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REVIEW

Applying theoretical models of positive emotion to improve pediatric asthma: A positive psychology approach

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Abstract

Positive emotion, encompassing feelings such as joy and happiness, has been shown to predict a multitude of health outcomes. However, the role of positive emotion in pediatric asthma is not understood. No work to date has examined how positive emotion may offer benefits to children and adolescents with asthma. Based on theory and models of positive emotion and health, we hypothesize that positive emotion may improve asthma outcomes through mediators such as health behaviors and health-relevant physiological functioning. Moreover, boosting positive emotion during times of stress may be particularly relevant in mitigating asthma symptoms. In the present commentary, we elaborate on the hypothesized mechanisms behind such associations grounded within positive emotion theoretical frameworks. Additionally, we summarize the methodologically rigorous work of positive emotion interventions in other clinical settings to propose that positive emotion could be a useful tool in the management of pediatric asthma.

KEYWORDS

main effect model of positive emotion, positive emotion, positive psychology, stress buffering model

1 | INTRODUCTION

Asthma can be life-threatening and is associated with a multitude of adverse outcomes, including ongoing symptoms, emergency department visits and hospitalizations, sleep disruption, school absences, and restriction of daily physical activity.¹ Additionally, there are numerous other costs associated with this illness, including the financial burden and time (e.g., cleaning the house/environment, medication administration, health care visits), as well as the stress experienced by parental caregivers caused by managing their child's disease.² Although guideline-recommended medical care³ has significantly improved the treatment of asthma in children, asthma remains a considerable health concern in this age group.

The underlying etiology of asthma and the various mediators and moderators of this disease have been studied for decades,^{4–8} and there is wide agreement that multiple psychosocial factors (i.e.,

psychological and social variables at the individual [e.g., health literacy, depression, stress] and social [e.g., family discord, poverty] levels) impact asthma symptoms.⁷ For example, negative emotions in the family environment, as well as child anxiety and depression, have been associated with increases in the severity of pediatric asthma outcomes.^{9,10} However, more work can be done to test the psychosocial factors that improve outcomes and the management of asthma in children.

The relatively new discipline of positive psychology has taken an approach in many disease contexts by which variables that promote health and wellness are the focus.¹¹ This view takes the perspective that while it is beneficial to reduce factors that hamper health (e.g., stress, depression), it is also important to promote psychosocial factors and experiences that help individuals flourish and grow. Understanding positive psychosocial factors (e.g., positive emotions, social support, self-efficacy) provides researchers and practitioners

with novel methods for improving the lives of children suffering from asthma. In this commentary, we review the evidence for why positive emotion may be one psychosocial factor within the framework of positive psychology that can be leveraged to promote better health in children with asthma as the role of positive emotion in asthma is not understood. To do this, we start with a definition of positive emotion and then elaborate on the mechanisms behind possible associations between positive emotion and asthma outcomes. Next, we provide a detailed discussion of positive emotion interventions in other clinical settings and propose that positive emotion interventions may be a particularly useful tool for the management of asthma for children with difficult-to-treat asthma. Finally, we conclude with a summary of future research that is needed.

2 | POSITIVE EMOTION

Positive emotion encompasses feelings such as joy, happiness, calm, excitement, and other emotions that are usually deemed pleasurable.¹² This is in contrast to negative emotion that is represented by unpleasant feelings such as anger, sadness, and anxiety. In research, positive emotion (and emotion in general) is most commonly measured through self-report in which participants are asked to indicate to what extent they have experienced different positive emotions.

There is a large literature on positive emotion in the context of health.^{13–17} For example, positive emotion has been shown to improve outcomes in health contexts such as cardiovascular disease,¹⁸ cancer,¹⁹ HIV,^{20–23} and stroke.²⁴ In the adult asthma literature, positive emotion has been tied to increases in forced expiratory volume in the first second (FEV₁)²⁵ as well as fewer asthma symptoms²⁶ and a reduced likelihood of respiratory tract infections.²⁷ However, to

date, no work has taken a positive psychology approach by focusing on how positive emotion in children may relate to lung function and asthma symptoms.

