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A conceptual model describing mechanisms for how yoga practice may support positive embodiment

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ABSTRACT

Yoga practice has been associated with various indices of positive embodiment in correlational and intervention studies. Yet, systematic, theoretically-grounded models detailing specific mechanisms by which yoga supports positive embodiment are lacking. In this article, we present a conceptual model that describes mechanisms (i.e., mediators and moderators) that can be used to guide research to help answer how, for whom, and under what conditions yoga practice may promote positive embodiment. Based on existing theoretical frameworks and empirical findings, this model suggests that (a) yoga practice may cultivate embodying experiences during yoga (e.g., state mindfulness), (b) these embodying experiences may build stable embodying experiences that generalize beyond the yoga context (e.g., trait mindfulness), and (c) these stable embodying experiences may then promote embodying practices (e.g., mindful self-care). This mediational chain is likely moderated by the yoga context (e.g., instructional focus, presence of mirrors, diversity of bodies represented) and yoga practitioners' social identities (e.g., body size, physical limitations), social and personal histories (e.g., experiences with weight stigma and trauma), and personality traits and motives (e.g., body comparison, appearance-focused motives to practice yoga). Using the structure of this conceptual model, we offer researchers ideas for testable models and study designs that can support them.

Clinical implications

- Understanding the mechanisms by which yoga supports positive embodiment is key to designing interventions.
- Embodying experiences during yoga may support more general trait-like embodiment variables.
- The impact of yoga on positive embodiment is likely moderated by a number of individual and situational characteristics.

Introduction

Over the past decade, researchers have become increasingly interested in how yoga participation may support positive embodiment. This attention has developed both from a desire to understand the pathways by which yoga may be used as a tool to prevent or treat disordered eating (Neumark-Sztainer, 2014) as well as an interest in cultivating positive embodiment for its own inherent benefits (Cook-Cottone, 2015a, 2015b). Embodiment is a multi-faceted construct that includes a person's body image and their experience of engaging their body in the world—or the extent to which a person perceives that they can interact in the world with strength, functionality, and agency (Piran, 2016, 2017, 2019). Importantly, the environment shapes embodiment via the degree to which it accepts and welcomes a person and provides a safe place for their body. Thus, certain yoga contexts that offer a climate of body positivity, intentional inclusion and acceptance, strength, and community may help promote positive embodiment (Cook-Cottone & Douglass, 2017).

In her Developmental Theory of Piran (2002, 2016, 2017, 2019)) includes five dimensions and three processes that range from positive to disrupted embodiment. Because yoga has the potential to support positive embodiment (Cook-Cottone & Douglass, 2017; Impett et al., 2006; Mahlo & Tiggemann, 2016), we frame our discussion of yoga mechanisms in relation to the protective ends of these dimensions and processes. The first dimension, body connection and comfort, involves being connected to and comfortable with the body as it engages in the world. The second dimension, agency and functionality, is the ability to act assertively, expressively, and influentially in the world. The third dimension, experience and expression of desire, involves being in tune with the body's needs and desires and being able to express them within daily life and relationships. The fourth dimension, attuned self-care, entails responding to the body's needs in a nurturing way, such as moving the body in a joyful way for physical activity. The fifth dimension, inhabiting the body subjectively rather than objectively, is engaging with the world from a first-person perspective rather a third-person (i.e., observer's) perspective of the body—the focus is on how the body feels rather than looks. The protective processes include physical freedom, mental freedom, and social power. Physical freedom, or immersion in joyful physical activity, may best represent the path by which yoga can support positive embodiment. Yet, yoga can also serve mental freedom by creating a space for mindfulness and body-related agency, and social power via a safe community which to practice.

There is a rather robust literature linking yoga practice with variables that represent these dimensions and processes of positive embodiment. However, systematic, theoretically-grounded tests of specific mechanisms by which yoga supports positive embodiment are lacking. *Mechanisms* can be used to

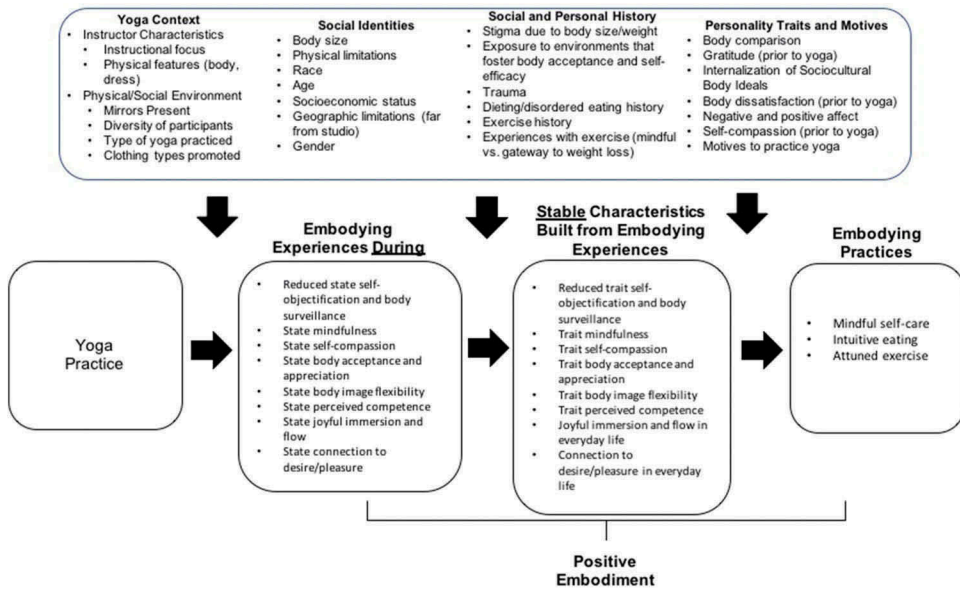


Figure 1. Conceptual model illustrating theoretically-grounded mediators and moderators as mechanisms of the link between yoga practice and positive embodiment. Bulleted variables are examples; they are not an exhaustive list.

