relationship is expected for submissive nonverbal signals. For the affiliation dimension the evaluation of friendly versus unfriendly signals again follows the principle of reciprocity. Accordingly, friendly nonverbal signals should be evaluated as more positive, and unfriendly signals as more negative by a perceiver. (3) *The interpretation of a nonverbal signal depends on the perceiver's implicit motives*. According to this hypothesis the gradient in the evaluation of dominant vs. submissive signals as negative vs. positive should be more pronounced as perceivers' n Power increases. The same principle applies to the affiliation dimension. Compared to individuals low in n Affiliation, those high in n Affiliation should perceive nonverbal behavior as more positive if it signals affiliation and more negative if it signals a lack of affiliation or rejection.

The principles underlying MFT are consistent with a number of empirical findings, beginning with the previously described studies by Klinger (1967; nonverbal behavior of experimenter influences participants' n Affiliation scores on the PSE) and Atkinson and Walker (1958; n Affiliation predicts perceptual sensitivity to faces). Evidence for the second assumption that nonverbal behavior can be classified along the dimension of affiliation and dominance comes from Knutson (1996) and Hess, Blairy and Kleck (2000) who demonstrated that facial expressions of emotion (FEEs) get differentially rated in their meaning as signals of affiliation and dominance. Figure 2 shows the position of seven fundamental FEEs (anger, disgust, fear, joy, sadness, surprise and neutral) on the circumplex of these two dimensions based on these studies and other evidence reviewed by Stanton et al. (in press).

Proceeding on the assumption that FEEs regulate interpersonal behavior, Keltner and his associates (Keltner, Ekman, Gonzaga, & Beer, 2003; Keltner & Haidt, 1999) have argued that FEEs in an interaction partner represent rewards which people work for or punishments that they try to avoid. Applied to the context of implicit motives, this means that a nonverbal signal that represents a sender's dominance (i.e., disgust and anger, but also joy) should be motivational disincentives and elicit negative reactions in perceivers high in n Power. In contrast, FEEs that signal another's low dominance (as in the case of surprise) represent motivational incentives and foster positive reactions in a high-power perceiver. Perceivers high in n Affiliation are expected to react more positively to FEEs perceived as highly affiliative (e.g., joy) and more negative to FEEs signaling rejection or a lack of affiliation (e.g., disgust and anger). For a full description of each FEE and its meaning as an affiliation and dominance signal, see Stanton et al (in press).

Schultheiss and colleagues could substantiate these relationships in a series of studies that investigated the influence of different FEEs on behavioral reactions in perceivers

depending on their implicit motives. In a study using an implicit learning task (Schultheiss, Pang, et al., 2005) they found that individuals high in n Power show enhanced learning of visuomotor sequences that were followed by low-dominance FEEs and impaired learning of sequences that were followed by high-dominance FEEs. Schultheiss and Hale (2007) found a similar pattern of results in their study on attentional orienting to emotional versus neutral faces. Individuals high in n Power allocated more attention to the low-dominance emotion of surprise and less attention on the high-dominance signals of anger and joy. Recently Schultheiss, Wirth, et al. (2008) even traced these differences in the perception of high- vs. low-dominance FEEs back to equivalent differences in the activation of brain areas involved in motivation (see above). Less clear is the role of n Affiliation in the studies reported above, a finding that could in part be explained by a greater sensitivity to rejection than to acceptance underlying the affiliation dimension. Neutral faces might therefore already signal a lack of emotional involvement to some extent and therefore represent weak disincentives. Taken together, these results emphasize the role of nonverbal signals in human communication, a role that critically depends on the implicit motives of the involved persons.

Stanton et al (in press) also specify moderators for the relationship between nonverbal signals and their motive-dependent influence on perceivers. For instance, they contend that perhaps the most prominent moderator is the match between senders' and perceivers' gender. In general, heterosexual perceivers are more sensitive to dominance signals from same-gender senders and more sensitive to affiliation signals coming from senders of the opposite gender, a result pattern that fits well in a framework of intra-sexual and inter-sexual competition (see also Wilson, 1980).