3 | MECHANISMS OF POSITIVE EMOTION AND HEALTH

To capitalize on positive emotion interventions, it is helpful to understand the mechanisms by which positive emotion impacts health and could influence asthma health outcomes more specifically. Drawing upon models in the field of positive emotion can provide us with such mechanisms. Specifically, the Main Effect Model of Positive Emotion^{13,14,28} demonstrates strong support that positive emotion has health-enhancing effects through its influence on protective health behaviors (e.g., sleep, routine medication use, adherence to self-management behaviors) and health-relevant physiological responses (e.g., better immune functioning, lower stress hormone levels, reduced inflammation, lower blood pressure, lower sympathetic nervous system activity throughout the day). For example, previous literature has shown that higher positive emotion is associated with better health behaviors^{28,29} and health-relevant physiological functioning.³⁰ In the context of asthma, health behaviors (e.g., medication adherence,³¹ peak flow meter use,³² sleep,³³ diet,³⁴ exercise³⁵) and physiological functioning (e.g., hypothalamic-pituitary-adrenal [HPA] axis activity, sympathetic nervous system [SNS] activity)⁵ are associated with asthma health (e.g., symptoms, airway inflammation, and reactivity). Therefore, we predict that in pediatric populations with asthma, positive emotion may potentially improve asthma health through the pathways of health behaviors and physiological functioning (Figure 1 paths a and b).

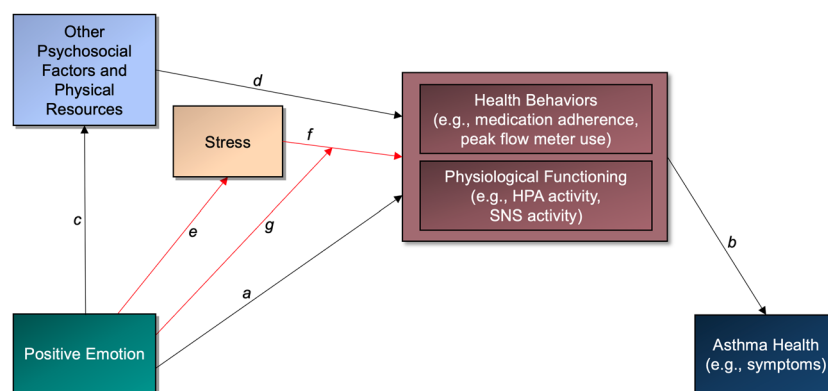


FIGURE 1 “Main Effect Model of Positive Emotion and Health” and “Stress Buffering Model of Positive Emotion” applied to asthma. Demonstration of how health behaviors and physiological functioning could mediate (paths a and b) the association between positive emotion and asthma health. Also depicted is how other psychosocial factors and physical resources could mediate the association between positive emotion and health behaviors/physiological functioning (paths c and d) relevant for asthma health. Stress is highlighted as a psychosocial factor that may mediate the association between positive emotion and health behaviors/physiological functioning relevant for asthma (paths e and f). Further, positive emotion may moderate the impact of stress on health behaviors/physiological functioning (paths f and g). Lines describe predicted associations. An absence of a line does not necessarily indicate that an association would not be present. Rather, lines are drawn to emphasize the primary focus of the model. Similarly, associations may be bidirectional but are shown here in only one direction (with arrowheads) for the purposes of the model [Color figure can be viewed at wileyonlinelibrary.com]

TABLE 1 Summary of adolescent interventions to increase positive emotion in adolescents with type 1 diabetes