understand and explain how changes come about—that is, how yoga may produce a change in positive embodiment. Therefore, in this paper, we present a conceptual model that can be used by researchers to study how, for whom, and under what conditions yoga practice may promote positive embodiment (see [Figure 1](#)).

In this model, we present potential mediators and moderators as mechanisms that help explain the relationship between yoga practice and positive embodiment. Embodying experiences during yoga are thought to build stable embodying experiences that generalize beyond the yoga context. These embodying experiences, in both state and trait form, may serve as *mediators* of the relationship between yoga practice and embodied practices (see [Figure 1](#)). For example, yoga practice may facilitate mindfulness both during and after practice, which then facilitates the embodied practices of eating mindfully and intuitively. Yet, perhaps yoga does not facilitate embodying experiences in everyone in every yoga context. Thus, we also have to consider *moderators*, or variables that can strengthen or weaken the links among yoga practice, its mediators, and embodying practices. Many mediators and moderators in [Figure 1](#) have been identified as potential mechanisms of change within existing theory and research. Our conceptual model brings these mediators and moderators together in a framework that researchers can use to construct testable predictions for how yoga practice may promote positive embodiment. It is our hope that this

conceptual model provides a clear pathway forward for systematically investigating these mechanisms of change within specific theoretical frameworks.

Conceptual model of pathways from yoga to positive embodiment

Next, we review the variables and the pathways within our conceptual model presented in [Figure 1](#). These variables do not represent an exhaustive list; instead, they have been identified within extant theory and research as potentially important mechanisms in the relationship between yoga and embodied practices. Future developments in theory and research will reveal other possible variables, and we therefore encourage readers to use the structure of our conceptual model to consider additional mechanisms (mediators and moderators) of the relationship between yoga practice and embodied practices.

Yoga practice

We define yoga practice as just that—practicing yoga. The word ‘yoga’ is derived from the Sanskrit ‘yuj,’ which means to ‘yoke’ or ‘join’ the mind, body, and spirit (Hewitt, 1977) and to join the internal with the external (Neumark-Sztainer, 2019). In yoga, emphasis is placed on moving, stretching, and balancing through a series of asanas (poses), pranayama (breathwork), meditation (dhyana), and mindfulness (dharana). Asanas can be physically challenging, with the potential for helping the practitioner feel empowered and strong, and they can be gentle, with the potential for helping the practitioner feel relaxed. These asanas, whether challenging or gentle, can facilitate the journey ‘inward’ (i.e., greater connection to oneself) and provide “an avenue for working with the physical body in a gentle, compassionate, and positive manner” (Neumark-Sztainer, 2019, p. 328). Pranayama can provide a foundation for the calming of the mind by observing the breath as it is, changing the breath in tandem with a count, or breathing in what is useful (e.g., gratitude for the body, confidence, strength, and calmness) and breathing out what is not useful (e.g., negativity towards the self, stress). Dhyana and dharana help practitioners meet their present-moment experience with openness, acceptance, and nonjudgment (Desikachar, 1995). In all of these ways, yoga aids in quieting the fluctuations of the mind (Patañjali & Feuerstein, 1989) and facilitates self-discovery through deep listening during practice (Neumark-Sztainer, 2019). Through regular yoga practice, this deep listening can be transferred “off the mat,” to daily life, potentially providing a heightened sense of body connection and body trust.

Embodied experiences and stable embodied characteristics

Yoga practice may enhance embodying experiences or states that, over time, build stable attitudes and approaches representative of positive embodiment. In our conceptual model, we separate embodied experiences into “embodied experiences during yoga” and “stable characteristics built from embodied experiences,” with the proposition that state-based embodied experiences, when occurring regularly, will enhance trait levels of embodied characteristics (Garland et al., 2010). Research upholds this proposition. As an example, individuals who underwent an 8-week meditation intervention which activated regular state levels of mindfulness experienced, on average, higher trait mindfulness post-intervention (Kiken et al., 2015). The authors concluded that increasing state mindfulness over repeated meditation sessions may contribute to a more mindful disposition. In another study, women who listened to guided self-compassion meditation podcasts once a day for 3 weeks increased their trait levels of self-compassion over the course of the intervention, which was maintained at a 3-month follow-up (Albertson et al., 2015). Below, we review theory and research for both state and trait embodiment constructs together, but with an understanding that state embodied experiences will likely, over time, increase trait levels of embodied characteristics.

