



# Synergistic Opportunities for Affective Science and Behavior Change

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## Abstract

Behavior change can be challenging to facilitate and achieve. Behavior change frameworks largely focus on social cognitive determinants, omitting affective determinants or including them in a superficial way. However, evidence points to the role of affect in decision-making and behavior, particularly when the behavior at focus for change is affectively pleasant or when the behavior to be facilitated is affectively unpleasant. This paper identifies challenges and opportunities to further affective science by using behavior change as a context and, relatedly, to further the science of behavior change by leveraging theoretical and methodological innovations in affective science.

**Keywords** Behavior change · Decision making · Affect · Emotion

Behavior change is difficult to encourage and achieve, even for those who intend to change (Sheeran & Webb, 2016). Affect (a category of processes including emotions, moods, and stress) is a central determinant of behavior (Lerner et al., 2015), particularly for rewarding or affectively unpleasant behavior (Ferrer & Mendes, 2018; Ferrer et al., 2015). However, the integration of affect with behavior change frameworks (i.e., theories used to predict and change decisions and behavior) is often conceptually narrow and theoretically impoverished.

There is an urgent need to examine whether it is possible to target and measure relevant affect and whether changing affect produces behavior change. This “experimental medicine” approach is considered state-of-the-science for behavior change research and has yielded important discoveries about the causal dynamics of other constructs (Keller et al., 2021; Nielsen et al., 2018). Before this approach can be maximally leveraged to improve our understanding of

both affect and behavior change, we must tackle several difficult conceptual and methodological challenges.

This paper explores these challenges from the perspective of two intertwined assertions: (1) behavior change is a fertile context for facilitating affective science discoveries, and (2) stalled progress in the science of behavior change can benefit from the rich theoretical perspectives and methodological paradigms offered by affective science.

## Integrating Affect and Behavior Change Theories

Traditional behavior change theories are focused on social cognitive determinants, such as social norms and self-efficacy—omitting affect or including it superficially (Conner & Norman, 2017). Attention to the interplay of affect with social cognitive determinants can improve the utility of such theories (Stevens et al., 2019). However, even when affect is examined and targeted in behavior change research, the focus is largely on static affect (e.g., worry, anticipated regret), without consideration that affective processes are dynamic and complex and without integration with social cognitive factors (e.g., Dillard & Nabi, 2006; Ellis et al., 2018; Witte & Allen, 2000). Such approaches often fall short (Kok et al., 2018) and contribute little to affective science. Addressing these limitations can inform behavior change efforts and improve understanding of fundamental affective science questions, such as those about the dynamic nature of affect.

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Notable exceptions deviate from these traditional approaches, examining behavior with a rich social cognitive-affective lens. For example, research suggests that impulsive processes, including affect, are used to assign a subjective value to various behaviors (Berkman et al., 2017), and that positive affect and behavior change can amplify one another, creating a self-enforcing “spiral” that strengthens motives for difficult or costly behavior (Van Cappellen et al., 2018). Opportunity exists to maximize behavior change efforts and answer fundamental questions about affect by translating other affective theories to behavior change. For example, anger and fear engage behavior through certainty and control appraisals (Lerner et al., 2015), but discrete emotions have rarely been examined along with certainty and control-related social cognitive constructs such as self-efficacy. This type of research has the potential to improve our understanding of emotion by allowing for the examination of emotional dynamics in the context of appraisal-related predictors of behavior. Perspectives differentiating varieties of positive emotion also hold promise for improving behavior change efforts (Shiota et al., 2021) while simultaneously informing our understanding of positive affect.

### Creating Ecologically Valid Inductions

Another challenge is developing ways to target ecologically valid affective states (Ferrer & Ellis, 2019). To permit the strongest causal inference, most decision-making paradigms tightly control a specific emotion, often one that is incidental to a behavior. It is essential to develop inductions that target affect most likely to be experienced, and to influence behavior change, “in the wild.” This research can not only improve behavior change efforts but also extend knowledge of the dynamics of affect outside a laboratory and in real decision-making contexts.

For example, real-world affect does not tightly adhere to prototypical discrete emotions and are not experienced as cleanly categorized as they are operationalized in decision-making research (Barrett & Russell, 2014). As such, it is necessary to deconstruct components of emotion rather than assuming that all experiences that might be categorized as, for example, anxiety produce the same type of behavior. This would allow for the examination of the dynamics of blended emotion (e.g., experiencing fear and anger simultaneously).

Moreover, although it has been posited that incidental affect should influence decisions in the same way as integral affect (Loewenstein & Lerner, 2003), this has seldom been examined and may not be the case (De Hooge et al., 2008). For example, one study found that an anger-inducing video or autobiographical induction unrelated to the decision decreased risk perceptions, whereas an anger induction related to the decision increased risk perceptions (Ferrer &

Ellis, 2021). Creating ecologically valid inductions of integral emotion is crucial to understanding the mechanisms of behavior change, as well as to informing affective science theories about which components of affect that are critical to various decisions.

There are also practical and ethical challenges to inductions, especially of negative affect (e.g., inducing guilt or fear to facilitate behavior change). Targeting positive affect (Wilson et al., 2020) or reducing stress (Hoge et al., 2021) may address some of these challenges. For example, research suggests that mindfulness can help to maintain positive affect during exercise, thereby increasing days exercising (Gillman & Bryan, 2020). There is also an ethical imperative to define which emotions are appropriate to induce to change behavior, as well as whether it is ethical to induce strong and negative affect in service of behavior even if an individual’s goals are not aligned with goals targeted by interventions (e.g., if an individual values hedonic goals despite being targeted for an alcohol cessation intervention; see also Becker & Bernecker, 2023).

