On the Automatic or Nonconscious Regulation of Emotion

John A. Bargh & Lawrence E. Williams

Yale University

Abstract

Several forms of automatic or nonconscious self-regulation have been discovered recently – evaluative, perceptual, and motivational systems that keep one functionally in touch with one's present environment, and which provide a kind of default guide to adaptive responding within that environment when conscious processes are focused elsewhere (as when remembering the past or planning for the future). Because of their high efficiency and reliability, nonconscious processes are a boon for effective self-regulation, yet they have been understudied to date in emotion research. We review the known mechanisms of nonconscious self-regulation and point to how emotional influences might be nonconsciously managed in similar fashion. Existing research that supports the existence of nonconscious emotion regulation processes is described, but with the caveat that this is a fledgling research domain and there is much still to be discovered.

Emotions have long been recognized as powerful influences on human judgments and behavior, yet their function or purpose in our lives has been debated throughout intellectual history. Plato considered emotions, and affective reactions in general, to be 'foolish counselors'; two millenia later leading philosophers such as Descartes continued to view emotions as afflictions that biased and obscured thought and decisions. But then came Darwin (1872), who compellingly argued for the functional and adaptive nature of emotional expression across species, followed about a century later by scientific psychology, which eventually took Darwin's cue and began the experimental study of the interplay between emotion, cognition, and behavior. [For a contemporary version of Darwin's evolutionary argument, see Haidt (2001).]

The behaviorist O. H. Mowrer (1960) was one of the first to note the important function emotions played in learning, especially in providing a 'safe' internal preview or simulation of the potential consequences of the actual behavior. Herbert Simon (1967), early on in his pioneering work on human cognition and problem-solving, called attention to the important role played by motivation and emotion, describing them as necessary and essential controls over cognitive processes. Motivational controls, Simon argued, were needed to prioritize the organism's activities and to provide stopping rules for goal pursuits, such as how to know when to move on from one goal to another; emotional controls were needed to provide interrupts or signals that something needs attention right now and it can't just wait in the to-do queue. In this view, emotions are

important signals about the current state of the world – to paraphrase John Lennon, emotions are what happen to you when you're busy pursuing other plans.

Carver and Scheier's (1981) seminal model of self-regulation gave emotions a formal and prominent place in the process of goal pursuit – lack of sufficient progress towards a desired goal was posited to generate negative emotions (dissatisfaction, anxiety) that gave a further prod to effort towards the goal; positive emotions (see also Carver, 2002) were said to signal that sufficient progress has been made towards the goal such that it is now safe to disengage from that goal for a time in order to pursue other important goals. In other words, progress at a goal (or lack of it) produces positive (or negative) affect, which in turn influences rate of action towards the goal. Affect or emotion in their model is a *signal* to the regulatory system to either increase or decrease effort. And similarly, but at a more chronic, life-long level of goal pursuit, Higgins' (1987) self-discrepancy theory makes predictions of specific emotional responses to events which call to mind the gap between one's present state and one's long-term self-goals.

More recently, cognitive neuroscience researchers such as Damasio (1996), LeDoux (1996), Davidson and Irwin (1999), and Gray (2004) have documented how emotional processing is involved as a moderator or guide in all sorts of cognitive processes, such that impairment of such processing (as through stroke or other brain damage) has a profound negative impact on decision-making, personality, and life quality. This domain of research too has confirmed the intimate relations between emotional and cognitive processes, leading Davidson and Irwin (1999) to conclude that

"every region in the brain that has been identified with some aspect of emotion has also been identified with aspects of cognition... The circuitry that supports affect and the circuitry that supports cognition are completely intertwined".

As emotions are meant to signal us, as well as guide and shape cognitive processing, we must learn how to manage and deal with these interruptions to our ongoing goal pursuits if we want them to be successful, and not be continually distracted away from them. Precisely because emotions have this capability to interrupt our ongoing goal pursuits, they inevitably create attentional and response *conflicts* that must be resolved (see Morsella, 2005; Oettingen et al., 2006). Regulation of emotions is thus needed whenever there is a conflict between the responses suggested by the emotion, and those called for by one's current goals.

nonconscious self-regulation mechanisms -------------------------

To date, most emotion regulation research has focused on intentional, conscious forms of regulation (Gross, 1999; see Jackson et al., 2003, p. 612). However, there have been significant advances recently in the study of nonconscious forms of self-regulation (see review in Fitzsimons & Bargh, 2002), which have revealed several self-regulatory mechanisms that operate independently of conscious control. For instance, automatic evaluative processes operate immediately and unintentionally to encode nearly all incoming stimuli in terms of positive or negative valence (see Duckworth, Bargh, Garcia, & Chaiken, 2002), with this initial screening having important "downstream" consequences for approach versus avoidant behavioral predispositions (Chen & Bargh,

1999) as well as biasing further judgments in the direction of the initial, automatically supplied evaluation (Ferguson, Bargh, & Nayak, 2005). As do all nonconscious forms of self-regulation, these automatic evaluative processes keep the person adaptively tied to their current environment while conscious attention and thought might be elsewhere (for example, focused on the person's current goal pursuits).