Reduced self-objectification and body surveillance

One of the most fundamental ways that yoga practice may support positive embodiment is by providing a context that directs individuals to inhabit their body as a subject rather than as an object. This subjective way of inhabiting the body means that one focuses more on internal bodily experiences rather than their external appearance (Piran, 2002, 2016, 2017). Impett et al. (2006) suggest that yoga may direct nonjudgmental attention to what the body does and how it feels, thereby reducing an emphasis on the external appearance of one’s body. Yoga practitioners are also often encouraged to synchronize their breath with the physical movements of the practice, thereby increasing an internal awareness of bodily sensations—this internal focus is in opposition to the external focus on appearance that characterizes self-objectification.

Self-objectification refers to inhabiting the body as an object—that is, valuing one’s body more for its aesthetic qualities rather than internal experiences such as sensation and function (Roberts et al., 2018). According to objectification theory, self-objectification is a consequence of the cultural emphasis placed on appearance, which prompts habitual body surveillance (i.e., closely monitoring one’s appearance), which can then contribute to other disembodied experiences such as body shame, appearance anxiety, disordered eating, and depression (Fredrickson & Roberts,

1997). Research upholds the links from self-objectification and body surveillance to higher body shame, appearance anxiety, disordered eating, and negative affect (for a review, see Roberts et al., 2018) and lower body appreciation (Andrew et al., 2016; Avalos & Tylka, 2006; Cox et al., 2017), and focusing on internal body experiences is related to higher body appreciation (Oswald et al., 2017). Therefore, embodying physical activities such as yoga that encourage participants to be aware of and respond to the way their bodies feel rather than appear and to immerse themselves in the act of moving may support positive embodiment by reducing how often participants are mentally scanning or observing the appearance of their bodies (Daubenmier, 2005; Impett et al., 2006).

Evidence supports the association between yoga participation and lower self-objectification or body surveillance. For example, Mahlo and Tiggemann (2016) demonstrated significantly lower body surveillance in female yoga participants compared to a sample of university students. Furthermore, body surveillance partially explained the relationship between yoga participation and body appreciation. In longitudinal studies of yoga participants, significant decreases in body surveillance have been observed over eight, 12, and 16 weeks of yoga participation (Cox, Ullrich-French, Cole et al., 2016; Cox et al., 2017, 2019). These findings provide strong support for the inverse relationship between yoga participation and body surveillance; however, more rigorous experimental research designs that include a comparison group are needed to provide more robust evidence for the role yoga plays in reducing body surveillance as well as identifying characteristics of the yoga context that make this more likely to occur.

Mindfulness

The reduction in body surveillance over the course of sustained yoga participation may be due to the emphasis on paying attention to the physical sensations in the body while moving through the asanas or poses. Teachers often (but not always) encourage students to turn inward to tune into these physical sensations in order to make decisions that best serve the self in that moment. Daubenmier (2005) demonstrated some initial evidence for higher body awareness and responsiveness in yoga practitioners compared to non-practitioners. However, researchers have not delved deeply into how this may occur in yoga classes. Recent research on mindfulness may be one avenue through which we can begin understanding how specific experiences of yoga support lower body surveillance, more general improvement in self-care, and other embodying experiences and practices.

The body reflects a particular target of mindfulness. Whereas mindfulness more generally refers to open, nonjudgmental, and intentional focus on (or attention to) the present moment (Bishop et al., 2004; Tanay & Bernstein, 2013), mindfulness of the body applies this focus to bodily

sensations and experiences (Cox, Ullrich-French, French et al., 2016; Tanay & Bernstein, 2013). Empirical evidence suggests that when one is more mindful of their bodily or physical experiences during yoga (i.e., state mindfulness), they experience greater declines in trait body surveillance and increases in physical self-worth over an 8-week period (Cox, Ullrich-French, French et al., 2016). State mindfulness of the body during yoga participation has been associated with lower state body surveillance in adolescents and adults (Cox, Ullrich-French, French et al., 2016; Cox et al., 2017). Finally, growth in trait mindfulness has been linked to growth in body appreciation over 16 weeks of yoga participation in a university sample (Cox & McMahon, 2019). However, the relationship between mindfulness during yoga practice and other embodying practices, such as self-care, has not been investigated and is a potential avenue for future research. Finally, the measure of state mindfulness that has been used focuses on awareness of and attention to physical sensations but not necessarily the quality of that attention (e.g., open, accepting, nonreactive, nonjudgmental). Developing measures that capture these other characteristics of mindfulness may more fully elucidate how it supports positive embodiment during the practice of yoga.

Self-compassion

Self-compassion is a multi-faceted construct that includes mindfulness, but also represents a more comprehensive response to pain, discomfort, or suffering that one experiences (Neff, 2003). The definition of self-compassion is grounded in how compassion more generally has been conceptualized and represents a fundamental attribute to be cultivated through yoga (Crews et al., 2016). There are three core components to self-compassion: (a) mindfulness (defined here as being able to hold painful or uncomfortable experiences such as thoughts and emotion with balance and clarity rather than ruminating or ignoring uncomfortable experiences altogether), (b) self-kindness (expressing care, comfort, and acceptance to the self rather than being self-critical), and (c) common humanity (having a greater sense that making mistakes, failure, and suffering are shared experiences among all human beings rather than feeling alone and isolated in pain and discomfort).