Article	Intervention description	Format	Participants	Summary of findings
Jaser et al. ^{46,47}	"Check It!" intervention to promote positive emotion (e.g., exercises in gratitude and self-affirmations, small gifts, tailored messages from parents of positive affirmations)	One in-person session followed by bi-weekly phone calls to remind participants to use the exercises (for 8 weeks)	Adolescents with type 1 diabetes between the ages of 13–17 years	Pilot study showed that participation, satisfaction, and retention were high; No significant effects on blood glucose monitoring, quality of life, or glycemic control
Jaser et al. ⁴⁸	"Check It!" intervention to promote positive emotion (e.g., exercises in gratitude and self-affirmations, small gifts, tailored messages from parents of positive affirmations)	One in-person session followed by weekly text messages/phone calls to remind participants to use the exercises (for 8 weeks)	Adolescents with type 1 diabetes between the ages of 13 to 17 years and who were not meeting current treatment goals (but also not extremely poor in glycemic control)	Significant increase in quality of life and significant decrease on disengagement coping; no significant differences on blood glucose monitoring, glycemic control, or reported adherence
Jaser et al. ⁴⁹	"THRIVE!" intervention includes diabetes education plus text message-based positive emotion intervention (e.g., exercises in gratitude and self-affirmations, small gifts, tailored messages from parents of positive affirmations)	One in-person session followed by weekly text messages to remind participants to use the exercises (for 8 weeks)	Adolescents with type 1 diabetes between the ages of 13–17 years and who reported moderate diabetes distress	Rationale and trial design discussed (ongoing data collection)
Schache et al. ⁵¹	Gratitude journaling intervention (participants asked to write down three things they were grateful for each day)	8 weeks of journaling	Adolescents with type 1 diabetes between the ages of 10–16 years	No significant differences in psychological well-being; more stable glycemic control

The Broaden and Build Theory of Positive Emotion outlines another way in which positive emotion can be capitalized upon to improve health.³⁶ This theory posits that positive emotion has a broadening effect on how people think and behave, which allows individuals to overcome automatic responses and instead think and act in flexible ways. This perspective helps to build psychological, physical, and social resources that can be drawn upon to address health issues such as asthma. For example, an adolescent with high levels of positive emotion may be more inclined to regularly take his/her preventive asthma medication (due to improved cognition, good social support). Thus, implementing the Broaden and Build Theory, we predict that other psychosocial factors and physical resources are important components in our model of positive emotion and asthma (see Figure 1). These variables may serve as additional mediators between positive emotion and asthma health outcomes.¹ Specifically, positive emotions may impact psychosocial (psychological, social) and physical resources (Figure 1 path c) that may have downstream consequences for health behaviors/physiological function (Figure 1 path d) that are ultimately important for asthma health outcomes (Figure 1 path b). While these psychosocial factors and physical resources may have effects independent of positive emotion, we have included them in Figure 1 to demonstrate how they may come into play with regard to our Main Effect Model of Positive Emotion and Health Applied to Asthma.

Stress is one psychosocial factor that is pertinent to consider and elaborate on as both daily and chronic stress have been shown to be associated with increases in asthma exacerbations as well as symptom frequency and severity.^{5,37,38} Stress' impact on asthma health outcomes may be due to its association with poorer health behaviors²⁸ and physiological functioning⁵ that, as mentioned above, are relevant for asthma health outcomes.^{5,31,33–35} Therefore, stress may be negatively impacting asthma health outcomes through its detrimental effect on such health behaviors and physiological functioning. Applying the Stress Buffering Model of Positive Emotion^{13,14} to asthma helps explain and predict when this association could be modified. First, positive emotion may directly impact the negative consequences of stress by reducing stress altogether (Figure 1 path e). Indeed, evidence demonstrates that positive emotion decreases stress directly.³⁹ Second, given the known benefits of positive emotion on the health behaviors²⁸ and physiological systems impacted by stress,¹⁴ this model predicts that positive emotion may buffer against the negative impacts of stress on health behaviors/physiological functioning and, subsequently, asthma health outcomes. In other words, while stress may have deleterious effects on health behaviors/physiological functioning (Figure 1 path f), positive emotion may dampen those negative effects (Figure 1 path g).

4 | POSITIVE EMOTION INTERVENTIONS

Given the costs associated with ongoing asthma symptoms, understanding positive emotion as an elicitor of improved health may provide avenues for future intervention work that may mitigate these costs. If

indeed positive emotion buffers against the negative implications of stress on asthma health outcomes, interventions to boost positive emotion in daily environments may be fruitful. While there are no positive emotion interventions in the area of pediatric asthma that we are aware of, there is a growing body of literature on positive emotion boosting interventions in other health contexts.^{20–22,40–43} For example, interventions encouraging positive emotions have been utilized in samples of adults with breast cancer,⁴⁴ type 2 diabetes,⁴² and HIV²¹ as well as in a single study of an adult sample with asthma.⁴⁵ These interventions often encompass teaching participants certain skills that are associated with increases in positive emotion.²¹ For example, participants are taught to notice and savor positive events, express gratefulness towards others, engage in mindfulness, reappraise negative events in a positive light, value their personal strengths, be kind to others, and use spirituality.^{21,42,44} These interventions have been shown to be feasible and acceptable in clinical settings and can be delivered in-person, over the phone, and online by trained facilitators.