A second form of nonconscious self-regulation is afforded by automatic linkages between perceptual and behavioral representations such that perceiving another person's behavior creates the tendency to behave the same way oneself – again without intending to or being aware of this influence. This mechanism, alternatively known as the perception-behavior link within social psychology (Dijksterhuis & Bargh, 2001) and the 'mirror neuron' effect in social-cognitive neuroscience (e.g., Gallese, Fadiga, Fogassi, & Rizzolatti, 1996; see also Decety & Sommerville, 2003; Frith & Wolpert, 2004), connects us to each other through a brain mechanism designed to facilitate imitation and mimicry. Research has shown that we tend to imitate the posture, facial expressions, and bodily gestures of those we interact with, without intending to or being aware of doing so (Chartrand & Bargh, 1999, Study 1), and that in return such mimicry automatically fosters feelings of closeness and empathic understanding between the interaction partners (Chartrand & Bargh, 1999, Studies 2 and 3; also Lakin & Chartrand, 2003). Again, as a default mechanism or process while the conscious mind is elsewhere, the perception-behavior link keeps us on the same page with our interaction partners and help us to respond in an appropriate manner (i.e., similarly to the others we are with at the moment).

But the most relevant form of nonconscious self-regulation for current purposes is *nonconscious goal pursuit* (Bargh & Gollwitzer, 1994). According to the *auto-motive model* of nonconscious goal pursuit (Bargh, 1990), emotion regulation goals -- like all goals -- correspond to mental representations (see also Kruglanski, 1996). These are presumed to contain information as to when and how to pursue the goal, how likely one is to succeed, the value of that goal, and so on. More importantly for present purposes, goals as mental representations can develop automatic associations with other representations, to the extent they are active in the mind at the same time (see Hebb, 1949). Thus, if an individual chooses to pursue the same goal (e.g., to enjoy oneself) each time he or she is in a particular situation (e.g., the classroom) eventually the representations of the situation and of the goal would become automatically associated, so that activation of the former automatically causes the activation of the latter. Because representations of common situations become activated automatically themselves when we merely enter and perceive that situation, the goal too will become active at that time and begin operation, but without the person's conscious choice or knowledge.

Several studies have now shown that goals of various types and levels of abstraction can be nonconsciously activated (i.e., primed) to then guide information processing and social judgment (Chartrand & Bargh, 1996, 2002; Moskowitz, Gollwitzer, Wasel, & Schaal, 1999; Sassenberg & Moskowitz, 2004); verbal task performance (Bargh, Gollwitzer, Lee-Chai, Barndollar, & Troetschel, 2001; Fitzsimons & Bargh, 2003), and interpersonal helping and cooperation (Bargh et al., 2001, Study 2; Fitzsimons & Bargh,

2003). One pillar of support for nonconscious emotion regulation, therefore, comes

from existing evidence in support of this model of nonconscious goal pursuit. For

example, unobtrusively priming participants with stimuli closely related to the goal of

achievement causes them to outperform control groups on a variety of verbal tasks, and

subliminal priming of the goal of cooperation caused participants to make a greater

number of cooperative responses in a "commons dilemma" situation (Bargh, et al., 2001,

Study 2).

Critically, across these and similar experiments, the same outcomes are obtained

when the goal is primed and operates nonconsciously as when participants are given

the goal explicitly through task instructions (see Bargh, 2005; Chartrand & Bargh, 2002;

Fitzsimons & Bargh, 2002, for reviews). Moreover, in none of these experiments are

participants aware of either the activation of the goal or their pursuit of it, as indicated

by systematic questioning during debriefing (as well as the frequently subliminal

nature of the priming manipulation itself).

the **a priori** *case for nonconscious emotion regulation--------------------*

Given that these nonconscious self-regulatory mechanisms have been established

in the case of other external environmental influences, it is likely that emotions --

powerful and persistent influences that they are – are also subject to nonconscious

forms of regulation. It would be odd indeed if emotions constituted the one form of

external influence that was *not* subject to nonconscious control. After all, they are

meant to distract one from currently active goal pursuits and they can often engulf

one's phenomenal field (Loewenstein & Lerner, 2002) , and so we are quite frequently

presented with occasions in which we need to control emotional influences if we are to stay on track and accomplish our situational objectives. And in fact, there is evidence that infants begin to use emotion regulation strategies (such as attentional disengagement) as early as 3 months of age (Calkins, 2002; Posner & Rothbart, 1998). Thus the sheer frequency alone of these regulatory attempts over the course of one's (early) life should culminate in their automation, according to basic, established principles of skill acquisition (see Bargh, 1996; Bargh & Chartrand, 1999).