Future directions

While research on the role of emotional signals in n Power and n Affiliation is already underway, the role of n Achievement in nonverbal communication remains unclear,

because it does not easily fit into the MFT circumplex. However, even though this motive is task-oriented, its origins go back to social learning experiences in early childhood (e.g. McClelland & Pilon, 1983; Winterbottom, 1958) and it therefore seems plausible that achievement-motivated perceivers remain sensitive to nonverbal signals suggesting approval of tasks well done and disapproval of suboptimal performance. More research is also needed on the role of the senders' implicit motives and how their motives are reflected in their nonverbal signals. The study by McAdams et al. (1984) already indicates that there are variations in senders' nonverbal behavior that can be traced back to their motivational status. It will be the task of future studies to systematically examine the role of channels of nonverbal communication other than faces and to integrate these findings into the circumplex framework of the MFT. This might finally lead to a truly comprehensive understanding of the back and forth of nonverbal signals in complex sender→signal→perceiver interactions.

6. Interactions between implicit and explicit motives

Research over the past 50 years has documented a pervasive lack of substantial correlations between declarative (self-report) and non-declarative (PSE) measures of motives (King, 1995; McClelland, 1987; Pang & Schultheiss, 2005; Spangler, 1992). Because correlations between implicit and explicit motive measures remain low even if self-report measures of motivation are made as similar as possible to the PSE, Schultheiss et al. (2009) concluded that "the statistical independence between implicit and explicit motives appears to be genuine and to reflect a true dissociation between the types of motivational preferences individuals spontaneously express when writing imaginative stories and what they declare their motivational needs to be when asked directly" (p. 79).

This conclusion can also be extended to the statistical relationship between implicit motives and the goals people consciously set and pursue in their daily lives. Despite earlier claims that people's personal goals and strivings represent specific manifestations of their

more general implicit needs (e.g., Elliot, 1997; Emmons, 1989; Murray, 1938) and some findings supporting this view (Elliot & Sheldon, 1997; Emmons & McAdams, 1991), most empirical studies so far have failed to find substantial overlap between people's implicit motives and their explicit goals (e.g., Brunstein, Schultheiss, & Grässmann, 1998; Hofer & Chasiotis, 2003; King, 1995; Schultheiss, Jones, Davis, & Kley, 2008; Rawolle, Patalakh, & Schultheiss, in preparation). Anticipating the lack of relationship between implicit motives and personal goals, McClelland et al. (1989) argued that goals are part of the explicit motivational system that channels behavior in line with societal expectations and demands.

Moving beyond the mere demonstration that implicit and explicit motives and goals are statistically independent, researchers have started to look into the causes and consequences of (in-)congruence between implicit and explicit domains of motivation.

Implicit-explicit interactions on outcomes

The degree to which personal goals are motive-congruent or motive-incongruent has consequences for goal progress and well-being. According to Brunstein et al (1998; see also Brunstein, Maier, & Schultheiss, 1999), engagement in motive-congruent goals provides opportunities to satisfy one's implicit motives and thus allows consummation of affectively charged incentives. Accordingly, progress with motive-congruent goals offers an opportunity for motivational gratification. However, failing to achieve a motive-congruent goal can cause motivational frustration. Since success and failure are associated with strong emotional reactions, striving for motive-congruent goals can be considered an affectively "hot" mode of goal pursuit (Schultheiss, Jones, et al., 2008).

Recent research supports this notion. Schultheiss, Jones, et al. (2008) found that success on goals that were supported by implicit motives was associated with increased happiness and decreased depressive symptoms, whereas low progress on such goals was associated with decreased feelings of happiness and increased depressive symptoms. In

contrast, progress on goals that were not supported by participants' implicit motives was not associated with variations in well-being or symptoms of depression. Similarly, Hofer and Chasiotis (2003) found that congruence between implicit motives and goals was associated with enhanced life satisfaction of Zambian adults. However, congruence between implicit and explicit motives is only beneficial for well-being if the person gives free rein to his or her motivational impulses (Langens, 2006), and if the person indeed shows the behavior capable of satisfying the implicit motive (Schüler, Brandstätter, & Fröhlich, 2008).

Motive-incongruent goals, in contrast, can be considered as “cold” mode of goal pursuit, since neither high nor low goal progress has emotional significance. Commitment to motive-incongruent goals only impairs emotional well-being if it distracts people from pursuing motive-congruent goals and, therefore, from satisfying their implicit motives (Brunstein et al., 1995; Brunstein et al., 1998).