Self-compassion has been investigated as a potential mechanism explaining the relationships between yoga participation and stress (Gard et al., 2012; Riley & Park, 2015), body appreciation, and lower body surveillance (Cox et al., 2019). This work has demonstrated increases in self-compassion associated with yoga participation (Braun et al., 2012; Cox et al., 2019; Gard et al., 2012). In addition, empirical evidence links self-compassion to body image variables that are reflective of positive embodiment (see Braun et al., 2016), such as higher body appreciation, higher functionality appreciation, and lower body surveillance (Alleva et al., 2017; Cox et al., 2017;

Wasylikiw et al., 2012). Interventions have shown that extending more kindness to the self and less self-judgment helps women accept and appreciate their bodies (Albertson et al., 2015). Experiencing common humanity may also help women realize that almost no one fits cultural appearance ideals, and thus broaden their definition of beauty to be inclusive—that is, having more appreciation for varied expressions of internal and external beauty (Tylka & Iannantuono, 2016). Growth in self-compassion over the course of semester-long yoga classes in a university setting was found to associate with increases in body appreciation and declines in body surveillance (Cox et al., 2019). Collectively, these studies suggest that the extent to which self-compassion is promoted or facilitated within the context of yoga may be one pathway by which yoga supports positive embodiment.

Body appreciation

Body appreciation includes holding favorable opinions of the body regardless of actual physical appearance, accepting the body despite perceived imperfections, respecting the body by attending to its needs and engaging in healthy behaviors, and protecting the body by rejecting unrealistic societal appearance ideals (Avalos et al., 2005; Tylka & Wood-Barcalow, 2015). Thus, body appreciation encapsulates many characteristics illustrative of gratitude, acceptance, self-care, protection, love, and respect, which are offered unconditionally to the body. That is, the body does not need to look a certain way, function well, and have superior health to be accepted, loved, respected, treated well, and appreciated (Alleva et al., 2017; Wood-Barcalow et al., 2010). Body appreciation is distinct from body satisfaction: a person may not be satisfied with all, or even many, aspects of how their body looks, how their body functions, and their body's health, but still appreciate what their body provides for them and participate in practices to take care of it (Tylka & Wood-Barcalow, 2015).

Research has linked yoga practice to body appreciation. Mahlo and Tiggemann (2016) found that Iyengar and Bikram female practitioners reported higher levels of body appreciation than women who did not practice yoga. Moreover, they found that yoga participation was uniquely associated with body appreciation, even when body surveillance was considered as a mediator of this relationship. In a study about the perceived positive and negative effects of practicing yoga, Park et al. (2016) revealed that approximately 85% of 542 students who practiced yoga indicated that yoga had a positive impact on their level of body appreciation.

More recent studies have considered the changes in body appreciation that occur as a result of yoga practice. Cox and McMahan (2019) explored yoga practitioners' individual trajectories of change in trait body appreciation over a 16-week yoga course. They found average linear increases in body appreciation over the course, although not everyone experienced change at the same rate. It

should be noted, though, that Cox et al. (2017) did not find an increase in body appreciation among high school students taking a yoga class over 12 weeks (in lieu of their traditional physical education course). Halliwell et al. (2019) conducted a 4-week yoga-based body image intervention which incorporated themes specially tailored to focus on positive body image. For example, themes included connection to the body, gratitude and appreciation of body function, body acceptance, and valuing the body by engendering respect and self-care. Participants in the yoga intervention reported increased body appreciation and body connectedness at post-test and at a 4-week follow-up.

Body image flexibility

Based in the psychological flexibility and acceptance and commitment therapy literature (Hayes et al., 2012), body image flexibility represents the ability to embrace rather than avoid, escape, or otherwise alter the content or form of distressing body-related thoughts and feelings in the present moment, while engaging in action toward chosen values even in times of great discomfort (Rogers et al., 2018; Sandoz et al., 2019). For instance, if a yoga practitioner high in body image flexibility notices that they have the largest body in a studio class, they are able to accept their discomfort without letting their thoughts and body-related distress overwhelm them as they continue their practice. Similar to psychological flexibility, body image flexibility is enhanced via six interdependent skills: present moment awareness (noticing the body's experiences), experiential acceptance (being open to the body's experiences even when uncomfortable), cognitive defusion (observing thoughts related to the body's experiences without them dominating attention or behavior), self-as-context (experiencing the self as more than the present body's experiences), valuing (choosing a purpose to guide action even when the body's experiences are painful), and committed action (engaging in behavior consistent with values, even when it results in increased contact with painful body experiences) (Sandoz et al., 2019).

The connection between yoga and body image flexibility has yet to be studied. We propose that yoga practice has the potential to provide a context for building these six skills. It may provide a context for yoga practitioners to begin to notice their body's experiences during yoga (e.g., they may notice their breathing become deeper and more regular, stretching sensations in their muscles). Some physical experiences may be unpleasant (e.g., emotional discomfort is often felt in certain asanas, noticing that an asana cannot be achieved or held). In yoga, the instructor may bring attention to this discomfort, create the space to invite it to surface, and meet it with compassion, which can help practitioners observe their thoughts without these thoughts dominating their practice. The act of practicing yoga, even when these unpleasant emotions arise, could represent committed action. Researchers may want to investigate these connections. Furthermore, given that self-

compassion and mindfulness are emphasized in the six skills, researchers should determine whether they mediate the association between yoga practice and body image flexibility.