Jackson et al. (2003, p. 612) have recently called for the development of models and research methods to study the more automatic forms of emotion regulation, so to complement the historical (and current) emphasis on conscious or voluntary forms. They also provide some of the early data in support of nonconscious emotion regulation: in their study, individual differences in the resting activation levels of the prefrontal cortex predicted the duration of negative affect caused by disturbing photographs, as measured by eyeblink startle magnitude, even though there were no explicit instructions to regulate emotion given to participants in this study. Ochsner, Bunge, Gross, and Gabrieli (2002) had previously shown that the same regions of the prefrontal cortex became active during conscious, intentional emotion regulation. Thus, chronic levels of activation in these regions, as measured by Jackson et al. (2003), seem to correspond to chronic – perhaps "automatic" (as the authors concluded) -- emotion

regulation tendencies, because participants engaged in them without being told to do so.[1]

The concept of *automaticity* is a complex one with multiple defining features (see Bargh, 1989, 1994; Moors & de Houwer, in press; Wegner & Bargh, 1998) and cautionary tales can be told against invoking it prematurely (see Fiske, 1989, and Bargh, 1999, in the case of automatic stereotyping research). Automatic processes are characterized by their *unintentional,* relatively *effortless* (i.e., *efficient;* minimal attentional resources required) and *uncontrollable* nature, and operation *outside of awareness*; conscious processes are generally *intentional, controllable, effortful,* and the person is *aware* of engaging in them (see Bargh, 1994). However, these defining qualities of an automatic or conscious process do not always co-occur in an all-or-none fashion – some of the classic examples of automatic processes such as typing or driving an automobile (for experienced typists and drivers) nonetheless require an intention to be engaged in, and while stereotyping another person might well be unintentional, it is not uncontrollable (see Devine, 1989; Fiske, 1989). Thus, it is a risky thing to conclude that a process is automatic (conscious) merely because it does not possess one of the features of a conscious (automatic) process.

Because of the problems inherent in the unitary concepts of automatic and conscious processing, researchers interested in automatic emotion regulation might

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[1] That participants engage in a mental process spontaneously, without being told to do so, as in the Jackson et al. (2003) study (see also Handley, Lassiter, Nickell, & Herchenroeder, 2004), is suggestive and consistent with the emotion regulation process being automatic, but is not conclusive by itself (see below; also the excellent discussion of this issue by Uleman, 1989). People do many things in an experimental session without being explicitly instructed to do them, in part because of their assumptions about what the experiment is about and what is expected of them (e.g., demand effects).

wish to focus instead on the particular quality(ies) of most interest to them. For

example, in the highly researched domain of automatic stereotyping and prejudice, the

feature of special interest seems to be *intentionality*: most research is directed at the

question of whether people stereotype others even though they do not intend to do so

(and perhaps even have strong intentions *not* to do so)? But to researchers of the

attitude-behavior relation, it is the *efficiency* or effortlessness of how attitudes become

activated by relevant stimuli that is the dimension of most interest (Fazio,

Sanbonmatsu, Powell, & Kardes, 1986). Separate research methods have been

developed for each of these component features (see Bargh & Chartrand, 2000; also

Bargh, in press) and some of these should prove useful to emotion researchers.

At the same time, the study of automatic emotion regulation is unlikely to be a

repeat or merely a matter of applying what is already known about automaticity from

cognitive or social psychology. Some of the hard-earned knowledge gained from the

study of automaticity in social cognition will transfer to emotion regulation but some

will not, and we would wager that emotion researchers will discover some new forms

or domains of automatic and nonconscious phenomena that are unique to the case of

emotion processing -- just as some of the cognitive psychology research on automatic

processes transferred to social psychological phenomena (e.g., stereotyping, attitude

activation) but entirely new forms were discovered as well (e.g., nonconscious sources

of affect; the perception-behavior link; nonconscious goal pursuit). The past and

ongoing research on automaticity in social cognition and self-regulation will likely be

informative, even directive, to emotion researchers, but that research is unlikely to map

perfectly onto the key concerns and phenomena of emotion research. We eagerly await the new discoveries to be made by researchers of nonconscious emotion regulatory processes in the years ahead.

general forms of emotion regulation----------------------

As emotions serve important adaptive functions for the human organism, emotion regulation, if it is also to be adaptive and useful, should not be just a blanket, unconditional affair of suppressing or attenuating one's emotional reactions in all cases. Emotions are signals as to the state of the world and our place in it; it would make no sense to have an interrupt or override system that we routinely ignored. Moreover, true flexibility in responding, and adaptation to one's environment, does not always entail overriding impulses or environmentally-triggered influences – to do so would be just as rigid as to always *act* on them (Gray, Shaefer, Braver, & Most, 2005). Indeed, some recent attention-based models of self-regulation have moved away from the idealization of top-down control over external influences, to a more balanced approach – one in which, "...for any given context, there is an ideal balance in the allocation of top-down attention, such that an individual's goals are met but can be *flexibly modified by new information"* (MacCoon, Wallach, & Newman, 2002, p. 439; our emphasis).