Implicit and explicit motives also have different effects on performance. Biernat (1989) found that n Achievement predicted performance in an arithmetic task, whereas questionnaire measures of achievement striving predicted the person's preference to volunteer as task group leader (for related findings see Brunstein & Hoyer, 2002, and Brunstein & Maier, 2005). Schultheiss and Brunstein (1999) report similar findings for the power domain: n Power, but not self-reported power motivation, predicted performance in a computer game offering participants the possibility to obliterate competing players’ entries in a high-score list. Furthermore, self-reported power motivation, but not n Power, predicted the commitment to outpace competitors in the high score list (Schultheiss, 2008). These studies imply that implicit motives predict performance in tasks containing motive-congruent incentives, whereas explicit motives predict commitment to tasks that fit one's explicit motives. However, implicit motives have the capacity to compensate for lacking goal commitment, probably because they energize and direct behavior automatically. Schultheiss, Jones et al. (2008)

found that high levels of implicit motivation were associated with increased goal progress and decreased rumination about goals in the absence of high goal commitment. Overly high goal commitment even impaired progress on goals supported by implicit motives (Schultheiss, Jones, et al., 2008).

In sum, these findings imply that pursuing motive-congruent goals has favorable effects for well-being and performance. For that reason, it seems desirable to promote congruence between the implicit and explicit motive system, an issue to which we turn next.

Factors that influence congruence

What are some of the factors that influence congruence between implicit and explicit motives? One can distinguish between dispositional factors (e.g., personality variables) and situational factors (e.g., processes and mental strategies) that moderate implicit-explicit congruence. With regard to personality dispositions that facilitate congruence, research has documented significant effects of the following individual-difference variables: self-determination (Thrash & Elliot, 2002), identity status (Hofer, Busch, Chasiotis & Kiessling, 2006), the ability to quickly downregulate negative affect (Baumann, Kaschel, & Kuhl, 2005; Brunstein, 2001), private body consciousness, preference for consistency, and low self-monitoring (Thrash et al., 2007).

In terms of situational factors, Schultheiss and Brunstein (1999, 2002; see also Schultheiss, 2001) and Job and Brandstätter (in press) argued that goal imagery promotes motive-goal congruence. The goal-imagery technique is based on Schultheiss's (2001) information-processing model, which holds that implicit motives respond preferentially to nonverbal, experiential incentives and cues. Visualizing the pursuit and attainment of a potential goal entails translating the verbal goal representation into a rich, experience-like mental simulation that can be processed by implicit motives. Depending on the fit between a person’s motives, she or he will respond with positive affect (goal features incentives for a

motive), negative affect (goal features disincentives for a motive) or neutral affect (goal features no incentives for a motive or person does not have a matching motive). This affective response can then be used as a valid guide for making a decision to commit to and pursue the goal or not. Recent research (Schultheiss & Brunstein 1999; 2002; for similar results see Job & Brandstätter, in press) supports this notion. In a series of studies, participants were given power- or affiliation-related goals and then either mentally envisioned the goal (goal imagery group) or not (control group). Results show that in the goal imagery group, but not the control group, declarative (e.g., goal commitment, self-reported activation) and non-declarative (e.g., task performance, expressive behavior) measures of motivation were well-aligned with the person's implicit motives.

Future directions

In line with these findings, Kehr and Rawolle (2008) speculated that visions promote motive-goal congruence. Visions are idealized mental images of the future. Hence, visions are represented in a rich, experience-like mental simulation and therefore have access to the implicit motive system. A person can use the affective responses to his or her vision as valid indicator whether the vision fits to his or her needs or not. Therefore, visions should typically be motive-congruent. If concrete goals are derived from an overarching vision, chances are high that these goals will also be motive-congruent (cf., Rawolle, Glaser, & Kehr, 2007). This leads to the proposition that visions promote motive-goal congruence. Here, more research is needed.

Another promising attempt to promote implicit-explicit motive congruence is the "enlightenment approach" of providing individuals with feedback about their implicit motive dispositions and how well they fit their explicit goals (Roch, Rösch, & Schultheiss, in preparation; see also Kehr & von Rosenstiel, 2006; Krug & Kuhl, 2005). Results from pilot research attest to the usefulness of this approach for increasing motivational congruence,

particularly if feedback about motives is combined with opportunities to identify and experience effects of implicit motives in one's life and to adjust one's goals to one's motivational needs.