Perceptions of competence

Yoga may also facilitate perceptions of competence, such as self-efficacy and agency, that are characteristic of positive embodiment (Piran, 2016). Perceptions of competence can be conceptualized in more than one way. Achievement goal perspective theory (Nicholls, 1989; Seifriz et al., 1992) outlines two primary orientations or perspectives that individuals use to evaluate their own competence. The first is an ego goal orientation in which individuals compare their own abilities to others or a normative standard to evaluate their own competence. The second is a task goal orientation in which individuals use themselves as their own reference point and focus on skill mastery or improvement as indicators of competence. The degree to which yoga supports a sense of competence may depend in part on which perspective is emphasized by the yoga instructor (i.e., an ego-involving or task-involving climate). In physical activity settings, a task-involving climate is associated with greater enjoyment, effort, and self-confidence (e.g., Hogue et al., 2013).

In a yoga setting, instructors can create a task-involving climate that will support feelings of competence by emphasizing each participant's own unique path in yoga, finding modifications that work for each participant's body, and encouraging participants to listen to internal physical cues that may inform how much effort to put forth. It is common for yoga instructors to encourage participants to turn inward and make decisions that serve the body while still reaching for their edge to find personal challenge (see Neumark-Sztainer & Piran, this issue) and yoga participation has been associated with improvements in physical self-worth (Cox, Ullrich-French, Cole et al., 2016). These gains are exemplified by an interview response from a 29-year old yoga practitioner recovering from an eating disorder who noted how yoga led to, "a sense of competency and efficacy in my body and power and accomplishment" (Dittmann & Freedman, 2009, p. 283). However, creating a task-involving climate is certainly not universal in yoga settings and some participants have stated that practicing yoga actually prompted more social comparison and negative self-talk about their body (Neumark-Sztainer, Watts et al., 2018). Yoga instructors may inadvertently draw students' attention to social comparison or present a particular version of a pose as the one everyone should be striving for, thus creating more of an ego-involving climate. In this way, the approach of the instructor may moderate the impact of yoga practice on embodiment experiences and outcomes. Intentionally creating a task-involving climate in which one's personal path and improvement is emphasized and there

is no greater value associated with certain versions of poses, may best support students' feelings of competence and agency in the yoga setting.

Even though many girls are immersed in physical activities in which they feel competent in their bodies, their physical agency and self-efficacy tend to get disrupted around puberty (Piran, 2016, 2017, 2019). The confluence of the maturing female body, pressure to conform one's external appearance to societal ideals, and increased sexualization and objectification of the female form contribute to declines in feelings of competence and increases in self-objectification (Piran, 2016). Yoga participation in adulthood may help women reclaim that sense of agency and develop a sense of competence for what their body can do and how they can progress in the physical postures. Although evidence is emerging on the relationship between yoga participation and a sense of physical competence, its ties to having a voice or agency more generally is lacking and represents an area for future research.

Joyful immersion and flow

The feelings of competence that can be cultivated in the context of yoga are also integral to the experience of being joyfully immersed in the experience of physical activity. The experience of being fully immersed in the act of moving one's body is reflected both in flow state and intrinsic motivation. The experience of flow is characterized by total absorption in a task or activity, high levels of concentration and functioning, and a sense of effortless control (Csikszentmihalyi et al., 2014). There is generally a complete loss of self-consciousness as the individual's awareness merges with the action and the participant is often not aware of the passage of time. For flow to occur, one's sense of competence must align with the degree of perceived challenge that one is encountering, goals must be clear, and feedback needs to be immediate and unambiguous. The degree to which participants experience a balance between their yoga abilities and the degree of challenge presented to them in class, the more likely they will be to experience flow. Yoga instructors can help students achieve flow through the creation of a task-involving climate that will support the development of competence as well as offering options that allow students to select an optimal level of challenge, and appropriate feedback that helps them meet the challenge. The practice of mindfulness throughout class may also improve their ability to concentrate and be in the present moment.

When individuals experience joyful immersion in physical activities, their behavior is likely being regulated from a place of intrinsic motivation. Intrinsic motivation represents the most adaptive and autonomous or volitional form of motivation as conceptualized within self-determination theory (Ryan & Deci, 2017). Individuals are intrinsically motivated when they participate in physical activity for the inherent rewards of the activity such as pleasure, enjoyment, satisfaction, or sense of accomplishment. This most internalized and integrated

form of motivation is the strongest motivational predictor of sustained physical activity behavior (Teixeira et al., 2012) and supports feelings of enjoyment or pleasure (Hagger & Protogerou, 2018). Preliminary evidence suggests that more internal reasons (e.g., health) for exercise increase during eight weeks of yoga participation (Cox, Ullrich-French, French et al., 2016), and gains in body appreciation correspond with increases in intrinsic motivation over the course of 16 weeks of yoga participation (Cox et al., 2019). A recent study has found that gains in perceived competence and autonomy during yoga participation coincided with increases in more autonomous physical activity motivation (Cox et al., under review), thereby supporting strategies used by yoga instructors to facilitate the development of competence, feelings of autonomy, and intrinsic motivation.

Connection to desire and pleasure

Yoga practice also provides the opportunity to be aware of and connect with the body's sensations by potentially providing experiences of gratitude and positive affect as well as lowering negative affect. Gratitude is a habitual orientation toward noticing and being appreciative of the positive aspects of life (Wood et al., 2010), and could be beneficial to embodiment via amplifying a healthy and affirming connection to the body (Homan & Tylka, 2018; Tiggemann & Hage, 2019). Positive affect (e.g., feelings such as joy, interest, contentment, inspiration, and excitement) inspire approach behavior; that is, they prompt individuals to engage with their environments and partake in valued activities (Fredrickson, 2001). On the other hand, negative affect (e.g., feelings of distress, anxiety, fear, nervousness, worry, and sadness) tends to restrict engagement and concentration in non-threatening activities.