True adaptation, in other words, does not only mean being able to pursue purposes independently of what is going on in the current environment (i.e., escaping stimulus control, as some models of self regulation would have it; e.g., Mischel & Ayduk, 2002), it also means being open to and taking advantage of the unexpected opportunities that arise. As the neuropsychologist Barkley (2002, p. 5) put it, the field of

mental health "tends to view impulsiveness as a problem or deficit, yet for most species that have a nervous system that learns from contingencies of reinforcement, there actually is no 'problem' of impulsiveness – it is their default state. The 'problem' posed by impulsiveness is relatively unique to humans."

What the existing research shows is that while there are a few general rules of emotion regulation, successful emotion regulation strategies vary as a function of one's current goals and purposes. That is, emotions tend to be regulated on the basis of whether they facilitate versus interfere with our particular ongoing goal pursuits.

Maintaining stability and equilibrium. One such general principle is that we need to manage our manifest variability in the eyes of others – to be seen as steady, predictable, and not likely to act suddenly, spontaneously, and unpredictably. In Tetlock's (2002) terms, we are accountable to others in our group on whom we rely for support and aid in pursuing our important life outcomes (many of which require the cooperation if not participation of others), and thus we need to manage their impression of us. Unpredictable = danger and being seen as dangerous is also very dangerous to the person him or herself. So we need to be "regular", to set within boundaries the range of reactions we might safely and reasonably have in a given situation.

Social or group *norms* serve this purpose of providing these guidelines for us within many situations. Certain emotions are appropriate in certain settings but not others; as Barker and Wright (1955) reminded us, the average person behaves very differently in a library, say, than at a football game (see also Aarts & Dijksterhuis, 2003). And to fit in and be accepted by our fellow group members, we need to respond in a

similar fashion as they do to the same external events -- for example, if we were grouchy or upset after the home team won, or if we were seemingly not concerned over a threat to the community or group, these would signal that our goals are not the same as the others', and this would threaten our standing within our group. Conversely, as research has shown, having the same emotional expressions or reactions as do the others in our group naturally and automatically strengthens the empathic bond between people (Chartrand & Bargh, 1999; Lakin & Chartrand, 2003).

This tendency to maintain a steady state or equilibrium, or *homeostasis,* is also emphasized in the cybernetic self-regulation model of Carver and Scheier (1981). Given this overarching goal of maintaining a steady state, emotional responses represent a break in equilibrium that should, according to the theory, automatically provoke emotion-regulatory responses.

Forgas and Ciarrochi (2002) have also argued specifically for the existence of automatic emotional homeostatic mechanisms. In their studies, either a good or a bad mood was first induced in participants, who were then asked to generate open-ended responses (e.g., complete word fragments, describe a typical male or female) that were coded for their positivity or negativity. The usual or default mood-congruency effect was shown at first in these free responses, but over time there was a spontaneous shift to mood-incongruent responses. Thus, those in a good mood shifted over time to generate negative instead of positive completions; those in a bad mood shifted over time from negative to more positive completions. Forgas and Ciarrochi (2002)

concluded that people automatically correct for mood-congruency effects over time by shifting to mood-incongruent retrieval, "as if seeking to manage their mood".

Larsen and Prizmic (2002, p. 41) also posit a general "equilibrium-seeking" emotion regulation goal; according to these authors we generally want "to limit the residual impact of lingering emotions and moods on subsequent behavior and experience" such that we not only seek escape from our bad moods, we also often seek to downplay our good moods, especially under circumstances in which it might interfere with our current purposes. One such circumstance is when we expect to interact with another person, especially a stranger: Erber, Wegner, and Therriault (1996) found that people tend to regulate their mood to be neutral in preparation for social interaction, even downplaying their good moods in order to attain this neutral state.