7. Assessment of implicit motives

Picture-story measures

Recent years have witnessed a renewed interest in issues surrounding the assessment of implicit motives. One the one hand, researchers have scrutinized the PSE more closely, focusing on the suitability of specific pictures for the measurement of individual motives as well as on issues of score reliability. On the other hand, they have also started to develop new measures for motive assessment. In our last section, we will provide a brief overview of these developments.

Why a particular set of pictures is used for motive assessment and how the choice of individual pictures in the set influences mean, variance, and distribution of the overall score has remained a mystery to many inside and outside of the field. What was missing for a long time were precise data on picture cue properties, particularly on how much motive imagery a given picture elicits on average if a specific coding system is used for scoring imagery. Schultheiss and Brunstein (2001) aimed to fill this gap and explored the strength of picture cues across the major three social motives. The authors found that picture cues differ markedly in the amount of achievement, affiliation, and power motive imagery elicited. In their study, 428 German university students were administered the PSE using the following pictures: architect at desk, women in laboratory, ship captain, couple by river, trapeze artists, and nightclub scene. The authors suggest that a picture cue is considered to have a high pull for a given motive if 50% or more of participants respond to the cue with codeable material meeting the requirements of motive imagery (Winter, 1994) and to have a low pull if this threshold is not reached. Using this criterion, women in laboratory, ship captain, trapeze

artists and nightclub scene produced a high pull for *n* Power; architect at desk, couple by river and nightclub scene generated a high pull for *n* Affiliation; and women in laboratory and trapeze artists showed a high pull for *n* Achievement.

Pang and Schultheiss (2005) replicated and extended these findings with a slightly modified picture set and in a large sample of university students in the US. The authors substituted the architect at desk picture with the boxer picture. Pang and Schultheiss found that the pictures exhibited high pull for the same motives as shown by Brunstein and Schultheiss (2001). Moreover, Pang and Schultheiss (2005) found the boxer to be a more effective picture cue in eliciting motivational imagery, as it produced a strong stimulus for *n* Power as well as *n* Achievement. Similar findings were also obtained by Langan-Fox and Grant (2006), who sought to determine what picture cues most effectively elicit motive imagery. They report that women in laboratory, couple by river and trapeze artists exhibited a strong stimulus pull for *n* Achievement, *n* Affiliation and *n* Power, respectively, results that are comparable to those of Schultheiss and Brunstein (2001).

In fact, mean scores for the same pictures, but reported by different authors, obtained with different coding systems and obtained in different cultural settings, are surprisingly similar. For instance, correlations of mean motive imagery scores obtained with Winter's (1994) integrated coding system in German participants (Schultheiss & Brunstein, 2001, Table 1) with those obtained for the same five pictures and using original motive coding systems (Smith, 1992) in Australian participants (Langan-Fox & Grant, 2006, Table 1) are .94 for n Achievement, .90 for n Power, and .97 for n Affiliation. Comparison of the scores reported by Schultheiss and Brunstein (2001) with those reported for US students by Pang and Schultheiss (2005) indicates a similar high level of picture cue similarity. Taken together, these findings suggest that specific picture cues have very robust cue properties that can be described precisely and used for the compilation of picture sets that ensure a high

yield of motive imagery and normal score distributions. Tables with further information on the motive-pull properties of a wide variety of picture cues can be found in Schultheiss and Pang (2007) and Pang (in press).

Researchers have also started to take another look at motive score reliability, an issue that has set off some heated debates in the past because motive scores obtained on stories from one picture typically do not correlate much with motive scores derived from another picture (see Entwisle, 1972; Lilienfeld, Wood, & Garb, 2000; McClelland, 1980; Reuman, 1982). Blankenship et al. (2006) aimed to develop a PSE picture set that maximized inter-item score reliability. The authors utilized the Rasch model which is able to address measurement characteristics and can therefore provide information on how well items or questions (i.e., coders, pictures, and probes) on assessments work to measure the ability or trait (i.e., high n Achievement). Due to the requirement of the Rasch model that the items have to be independent of each other, the original coding system of McClelland et al. (1953) was modified: All categories and subcategories were coded by paragraph, not by story, and some scoring subcategories were dropped due to their innate arbitrariness (i.e., the distinction between block in the world and block in the person; nurturant press; thema; unrelated imagery).