Gratitude predicts many aspects of well-being, such as life satisfaction, optimism, empathy, and hope (Emmons & McCullough, 2003; McCullough et al., 2002). The amplification model of gratitude suggests that gratitude enhances well-being by identifying the good things in life and magnifying them, bringing them into clear and sharp focus (Watkins, 2014). People are then motivated to think and behave in ways that will enhance these good things. Gratitude is linked to higher body appreciation, in part because it lowers social comparison and appearance and approval-contingent self-worth (Homan & Tylka, 2018). While gratitude is conceptualized as a trait (Wood et al., 2010), it can also be enhanced via practice (e.g., keeping daily gratitude lists (Emmons & McCullough, 2003). Given that yoga instructors may emphasize gratitude during practice (e.g., messages of being grateful for what is going well in life, messages of gratitude expressed toward the body), regular yoga practice containing these messages may support students' trait levels of gratitude. Indeed, yoga practice has been found to be related to trait levels of gratitude (Ivtzan & Papantoniou, 2014). Future research exploring state and trait gratitude shifts as a function of yoga interventions is needed.

Studies have provided evidence for the role of both short- and long-term yoga interventions in enhancing positive affect (Bershinsky et al., 2014; Halliwell

et al., 2019; Impett et al., 2006; Kiecolt-Glaser et al., 2010) and reducing negative affect (Bershinsky et al., 2014; Felver et al., 2015; Impett et al., 2006; West et al., 2004). Yoga has also had beneficial effects on affect among cancer survivors. Positive affect (i.e., energy) increased and negative affect (i.e., tiredness, tension) decreased for a group of breast cancer survivors over a 7-week yoga intervention, and these effects were maintained or enhanced at the 6-month follow up (Mackenzie et al., 2013). In a sample of Stage II and III breast cancer survivors, those who attended at least three yoga sessions a week for six weeks experienced increased positive affect and decreased negative affect compared to those who were in a supportive therapy condition (Vadiraja et al., 2009).

Embodying practices

The abovementioned embodying states and stable characteristics encouraged by yoga practice may, in turn, facilitate embodied practices. Embodied practices consist of behaviors that involve listening to the body and trusting its signals. Three embodied practices have received research attention relative to yoga: mindful self-care, intuitive eating, and attuned exercise.

Mindful self-care

Mindful self-care is an iterative, embodied process that involves being aware of what the self and body need given the demands of the current situation and engaging in self-care practices to address these internal needs and external demands in a way that serves well-being (Cook-Cottone, 2015a, 2019; Cook-Cottone & Guyker, 2018). It includes physical care (e.g., nutrition, hydration), self-compassion and purpose (e.g., supportive and comforting self-talk, engaging in meaningful activities), supportive relationships (e.g., respect of boundaries), supportive structure (e.g., comfortable and pleasing living environment, manageable schedule), mindful awareness (e.g., calm awareness of thoughts and feelings), and mindful relaxation (e.g., intentional behaviors to relax) (Cook-Cottone & Guyker, 2018). For example, if a college student is studying for an exam, mindful self-care would entail studying *and* nourishing their body, receiving adequate sleep the days leading up to the exam, hearing encouraging messages from themselves and others, and engaging in practices that help them relax.

By providing a context to regularly experience embodied states and build stable embodied characteristics, yoga may help individuals remain aware of and connected to what their body needs and facilitate their engagement in embodied practices (Cook-Cottone, 2015a, 2019; Cook-Cottone & Guyker, 2018). Given the relevance of mindful self-care to well-being and the advancement of the Mindful Self-Care Scale (Cook-Cottone & Guyker, 2018), it is important that researchers explore whether embodying states

and stable characteristics that are developed through yoga do indeed predict mindful self-care practices over time.

Intuitive eating

Intuitive eating involves being connected to, trusting in, and (mostly) eating according to the body's internal hunger and satiety cues (Tylka & Kroon Van Diest, 2013; Resch & Tylka, 2019). Further, it entails eating for physical rather than emotional reasons and choosing foods that help the body function well while eating in a flexible and non-restrictive manner. Much research provides evidence for intuitive eating's connection to psychological well-being and physical health among various age, gender, and cultural groups (for a review, see Resch & Tylka, 2019).

The acceptance model of intuitive eating (Augustus-Horvath & Tylka, 2011; Avalos & Tylka, 2006) suggests that when individuals feel that their bodies are accepted and they are in a body-positive environment, they will appreciate their bodies more and engage in body surveillance less, which then facilitates intuitive eating (Avalos & Tylka, 2006). Research provides evidence for the acceptance model of intuitive eating with adolescent, college, and community samples. For example, in a sample of adolescent girls, Andrew et al. (2016) found that body acceptance by others predicted increased body appreciation, and body appreciation predicted increased intuitive eating, over a 1-year period. Self-compassion (Kelly & Stephen, 2016) and body image flexibility (Schoenefeld & Webb, 2013) have also been shown to contribute to intuitive eating among college women.