Recently, Jostmann, Koole, van der Wulp, and Fockenberg (2005) have argued that preparation for action in general has the natural, automatic effect of moderating emotional experience. In their model, the personality trait of *action-orientation* (a basic orientation towards action and change; as contrasted with *state-orientation*) is associated with a tendency to regulate and moderate affective influences. In their studies, they obtained the usual or default affective priming effect on mood (using subliminal emotional faces) but only for state-orientation participants. Action-oriented participants, on the other hand, showed the same tendency towards reestablishing equilibrium as in the Forgas and Ciarrochi (2002) and Erber et al. (1996) studies – with the most negative affect following presentation of happy faces, and the most positive affect after the presentation of angry faces.

Koole and Jostmann (2004) argue that such "intuitive affect regulation" serves to facilitate volitional action and higher-order goal pursuits. Note here the similarity of emotion regulation effects obtained for the chronic individual difference of action orientation in the Jostmann et al. (2005) studies and those found for the stable and chronic individual differences in resting prefrontal activation state in the Jackson et al. (2003) study described earlier. In both cases, the "chronic" participants regulated emotions more than did other participants, without being told to do so explicitly by the experimenter, and apparently without awareness of having tried to do so. These findings are consistent with what we would expect if these groups of participants had developed, over frequent use, automatic or nonconscious emotion regulation skills.[2]

However, we do not know from these observed personality differences in regulation success or *outcome* what the responsible regulatory *process* was – how, exactly, did the action-oriented or equilibrium-seeking individual accomplish the regulation? Most likely, they used one of the following strategies (but in an automated fashion) that have been identified in the case of conscious self-regulation:

Specific (conscious) emotion regulation strategies-----------------------------

Emotion-regulation researchers have identified several conscious and strategic emotion control strategies that are commonly used by people, with varying degrees of success, in order to regulate their emotional experience. Here we will consider the

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[2] Relevant to this point is the research program by Heckhausen, Gollwitzer, and colleagues on implemental versus deliberative mindsets: this research has shown that it is a general feature of actional or "implemental" mindsets (relative to "deliberative" or pre-decisional mindsets), once the choice of action has been made, to deflect external impulses or suggestions for responses (e.g., priming effects) , providing a kind of "tunnel vision" that keeps the person on track in pursuit of the desired goal (see Gollwitzer, 1999; Gollwitzer & Bayer, 1999).

potential of these for developing into nonconscious emotion regulation mechanisms, based on the principles of skill acquisition (essentially: frequent and consistent use over time in the same situation).

Gross and colleagues (1999; Ochsner & Gross, 2002) have identified a variety of such strategies or goals that people select for purposes of moderating their emotional experience. Here we first briefly describe these strategies, and then consider the possibility that these strategies could come to operate nonconsciously as well, given frequent and consistent choice of that strategy upon experience of a particular emotion (and also, perhaps, upon particular emotional or affective inputs in the absence of conscious experience of them; see Winkielman, Berridge, & Wilbarger, 2005).

Response modulation strategies involve either decreasing or suppressing emotional responses, or increasing or enhancing them, depending on how appropriate or helpful (versus inappropriate or detrimental) the emotion is for one's current situation and purposes. For example, if at a funeral one remembers a funny story involving the dearly departed, one would most likely suppress the emotional response. Similarly, there are situations in which the enhancement of an emotional response is necessary. For example, hurricane victims waiting days for rescue workers to arrive may use their feelings of frustration and despair to enhance their visible outrage and anger in order to better gain empathy and needed assistance from others.

Attentional deployment strategies modify or redirect the focus of conscious attention in order to modify their emotions; a classic example is a small child covering his eyes during a scary stretch of a Harry Potter movie. This of course helps by cutting

off the stimulus input that is driving an unwanted emotion. Distraction is another common attention deployment strategy, in which one shifts one's attention to something else in the environment or to an effortful internal mental operation (such as counting to ten when angry).

Cognitive transformation or *reappraisal* involves recategorization of the situation or event that is producing the emotion so that its meaning or emotional significance is changed. The sports pages provide us with a real-life example of this strategy, as employed by Carlos Beltran of the New York Mets baseball team. Asked how he dealt with the intense booing and heckling visited upon him by fans of his former team, the Houston Astros, he replied "I can't let it influence my play. I tried to look at it a different way. When they booed me, I tried to think they do it because they care about me. I tried to make it a positive and not a negative".

Other emotion regulation strategies that have been described in the literature are less cognitive and more behavioral in nature, such as *situation selection,* which involves seeking out or avoiding situations that one knows tends to produce certain emotional reactions (e.g., not playing music associated with a failed relationship), and *mood repair,* in which one deliberately does something fun or enjoyable, or stress-reducing such as exercising. But note that these behavioral strategies can become automated just as can the regulating cognitive processes, following the same principle of frequent and consistent use over time (Bargh & Chartrand, 1999).