After conducting four experiments in which pictures were tested and eliminated iteratively, Blankenship et al. arrived at a picture set that yielded n Achievement scores with satisfactory internal consistency (Cronbach's alpha > .70; see Blankenship & Zoota, 1998, for a similarly high internal consistency of n Power scores). They also observed that pictures depicting situations with greater physical activity of only one individual are more effective in eliciting achievement imagery compared to those originally used by McClelland et al. (1953). Blankenship et al. (2006) also made an appeal to other researchers to employ the Rasch model in determining if their assumptions hold for other motives as well.

Retest stability is more commonly used to establish reliability of the PSE. Recent literature has affirmed retest stability in implicit motive measures. Schultheiss and Pang (2007) reported in a meta-analysis that average retest stability remained constant across the three social motives achievement, affiliation, and power. Moreover, they demonstrated that, while the stability coefficient did decrease over a time interval ranging from one day to 10 years, implicit motive scores exhibited moderate stability over time. Schultheiss, Liening, and Schad (2008) investigated retest reliability in a study in which the same eight-picture PSE was administered to 90 participants twice over a two-week interval. Schultheiss et al. showed, on the one hand, that retest stability was not systematically altered by writing condition (typed versus hand-written), and, on the other hand, that retest correlations were highly significant and substantial for all three social motives (.37 to .61).

Schultheiss et al. (2008) also investigated other measures of reliability. Inter-scorer reliability ranged from acceptable (> .70) to good (> .80) for all three motives over both testing dates. However, motive scores on one picture were not predictive for motive scores on other pictures, as reflected by internal consistency estimates ranging from -.02 to .43 (the authors analyzed scores by picture story without further differentiating them by paragraph, as Blankenship et al., 2006, did). Drawing on earlier work by Mischel and Shoda (1995), Schultheiss and colleagues also assessed ipsative stability, defined as the extent to which the profile of scores for a given motive across picture cues remained stable for each participant across assessments. To calculate ipsative stability coefficients, the authors first residualized motive scores for each picture for word count, then calculated an ipsative correlation for each participant's motive scores for the two testing dates across 8 pictures, and lastly determined the average ipsative correlation across all participants for each motive. Schultheiss, Liening and Schad (2008) established that ipsative stability was positive, significant, and accounted for 4% to 16% of the variance of motive scores. They interpreted these results as evidence for

their hypothesis that PSE retest stability can best be explained by participants exhibiting stable responses to the same picture cues over time. Thus, substantial retest stability despite low internal consistency of PSE motive scores is not a paradox if one accepts that motivational needs are not expressed to the same extent in response to different picture stimuli, but in the same way to the same stimulus across different occasions.

Chronometric measures

In recent years, there have been increasing attempts in developing chronometric tools that accurately measure implicit motives and thereby provide an alternative to the PSE. Greenwald et al (1998) developed the Implicit Association Test (IAT) as a way of tapping into self-evaluations that individuals are either unwilling or unable to consciously make. The IAT avoids self-deception and impression management by utilizing reaction-time methodology (Brunstein & Schmitt, 2004, in press) and generally assesses individual differences in self variables with a high internal reliability. The IAT is administered on a computer, and participants are presented with two categorization tasks, displayed either in an association-compatible or in an association-incompatible manner. The assumption is that participants will be able to respond more rapidly when categorizing two concepts if the concepts are strongly associated (e.g., male + math / female + arts) (Brunstein & Schmitt, 2004). The IAT has frequently been used to test discrimination or bias in social cognition.

Brunstein and Schmitt (2004) explored if the IAT could effectively be used as an implicit motive measure that would predict the same type of achievement behavior as the PSE n Achievement measure. Brunstein and Schmitt administered an IAT to 88 students, an achievement orientation questionnaire with comparable achievement-related items found in the IAT, and a mental concentration test. Half of the participants were given regular feedback during the mental concentration test. Upon completion of the mental concentration test, participants filled out a short questionnaire on their enjoyment of these tasks. Brunstein and

Schmitt were able to show that the IAT, just as the PSE, lacked correlation with the self-report achievement measures, that is, the two assessment types are statistically independent. The authors also presented evidence that the IAT predicted how much effort participants put into boosting their performance after they had received feedback, whereas the self-report measure was prognostic for the enjoyment participants reported (this was not observed for participants without feedback). These results closely paralleled findings obtained with a PSE measure of n Achievement (Brunstein & Hoyer, 2002; Brunstein & Maier, 2005).