The acceptance model of intuitive eating may be applied to the yoga context. The yoga environment may be a body accepting environment for yoga practitioners if, for example, individuals of various body shapes, sizes, and abilities are represented and feel welcomed and yoga instructors integrate body positive themes within the practice (Cook-Cottone & Douglass, 2017; Halliwell et al., 2019). Perceptions of body acceptance may then encourage yoga practitioners' own body appreciation and lower their body surveillance by increasing their body awareness and body responsiveness, which then may foster their intuitive eating. Indeed, in a sample of yoga practitioners, body awareness and body responsiveness were linked to higher intuitive eating (Dittmann & Freedman, 2009).

Attuned exercise

Attuned exercise involves moving the body in various ways that cultivate joy, mindful attention, self-compassion, self-acceptance, body connection, and body responsiveness (Calogero et al., 2019). It is based on a foundation of physical and psychological *safety* (i.e., movement that does not harm the body) on which people can focus on the *process* of becoming more aware,

connected, and responsive to their body and come to experience *joy* through physical activity.

Calogero and Pedrotty (2004) developed and facilitated an experiential, psychoeducational exercise program for women with eating disorders during residential treatment with the purpose of replacing dysfunctional exercise with attuned exercise. Compared to those who had traditional care (i.e., no structured exercise program), those in the attuned exercise group had significant reductions in dysfunctional exercise attitudes and behaviors, and the program did not adversely impact weight restoration. Furthermore, in community samples of women and men, attuned exercise attitudes and behaviors were associated with higher body appreciation, self-compassion, mindfulness, body responsiveness, intuitive eating, and lower body surveillance (Calogero & Mensinger, 2015; Reel et al., 2016). Directing research attention to determine additional embodied experiences and stable embodied characteristics that may be cultivated during yoga and promote attuned exercise, and the factors that moderate the strength of these associations, is necessary.

Moderators

Although there is ample evidence of a positive association between yoga participation and positive embodiment (Halliwell et al., 2019; Mahlo & Tiggemann, 2016), in contemporary yoga practices, there are a number of factors that could either support or undermine this relationship. Results of a recent qualitative study with young adults revealed that the majority of participants felt yoga had a positive impact on their body image; however, 25% of participants responded that yoga had a negative impact (Neumark-Sztainer, Watts et al., 2018). Therefore, certain variables may moderate the impact of yoga practice on positive embodiment. Moderators have largely been overlooked in research exploring the impact of yoga on positive embodiment. Therefore, we do not know whether the moderators mentioned below are empirically supported. Our hope is that researchers investigate these, and other, possibilities.

Contextual variables

Variables linked to the yoga context and type of yoga practiced may moderate the connection between yoga practice and positive embodiment. Contextual variables can include characteristics of the yoga studio or environment (e.g., presence of mirrors, practicing yoga in a gym setting), the content and tone of the yoga instruction, the type of yoga practiced (e.g., Hatha, Bikram), other class participants (e.g., body diversity represented versus predominantly thin/fit bodies, loose comfortable clothing versus form-fitting clothing), and instructor characteristics (e.g., physical appearance, dress, provision of assists and touch). For example, an instructor who focuses on appearance in class (e.g., by including statements such as “planks

help define your abs”) may be less effective in promoting positive embodiment than an instructor who emphasizes tuning in to physical sensations during yoga (e.g., “notice your spine lengthen as you lift your hips”).

Cook-Cottone and Douglass (2017) emphasized the importance of creating yoga contexts that foster the acceptance and inclusion of individuals with diverse bodies in order to support positive embodiment. Neumark-Sztainer et al. (2018) found evidence for this assertion in their qualitative study. Specifically, they interviewed individuals who practiced yoga who noted that the presence of diverse body shapes supported their positive body image. Furthermore, participants were more likely to be critical of themselves when they perceived others in the class to be more fit, thinner, or wearing form-fitting clothes. The presence of mirrors made comparing oneself to others more likely. Consequently, both Cook-Cottone and Douglass (2017) and Neumark-Sztainer et al. (2018) provide recommendations: Yoga instructors can address some of these factors that can potentially undermine positive embodiment by eliminating mirrors, avoiding diet or appearance-related talk, and creating a climate of personal improvement and growth (see task-involving climate) by encouraging participants to look inward and place emphasis on their own individual path. In both articles, the authors argue that it is important for yoga instructors to foster a diverse, inclusive, and welcoming yoga environment by using language that is supportive and inclusive of all regardless of experience, skill, or the shape or size of one’s body.

Indeed, recent intervention studies have provided preliminary evidence that it is effective to emphasize particular aspects of positive embodiment in the way that the classes are taught. For example, emphasizing self-compassion is a central focus in Kripalu yoga, and multiple studies have demonstrated significant gains in self-compassion after sustained yoga practice in this tradition (Braun et al., 2012; Gard et al., 2012). As another illustration, Halliwell et al. (2019) designed a 4-week yoga intervention that incorporated body positive themes, and participants exhibited significant gains in body appreciation and body connection at post-test and a 4-week follow-up. Additionally, Delaney and Anthis (2010) revealed that yoga classes with greater emphasis on the “mind” aspects of yoga, such as meditation, breathing, mindfulness, and chanting, promoted greater body awareness and fewer body shape concerns than yoga classes with greater emphasis on the “body,” such as postures and fitness. They discussed that further attention should be directed to how the benefits of yoga differ across the various forms of yoga, and we could apply this recommendation specifically to positive embodiment.