These emotion regulation goals should be capable of nonconscious activation and operation to the extent the individual has employed them routinely, in a frequent

and consistent manner, whenever he or she is in the given situation. Although there is little evidence yet as to whether these particular strategies do come to operate in individuals in an automatic fashion to successfully regulate emotions, this is a fledgling research area and we would not be surprised to see such evidence appear and then accumulate in the research journals over the next five to ten years. For one thing, evidence does already exist that one form of emotion regulation – reappraisal of one's situation using social comparison processes (Gross, 1999) – indeed becomes able to operate in a nonconscious fashion. People engage in both upward and downward social comparison with others in order to manage their moods and their sense of self-worth and well-being (e.g., Aspinwall & Taylor, 1993); this strategic selection (upward vs downward) of standards against which to compare oneself clearly constitutes an act of *reappraisal* of one's standing relative to others.

Spencer, Fein, Wolfe, Fong, and Dunn (1998) demonstrated that people tend to counter threats to their self-esteem by automatically denigrating out-group members – those who belong to social groupings other than one's own. Their studies made use of a paradigm developed by Gilbert and Hixon (1991), in which a load on the participant's attentional capacity (via a secondary task) was found to eliminate the commonly found automatic stereotyping effect. Spencer et al. first replicated these findings, but then in an extension of the paradigm gave participants failure feedback (thus threatening their self-esteem) prior to the main task. Under these conditions, the automatic stereotyping effect re-emerged, even though the person was operating under the same attentional load that Gilbert and Hixon had shown sufficient to knock out the stereotyping effect.

The authors concluded that the automatic goal to restore positive feelings about oneself was so strong and efficient in operation that it was capable of overcoming the shortage of attentional resources to then denigrate minority groups (i.e., downward social comparison processes), thereby repairing their mood – despite the participants' lack of awareness that they were stereotyping anyone at all.

Some of the best early evidence for the existence of automatic emotion regulation capabilities comes from a new study by Zemack-Ruger, Bettman, and Fitzsimons (2005). These researchers subliminally primed words related either to guilt or to sadness, and then assessed whether behaviors or goal pursuits appropriate for those particular emotional states were set in motion by the primes. Across four experiments, these behavioral and motivational effects were obtained -- for example, guilt-primed participants showed higher self-control than those primed with sad emotion – despite no differences between conditions in consciously made ratings of emotional experience. Without the participant knowing it, then, nonconscious activation of the emotion representation triggered a nonconsciously operating goal appropriate to deal with that emotion – exactly what is called for by our hypothesis of nonconscious emotion regulation.

potential for nonconscious operation-----------------------

For each of the conscious emotion regulation strategies, the assumed causal sequence runs as follows: (1) the person experiences and becomes aware of the emotional state; (2) based on situational constraints as to appropriateness or advisability of expressing that emotion, as well as considerations of whether the emotion would be

helpful versus harmful to one's current goal pursuits (i.e., the person's *lay theory* regarding the probable effect of the emotion on the goal pursuit; see Wilson & Brekke, 1994), the person decides whether to attempt to regulate his or her emotional state – and if so, how exactly to go about doing so; and finally (3) the person intentionally pursues that regulatory goal or strategy. These strategies would be expected to develop into nonconscious emotion regulation processes if the same strategy was chosen and pursued given the same emotional situation (i.e., the same emotion-situation complex, such as feeling anxious during the closing minutes of a college entrance exam, or experiencing elation at drawing a very winnable poker hand). With sufficient attempts at regulation, the consistently-chosen regulation goal would come to be activated automatically upon the experience of that emotion in that context (see Bargh & Chartrand, 1999).

One straightforward method for testing whether these emotion regulation strategies might operate nonconsciously would be to attempt to subtly and unobtrusively prime those goals, and then present participants with relevant emotional stimuli, or emotion-producing situations (see Bargh & Chartrand, 2000, for standard and easy-to-use priming methods, such as the popular 'scrambled sentence test'). Goal priming has been one of the more successful research strategies thus far in the study of nonconscious self-regulation. Subliminal versions of priming manipulations can also be used later on in the research program in order to help rule out demand issues (i.e., concerns that the priming manipulation was perhaps too strong and thus telegraphed, consciously, the experimental hypothesis to the participants). If such priming of

emotion regulation goals is successful in producing the same or similar effects as when the goal is pursued consciously (as through explicit experimental instructions) , as research has shown is true of nonconscious self-regulatory goals in non-emotional domains, this would indicate that these goals are capable of becoming activated and then operating independently of conscious intention and guidance.