Brunstein and Schmitt (in press) recently extended these findings by showing that the achievement IAT correlated positively and substantially with a PSE measure of n Achievement across three studies. Moreover, like the PSE measure the achievement IAT predicted participants' cardiovascular responses to tasks varying in difficulty. Participants who were high in achievement motivation as assessed by either measure showed the greatest systolic blood pressure increases on medium-difficulty tasks. Participants low in achievement motivation did not show this response. Consistent with the authors' predictions, neither the IAT nor the PSE measure of n Achievement predicted declarative measures of motivation. In summary, these findings suggest that the IAT may represent an alternative approach to the assessment of implicit motives, because it converges with the PSE and its range of predictive validity is similar to that of the PSE.

Future directions

Advances in science depend on the development, refinement, and evaluation of reliable and valid measures. One of the great strengths of implicit motive measures has always been that they were derived based on experimental arousal of motivational states in research participants rather than on mere correlations with other measures or psychodynamic theorizing (see de Houwer et al., 2009, for a discussion of this issue). But this is not enough to arrive at a thorough understanding of implicit motive measures. The process through

which an aroused motive manifests itself in specific imagery in PSE stories needs to be explored. Likewise, we think that it is important to understand why one person expresses a motive predominantly in one kind of imagery (e.g., strong, forceful action in the case of n Power) and in response to one set of stimuli (e.g., *ship captain* and *trapeze artists*) while another person expresses it using other types of imagery (e.g., persuasion and manipulation in the case of n Power) and in response to a different set of stimuli (e.g., *boxer* and *women in laboratory*). Is there a direct correspondence, a kind of deep congruence between the stimulus-response patterns evident in a person's PSE stories on the one hand and her or his context-behavior patterns in real life on the other? The better we understand these issues, the better we will understand how and why the PSE works as well as it does, and the more we will be able to improve the measurement instrument.

The measurement basis of implicit motives needs to be broadened, too. Brunstein and Schmitt (2004, in press) have already produced evidence that a measure of n Achievement based on the IAT converges with the PSE and also predicts the same kinds of phenomena as the PSE. What still needs to be demonstrated is that the IAT measure of n Achievement is sensitive to experimental arousal of the need to achieve. Such a study could also help pinpoint which IAT stimuli are most sensitive to motivational arousal effects and hence most valid for the assessment of n Achievement. If these forays into IAT assessment of motives turn out to be successful, it would of course also make sense to extend this approach to the assessment of other implicit motives. More generally, while recent efforts to establish new motive measures (such as the Operant Motive Test; see Kuhl, Scheffer, & Eichstaedt, 2003) are laudable, these instruments need to be validated sufficiently based on the criteria sketched out here (i.e., experimental arousal effects; convergent validity with PSE; similar range of predictive validity as the PSE; careful description and evaluation of test characteristics) before they can supplement or replace the PSE.

Finally, n Achievement, n Power, and n Affiliation represent important social motives, but in all likelihood they are not the only basic motives that operate implicitly. What about hunger, sex, or curiosity? While attempts at assessing these needs have been made in the past (e.g., Atkinson & McClelland, 1948; Clark, 1952; Maddi & Andrews, 1966), these efforts have not been taken any further. Thus, an expansion of implicit motive measurement and research to other biologically rooted needs is overdue.

8. Conclusion

Research on implicit motives has resurged in the past decade, leading to review papers (e.g., Woike, 2008; Winter, John, Stewart, Klohnen, & Duncan, 1998), chapters in key handbooks in the field of personality research (Schultheiss, 2008; Schultheiss & Pang, 2007), extensive treatments of the topic in textbooks (Carver & Scheier, 2007; Larson & Buss, 2008; McAdams, 2009; Winter, 1996), and a new book dedicated entirely to implicit motives (Schultheiss & Brunstein, in press). In the present chapter we had to be selective and focused on topics that deal with the assessment and core construct validity issues of implicit motives. We have not discussed applied aspects of motives or recent work on the role of motives in societal, economic, or historical processes, although these topics are fascinating and further underscore the fundamental validity and far reach of the implicit motive construct. The interested reader is therefore referred to recent publications documenting these lines of research (e.g., Collins, Hanges, & Locke, 2004; see also the chapters in Schultheiss & Brunstein, in press). What we hope this review of the state and future of the field, as we see it, reveals is that implicit motives remain a key topic in motivation research, a topic that can be addressed with hard-nosed measurement and experimental approaches and that can yield important insights into domains of human cognition, affect, and behavior that cannot be accessed in any other way.