Investigating contextual factors as moderators of the relationship between yoga practice and positive embodiment is paramount, given that, over a 40-year period, yoga images have become less diverse in age, race, and body size, and more consistent with societal thin and fit appearance ideals, as well as more adorned with objectifying attire with high body visibility (Vinoski et al.,

2017; Webb et al., 2017). Studios may reflect these images in their boutiques, creating an environment that potentially disrupts positive embodiment. Overall, studies are needed that attempt to better isolate and test the impact of various environmental, social, and instructional variables within the yoga context on positive embodiment variables.

Individual variables

In addition to contextual variables, yoga practitioners' *social identities*, *social and personal history*, and *personality traits and motives* could influence (i.e., moderate) the impact of yoga practice on positive embodiment. Social identities such as body size, age, physical limitations, race, social class, and/or gender could impact how individuals interpret or react to specific instruction and certain asanas in a yoga class. For example, a yoga practitioner with arthritis of the toe, ankle, and/or knee joints may find many asanas challenging and painful instead of embodying, especially if there are no modifications offered by the instructor.

Social and personal history factors such as experiencing weight-stigma or disordered eating may impact how comfortable and accepted individuals feel in a yoga class. Having a history of trauma may impact whether impromptu instructor assists, touch, and focus on form are positively embodying versus violating (Emerson, 2015). Even if state embodying experiences such as state mindfulness, state self-compassion, and state body appreciation are activated in the yoga context, living in a chronically stressful environment may prevent these state embodying experiences from forming stable embodying characteristics (e.g., trait mindfulness, trait self-compassion, trait body appreciation), as well as interfere with embodying self-care practices. A history of an eating disorder and/or dysfunctional exercise, whereby internal bodily cues have been suppressed, may make it more difficult to experience embodied states during yoga, form embodied stable characteristics, and engage in embodied practices such as intuitive eating and attuned exercise.

Finally, yoga practitioners' personality traits and motives, such as their general tendency to engage in body comparison or personal goals for weight loss, will shape their experience in the yoga context. For instance, even within a context where practitioners are invited to go inward, focusing on one's goal to lose weight (i.e., changing the external self) and engaging in body comparison with other practitioners may prevent them from doing so, and in this way lessen yoga's positive impact on positive embodiment. There are many opportunities for researchers to 'dive in' and investigate the roles that personality traits and motives play in the yoga-embodiment connection.

Additional research directions and conclusions

In this article, we offer a conceptual model that brings together various theoretical perspectives to illustrate mechanisms that may help explain and determine the strength of the yoga-positive embodiment relationship. Grounding our model in these theoretical perspectives is essential in order to move this research forward in a systematic manner that builds knowledge incrementally, while simultaneously informing the development of yoga interventions and contexts aimed at supporting positive embodiment.

In addition to the suggestions for future research offered in the preceding sections, the use of innovative research methods and more rigorous research designs are needed. For example, using our conceptual model as a framework to determine variable selection, ecological momentary assessment or a daily diary approach could be used to capture how participants feel throughout the days that they participate in yoga compared to when they do not (e.g., Kishida et al., 2019). State assessments could be used to capture what participants are experiencing during yoga classes and how that may change over the course of sustained yoga participation. Indeed, a key shortcoming of extant research is that most studies have tested for change or differences in trait embodying characteristics while overlooking the state embodying experiences occurring in or shortly after the yoga classes. Furthermore, experimental research designs with random assignment and appropriate control groups are needed to help identify key mechanisms of change (e.g., instruction, environment) that may support or undermine positive embodiment. For example, elements such as gratitude, body appreciation, mindfulness, and self-compassion could be manipulated through the instruction that the yoga teacher provides, allowing for tests of how different instruction impacts positive embodiment. It is our hope that our model provides a foundation from which to continue to explore this relationship.

Finally, there is a need for testing moderated mediation models that include multiple mediators and moderators of the relationship between yoga practice and positive embodiment, and our conceptual model may be useful for devising such testable models. One example of a mediation model is by Cox et al. (2019), who found evidence for the mediating roles of body appreciation and body surveillance in the relationship between self-compassion and intrinsic motivation for general physical activity during 16 weeks of yoga participation. In this example, an embodiment trait (self-compassion) predicted other embodiment traits (body appreciation and body surveillance) which then predicted an embodied practice (engaging in physical activity for intrinsic reasons), although no moderators were examined. State embodying experiences could also be integrated in moderated mediation models, and state measures of body appreciation (Homan, 2016), positive and negative affect (Watson & Clark, 1994), mindfulness (Cox, Ullrich-French, French et al., 2016), self-compassion (Arch et al., 2014), and body surveillance (Breines et al., 2008) do exist for the ease of assessing these variables.

In conclusion, while yoga practice seems to be beneficial for most practitioners' embodiment, it is not beneficial for everyone (Neumark-Sztainer, Watts et al., 2018). Therefore, our research should be directed to help answer the following question, "Under what conditions can positive embodiment be fostered in yoga practice, and do these conditions depend on the personality traits, social experiences, histories, and identities of yoga practitioners?" Our conceptual model can be used as a framework for researchers to develop testable models to explore this question, which speaks to the connection between yoga practice and positive embodiment: its state experiences, its stable characteristics, and its embodied practices.

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