Note however that people often do not appreciate the actual emotional influences on their judgments, decisions, and behavior, and this lack of recognition would necessarily stand in the way of the development of a useful, successful nonconscious emotion regulation process in that case (see Wilson & Brekke, 1994). There are many strong influences on us that we do not appreciate as such (e.g., social influence attempts by authority figures, as in cognitive dissonance research), and others that concern us overmuch (e.g., subliminal advertising), so in order to successfully regulate our emotions we need a correct theory of the direction (facilitative vs interfering) and strength of their effects (Wilson & Brekke, 1994). Often, however, we do not have this.

For example, Lerner, Small, and Loewenstein (2004) have demonstrated carry-over effects of induced emotional states on subsequent pricing and purchasing behavior. In their paradigm, participants are induced to experience a certain emotion in the first part of the experimental session, and then its subsequent effects on judgment are assessed in what participants believe to be an unrelated experiment. These studies have shown that approach-related emotions (e.g., anger) cause participants to be willing thereafter to pay more than usual for an object (pen, coffee mug) that they don't have,

and to charge more for an object they do, but participants who have recently experienced an avoidance or withdrawal-related emotions (e.g., disgust) are not willing to pay much for the object, and require significantly less in return to give it up. Participants in these studies typically show no awareness of how the emotion they consciously felt previously might have influenced their economic decisions, making it unlikely that these biasing effects of recent emotional experience will be successfully regulated, even by conscious regulatory attempts, much less by eventual nonconscious emotion regulation skills. As they used to say of Bob Feller's fastball, you can't hit what you can't see.

   Development of emotion regulation skills. Given the importance of frequent and consistent experience in the development of nonconscious goal pursuit capabilities, we should look to the developmental literature to see how young children deal with emotions and emotional stimuli. This literature shows that from early infancy onward, each of us gets plenty of practice at regulating our emotional states, with such skills beginning to develop as early as infancy. Posner and Rothbart (1998), using brain imaging techniques to study the development of executive attention networks, found that the earliest type of regulation ability that developed in infants in response to distress was attention allocation, such as distraction, which emerges during the first year of life. Other lines of research also support the conclusion that infants begin using attentional strategies of engagement and disengagement from the emotion-producing stimulus at 3-6 months of age, and these continue as important regulatory strategies during the preschool years (Calkins, 2002).

Self-control abilities, on the other hand, take significantly longer to develop. In their review, Posner and Rothbart (1998) concluded that successful inhibitory control does not begin to develop in children until about 3 years of age. Yet here too these skills of response inhibition and emotion suppression do emerge and become highly practiced during the preschool years, so that they become easier and less effortful – that is, increasingly automated and potentially nonconscious. Thus the basic skills necessary for nonconscious emotion regulation begin to emerge relatively early in life and would be expected to attain nonconscious operation capability by young adulthood, if not before.

Regulatory success as a determinant of nonconscious operation. As noted above, the frequency with which a given regulatory strategy is employed is an important determinant of whether that strategy will become automated. But frequency of use is not the entire story. Although researchers have delineated the different strategies people tend to use, they also note that these strategies are not equally effective in achieving the desired aims. For example, Gross (1999) and Larsen and Prizmic (2002) have concluded from available experimental evidence that reappraisal works better than suppression or distraction at reducing emotional intensity. According to Ochsner and Gross (2002), suppression might mask the observable manifestations of emotion (such as in one's facial expression) but it does not reduce the emotional experience itself (indeed, it increases physiological responding); reappraisal, on the other hand, is effective at attenuating both the behavioral responses and the underlying emotional experience.

Does the relative success of an emotion regulation strategy matter to whether it develops into an automatic or nonconscious form of emotion regulation? There are sound theoretical and good empirical reasons that, independently of frequency of use, relative success of the regulatory strategy should also be important in the development of automatic or nonconscious emotion regulation strategies. First of all, success at a goal attempt is known to increase subsequent strength of that goal or motivation, whereas failure decreases motivational strength (e.g., Bandura, 1977; Heckhausen, 1990). Moreover, relevant to the present thesis of nonconscious emotion regulation capabilities, these same effects on subsequent motivational strength following success or failure have now been obtained when the goal was pursued nonconsciously (Chartrand & Bargh, 2002). Consistent with these ideas, Ochsner and Gross (2002), in their review of emotion regulation strategies, concluded that reappraisal is both the most successful and the most frequently used strategy.

Moreover, recent research suggests that success might have its effect on goal strength through increasing the positive affect associated with the goal representation itself; in other words, the *incentive value* of the goal. Custers and Aarts (2005) used subliminal affective conditioning to implicitly link various goals with positive affect; doing so influenced how hard participants worked on the task (incentives) as well as their desire to complete the tasks. Thus, nonconsciously produced positive affect – such as that resulting from a successful act of goal pursuit – may well play a key role in the development of nonconscious emotion regulation abilities through automatically increasing the motivational strength of the emotion regulation goal.