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Figures

Figure 1. Information-processing model of implicit and explicit motivation (solid lines: significant correlation/influence; dashed lines: no significant correlation/influence). From Schultheiss, O. C. (2008). Implicit motives. In O. P. John, R. W. Robins & L. A. Pervin (Eds.), *Handbook of Personality: Theory and Research* (3 ed., pp. 603-633). New York: Guilford. Reprinted with permission of Guilford Press.

Figure 2. Motivational field theory circumplex model of the incentive value of nonverbal signals of emotion. Expressions of anger, disgust, and joy signal high dominance and expressions of surprise, fear, and sadness signal low dominance. Expressions of anger and disgust signal low affiliation and expressions of joy, sadness, and fear signal high affiliation. The extent to which these expressions then represent a positive or a negative incentive depends on the perceiver's needs for power and affiliation. Adapted with permission from Stanton, S. J., Hall, J. L., & Schultheiss, O. C. (in press). Properties of motive-specific incentives. In O. C. Schultheiss & J. C. Brunstein (Eds.), *Implicit motives*. New York, NY: Oxford University Press.

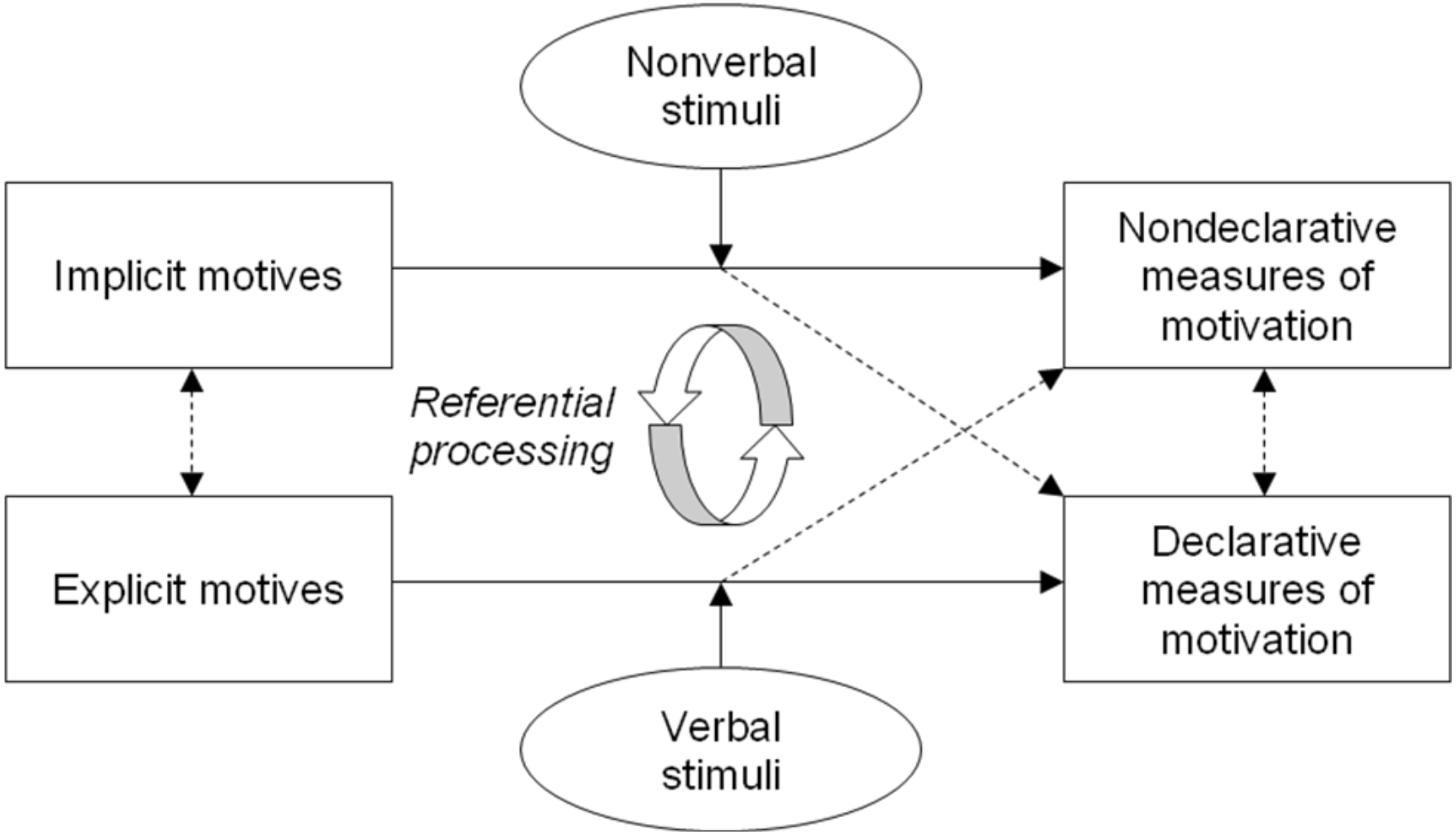
Nonverbal stimuli
Implicit motives
Nondeclarative measures of motivation
Referential processing
Explicit motives
Declarative measures of motivation
Verbal stimuli