A relatively new body of work on positive emotion interventions for adolescents with type 1 diabetes has come from two research groups^{46–51} (see summaries in Table 1). These groups have adapted interventions based on the adult literature to meet the needs of adolescents. Specifically, Jaser and colleagues' interventions include affirming messages from parents as well as the use of text messages as part of the intervention delivery. Schache and colleagues use easy-to-use gratitude journals. These interventions could be adapted for pediatric patients with asthma and capitalized on to help amplify the beneficial outcomes seen in the already existing cognitive-behavioral stress management programs in the area of pediatric asthma.⁵² Indeed, previous research has shown that positive emotion interventions can increase the effectiveness of health programs.²⁰

Several nuances exist in the area of positive psychology interventions. First, it is important to note for those developing interventions in this area that interventions may be more effective in the long-term if they teach skills to promote positive emotions. In contrast, interventions that initiate positive emotions directly (e.g., videos of puppies) may be less effective. This is because direct positive emotion interventions only increase positive emotions in the moment. The proverbial saying "Give a man a fish, and you feed him for a day. Teach a man to fish, and you feed him for a lifetime." is relevant here. By teaching individuals skills that promote positive emotions, they become equipped to continually boost positive emotions regularly in their lives. In other words, these interventions may lead to more instances/greater levels of positive emotion which then have downstream consequences for health behaviors/physiological functioning that could ultimately impact asthma symptoms and lung function. Second, positive emotion skills interventions usually take a buffet-style approach in which participants are taught a number of different skills (e.g., savoring, reappraisal, goal setting, acts of kindness).^{40,42} This approach has benefits in that it allows the intervention to match the preferences and needs of each individual.¹³ However, the drawback is that it is more difficult to assess the unique contribution of each skill on changes in positive emotion and subsequent health/health-relevant outcomes. Thus, more work in this area would benefit by testing the contribution of each skill separately.

5 | FUTURE RESEARCH IN POSITIVE EMOTION AND PEDIATRIC ASTHMA

While a large body of literature has demonstrated the health benefits of positive emotion,^{13–18,53} virtually no research has extended these positive emotion-health models to the area of pediatric asthma. It is important to test these models in this setting. Future basic science work could assess simple associations between positive emotion and asthma over the course of several weeks or months. Studies can investigate the mechanisms behind any associations by assessing whether health behaviors and physiological functioning mediate the positive emotion and asthma relationships. More complex questions remain as to whether positive emotion is most beneficial during times of stress and/or reduces stress that then has downstream implications for asthma-related outcomes.

Interventions in this area pose another pertinent area for future research. Interventions as described above, based on the positive emotion conceptual framework and underlying mechanisms, could be adapted and represent an innovative approach to improve the lives of children suffering from asthma. This may be especially important in light of the current coronavirus (COVID-19) pandemic. The pandemic has greatly increased the worry and concern of families with children who have asthma, with some caregivers reporting difficulties in obtaining medications and reduced access to care.⁵⁴ Additionally, unanswered questions about contraction risk and disease severity of COVID-19 in this population still remain.⁵⁵ Taken together, positive emotion interventions may be a timely and theoretically grounded tool for helping to improve the lives of children suffering from asthma.

CONFLICT OF INTERESTS

Dr. Zeev N. Kain serves as a consultant for Edwards Lifesciences, Medtronic and Huron consulting, is the President of the American College of Perioperative Medicine, and a speaker for Covidien and Owner of Progressive Medical Services.

AUTHOR CONTRIBUTIONS

Conceptualization (lead); writing original draft (lead); writing review & editing (lead): Brooke N. Jenkins. *Writing review & editing (equal):* Zeev N. Kain.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ENDNOTE

¹Additionally, these factors may serve as moderators of the association between positive emotion and health behaviors/physiological functioning but for simplicity, we do not show such interaction terms.

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