### Developing Valid and Reliable Measures of Multiple Facets of Affect

Another challenge is to shore up the measurement of affect to accurately identify the most effective way to target it (Ferrer & Ellis, 2019; Weidman et al., 2017). Most studies assess self-reported affect with ad hoc measures, resulting in conceptual “fuzziness” that obscures our ability to assess affect as a precursor to behavior change (Weidman et al., 2017). Moreover, attention to different modes of assessment, such as those involving physiology, neuroimaging, observation, and repeated measures/ecological momentary assessment, is necessary to shed light on which aspects of affective states are most impactful for behavior and behavior change. For example, within-person assessments of various facets of stress have yielded discoveries about how intraindividual variation in affective experience influences physical activity behavior, binge eating, and smoking behavior change, as well as discoveries about the dynamic nature of affective states (Scherer et al., 2022; Smyth et al., 2022).

Examining neural processes that underlie affective and social experiences has led to discoveries about behavior change that could not be uncovered with self-report alone (Falk et al., 2010), including discoveries that can be extrapolated to predict population-level behavior change (Falk et al., 2012); these discoveries have also improved our understanding of how neural processes map onto affective experience. Other work suggests that indirect assessments may provide important information to triangulate the experience of affect, such as work examining vocal expression patterns as an indicator of positive

emotion (Kamiloglu et al., 2021). To fully understand the role of affect in behavior change, it is necessary to capitalize on emerging discoveries in measurement to create multiple methods that can triangulate relevant aspects of affective experience. Developing valid and reliable measures will allow for affective science discoveries that are not limited by self-report or laboratory measures; this is particularly important for understanding the dynamics of affect in contexts in which it is challenging or unethical to induce behavior-relevant affect.

### Considering Multilevel Influences

Affective science should capitalize on the wealth of knowledge on multilevel factors that influence behavior (e.g., see the NIMHD Research Framework) and that may interact with affect to change behavior or limit affect's ability to produce change. For example, relational dynamics are critical determinants of behavior (Huelsenitz et al., 2022), but examination of affect in behavior change is often at the individual level. Moreover, behavior change requires resources and infrastructure, which are influenced by social, systemic, and environmental factors. In the absence of these, individual-level factors such as affect may have limited impact. For example, reducing stress to facilitate behavior change may be impossible without addressing unmet social needs in marginalized populations (Halbert & Allen, 2021). Indeed, one can appreciate the affective benefits of sleep but be unable to change sleep behavior due to working night shifts or multiple jobs (Hale et al., 2020). Similarly, targeting positive emotions to facilitate physical activity may have limited impact if an individual lacks a safe and convenient place to be active (McCormack & Shiell, 2011).

These and similar findings have important implications for developing affective science-based behavior change interventions, as without components that address factors at other levels, interventions may miss important nuance and are unlikely to produce meaningful change. Moreover, not only should researchers be aware of multilevel influences; they should engage and collaborate with community partners and institutions to ensure that affective science along the translational continuum toward behavior change works in concert with other factors. Consideration of multilevel influences can also inform affective science theories and shed light on boundary conditions and contexts in which a particular affective state is most decision-relevant. For example, examination of relational determinants into affect and behavior change research can shed light on the dynamics of emotional contagion.

### Diversifying the Science of Affect and Behavior Change

Both basic affective science and behavior change research often use samples that limit generalizability (Halbert & Allen, 2021; Henrich et al., 2010; Muthukrishna et al., 2020). The unique experiences of marginalized populations, including populations that experience health disparities (racial and ethnic minority groups, sexual and gender minorities, underserved rural communities, and people of low socioeconomic status), can influence both the experience of affective states and their link with behavior (Halbert & Allen, 2021). For example, affective states (e.g., stress, anger, anxiety, depression) associated with discrimination may be uniquely impactful for risk-taking behavior (Gerrard et al., 2012; Gibbons et al., 2004; Jamieson et al., 2013). Stress associated with discrimination can also uniquely impact poor sleep (Hicken et al., 2013), which can subsequently influence decision-making processes that contribute to behavior change (Harrison & Horne, 2000), including risk-taking preferences (Hisler et al., 2022). Additionally, there may be important differences in the links between affect and behavior between populations (Halbert & Allen, 2021). For example, blunted cortisol response was associated with health behavior-related comorbidities among Black, but not White, men (Wright et al., 2020). Identifying the affective processes most impactful for behavior change among various populations has the potential to improve disparities in disease contexts for which behavior is a risk factor. Moreover, doing so would generate important insights into affective processes within specific populations, such as the specific stress targets and biobehavioral processes most experienced by individuals who experience discrimination.

Our limited knowledge of the dynamics of affect among diverse samples also points to important cultural influences on the ways in which affective states are experienced, expressed, and accepted. For example, cultural differences in the acceptability of emotional displays can influence communication and subsequent behavior change (Tsai, 2007, 2017). Indeed, one study found that altruistic behavior was more likely when the recipient's emotional display matched the giver's ideal affective state, such that European Americans were more likely to be altruistic when the recipient displayed excitement and Koreans were more likely to be altruistic when the recipient displayed calmness (Park et al., 2017). Examining culturally specific affective influences on behavior can help interventionists to target and tailor their interventions. Moreover, it can improve our understanding of which affective states are more universally experienced vs. constructed or contextualized by sociocultural factors.

## Conclusion

To capitalize on behavior change as a context for understanding affective processes and leverage affective processes to facilitate behavior change, it is critical to address challenges in integrating affect with behavior change theories, creating ecologically valid inductions, developing valid and reliable measures of multiple facets of affect, considering multilevel influences, and diversifying the science of affect and behavior change.

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