Figure 1.

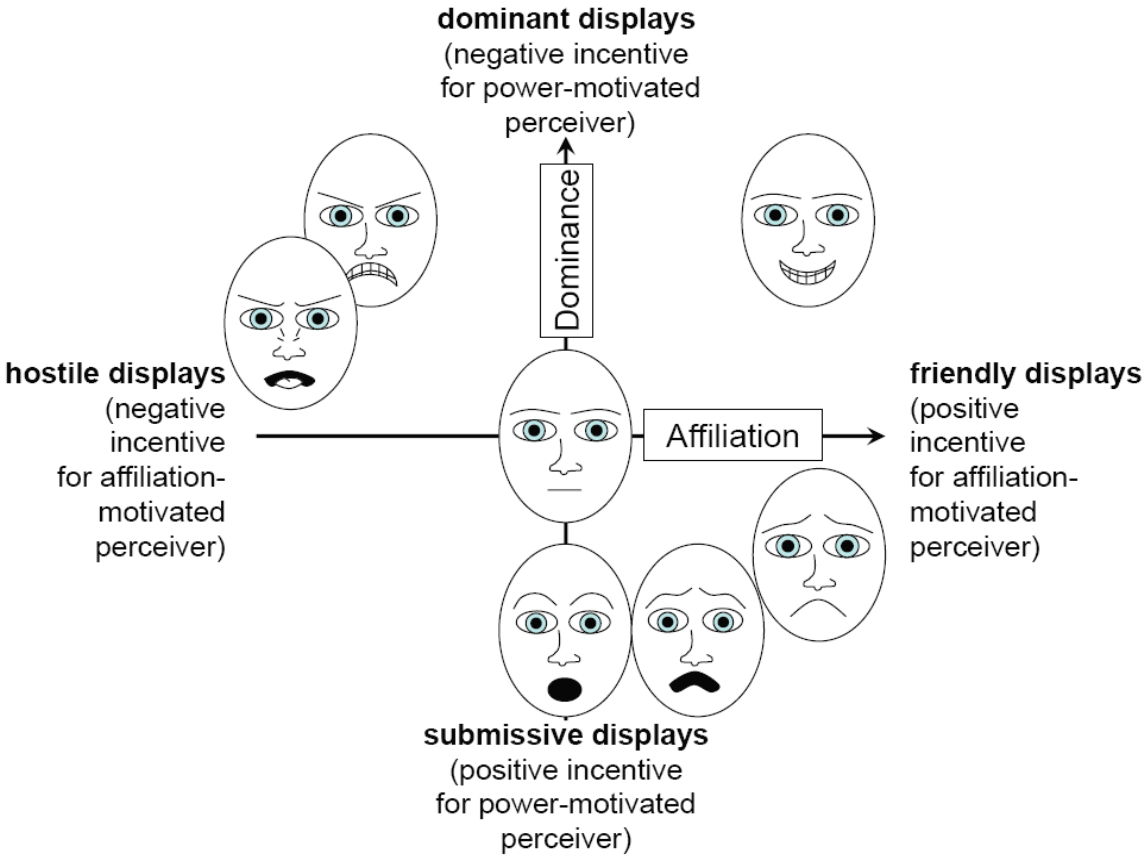
dominant displays
(negative incentive
for power-motivated
perceiver)
Dominance
hostile displays
(negative
incentive
for affiliation-
motivated
perceiver)
Affiliation
friendly displays
(positive
incentive
for affiliation-
motivated
perceiver)
submissive displays
(positive incentive
for power-motivated
perceiver)

Figure 2.