Consistent with this prediction, Mauss, Evers, Wilhelm, and Gross (in press) have recently shown that a participant's implicit attitude towards emotion regulation itself (which can be considered as the incentive value of the goal of emotion regulation for that individual) was related both to how well the person could regulate their emotions in the experimental session, but also to how effortful the person found the attempt. The more positive the implicit affect associated with the goal of emotion regulation, the better and more automatically (efficiently; less effortfully) that goal operated for the individual.

Different emotions, different strategies. It is likely that different emotions will have different strategies effective for regulating them (see Larsen & Prizmic, 2002), and thus different nonconscious regulation mechanisms associated with them. After all, different emotions serve different functions or purposes for us (Haidt, 2001; Loewenstein & Lerner, 2002), and so it would follow that different regulatory strategies will be effective on them in turn. For example, disgust-related reactions make us tend to turn away and withdraw from the stimulus, but one can easily imagine doctors and disaster-relief workers having to develop suppression or reappraisal strategies to push on through this tendency in order to accomplish their objectives; these same folks might not regulate anger at all, as it has approach and energization qualities that might be useful under such circumstances (see Loewenstein & Lerner, 2002). The findings of Zemack-Ruger et al. (2005) discussed above are also consistent with this reasoning; in their study subliminally presented guilt-related stimuli automatically triggered a self-control regulatory goal in their participants, whereas stimuli related to sadness did not.

conclusions: the potential benefits of nonconscious emotion regulation------

The word *regulation* comes from the Latin *regula* or "rule"; thus, according to Webster's dictionary to regulate means "to govern or direct according to rule", or "to bring order, method, or uniformity to"—that is, to make regular. To make a process automatic upon certain conditions is the pinnacle of regularity; whenever conditions X arise, goal or behavior Y is engaged. Automatic processes are much more consistent and reliable than conscious processes, for several reasons, and so nonconscious emotion regulation has the potential to be more effective than conscious regulation over the long term. Across several major domains of social psychological research – attitudes and persuasion, stereotyping and prejudice, and causal attribution -- it has been shown that conscious goals are not pursued unless the person has both the motivation as well as the ability to do so. Often, the person is distracted or cognitively busy and so fails to select the goal, or fails to notice the opportunity to do so, or just does not have the spare attentional capacity given the other things going on at the time – there are many possible slips twixt cup and lip when it comes to carrying out our intentions (Heckhausen, 1991).

Therefore, to the extent that an emotion regulation goal can be triggered automatically compared to consciously, it becomes a more reliable and consistent influence on us; it can also run effectively under busy conditions that would prevent the conscious goal process from operating (see Bargh & Thein, 1985); and it can take advantage of opportunities present in the environment that might otherwise have been missed because of conscious attention being directed elsewhere at the moment, or

because there is not enough time right then to decide and prepare the correct response through conscious means.

One immediate potential benefit of research into nonconscious emotion regulation, then, would be the application of the findings to the treatment of life problems that heretofore have resisted conscious regulation attempts. For example, in the field of addiction counseling and treatment, the major difficulty is the overcoming of compelling direct environmental cues that trigger the craving and the behavioral routines long associated with satisfying it. Treatments that have traditionally focused on *conscious* means of behavior change do not apparently work very well (Sayette, 2002). Perhaps it is time to meet fire with fire in the case of treating such addictions. That is, it may be that a nonconscious emotion regulatory goal could succeed where conscious regulation attempts routinely fail.

This might sound too good to be true, but there already exists evidence for this very process in the case of controlling unwanted stereotype influences on judgments of others. Moskowitz et al. (1999) showed that those participants who were committed to the goal of egalitarianism – of treating people from minority groups fairly – had developed an automatic, nonconscious goal of egalitarian treatment of others. More than that, the researchers were able to show that this goal was capable of *inhibiting* automatically activated stereotypes *before* they could influence the person's judgments. Remarkably, in these egalitarian participants, the group-stereotypes became activated automatically upon presentation of group-relevant stimuli, but were immediately *deactivated* by the nonconscious goal – all within less than a second. The strongest of the

unwanted influences of the stimulus environment, then, including emotional experiences, might be best met with counteracting nonconscious regulatory goals – fighting fire with fire, as it were – instead of the conscious regulatory strategies that, in many cases at least, have not proven up to the job.

In sum, then, the study of nonconscious emotion regulation is a promising new direction for research and has the potential for exciting new insights regarding the role of emotions in our lives, as well as expanding our knowledge of nonconscious self-regulatory mechanisms. The significant advances that were made in other domains when the research spotlight turned to the automatic components of the phenomenon – stereotyping and prejudice, the attitude-behavior relation, interpersonal interaction, and goal pursuit, among others – stand as a promissory note to emotion researchers today.

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