Methods

A Pilot Study to Adapt a Trauma-Informed, Mindfulness-Based Yoga Intervention for Justice-Involved Youth

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Abstract

The purpose of the present study was to adapt and pilot a trauma-informed, mindfulness-based yoga (TIMBY) intervention focused on enhancing self-regulation among youth in the Georgia Department of Juvenile Justice system. In this article we (1) describe the process by which we systematically adapted an evidence-based protocol specifically for this population, (2) describe the nature of and rationale for those adaptations, (3) present some preliminary qualitative findings based on interviews with youth participants, and (4) briefly summarize how the adapted protocol will be evaluated in the subsequent feasibility trial. The iterative drafting and revision process involved modifications to a well-established, protocolized Trauma-Informed Yoga program and was identified by the project advisory board and through formal interviews with intervention staff. Qualitative interviews were conducted with youth participants concerning intervention impact, credibility, and satisfaction. Several needed modifications were identified so that the intervention would be contextually appropriate for justice-involved youth. Thirty youth were enrolled in the pilot study: 77% were Non-Hispanic Black/African-American, 18% were Non-Hispanic White, and 5% were Hispanic White. The average age was 16.45 years (range 14–20). The youth consistently reported satisfaction with the sessions and positive beliefs about how the sessions were helping them with a range of physical and psychological/emotional challenges. Adaptations to the protocol in the present study highlight how mindfulness-based interventions for justice-involved youth need to consider what is both developmentally suitable for youth and appropriate in a justice setting. A feasibility study using this revised TIMBY protocol is underway at four Georgia Department of Juvenile Justice facilities to formally identify the barriers and facilitators to implementation for the present study and a future, larger-scale trial. *Owen-Smith et al. Int J Yoga Therapy 2021(31). doi: 10.17761/2021-D-21-00032.*

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Background

Approximately 700,000 youth under the age of 21 were arrested in 2019, accounting for 15% of all arrests in the United States.[1] Most of these youth (≈ 65%) will be rearrested within 3 years of their release,[2] and many of these arrests will be for felonies.[3] Recidivism is not only costly to society (juvenile confinement can cost more than $214,620 per youth per year[4]), but is also associated with myriad adverse and long-lasting health, educational, vocational, and interpersonal consequences for the youth and their families.[5–8] Unfortunately, juvenile offending is highly resistant to change; consequently, problematic behaviors are likely to continue into adulthood in the absence of effective intervention designed to alter risk trajectories.[9] The reduction in recidivism following the implementation of most current interventions (e.g., victim-offender mediation, rehabilitation treatment, family-based therapy) is modest at best, ranging from 7% to 26%.[10]

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Prior studies suggest that traumatic experiences are prevalent among justice-involved youth: Several studies report that more than 90% of juvenile detainees reported having experienced at least one traumatic incident,[11,12] and exposure to multiple traumas was the norm.[13] The relationship between exposure to trauma and delinquency is complex and not fully understood.[14,15] However, the evidence suggests that youth with a history of trauma are more likely to develop both externalizing and internalizing issues[16] and thus may be more likely to engage in disinhibited, aggressive, and delinquent ways of thinking and behaving compared to their non-trauma exposed peers.[17] This pathway can be explained by some of the survival-oriented biological changes in the brains of children exposed to trauma, namely, the compromised self-regulation systems responsible for reward/motivation, distress tolerance, and executive function.[17] As a result, youth with a history of trauma often have an impaired ability to modulate their behavioral and cognitive responses to a wide range of stressors.[18] In light of the prevalence of trauma exposure in this population, interventions for juvenile justice (JJ)–involved youth need to address trauma and provide youth with resources related to enhancing their self-regulation skills.

Although some interventions address emotional and behavioral reactivity, many do not teach or practice skills that help youth regulate their physiological arousal. Cognitive behavioral therapy, which involves exercises and instruction designed to alter dysfunctional thinking patterns, may focus on mood *monitoring* and teach relaxation-related skills,[19] but this is often done within the context of stress reduction rather than self-regulation of reactivity. Given that youth offenders with self-regulation difficulties are more likely to recidivate within 1 year of release than those without these difficulties,[20] interventions for JJ-involved youth must focus on enhancing these capacities.

One promising approach has been the use of mindfulness techniques. Mindfulness involves attending to the present moment in a sustained and receptive fashion,[21] with nonjudgmental awareness,[22] and can involve various techniques, including meditation, breathwork, and rhythmic movement; yoga is the specific combination of these three contemplative approaches. Yoga is an ancient practice rooted in Indian philosophy that includes physical postures *(asana),* breathing techniques *(pranayama),* and meditation *(dhyana).* A substantial body of literature provides evidence for the effectiveness of mindfulness-based interventions, particularly those that involve yoga, for individuals who have a history of trauma. For example, several studies have reported that mindfulness-based yoga can (1) reduce anxiety, emotional reactivity, symptoms related to posttraumatic stress disorder (PTSD), and depression; (2) increase relaxation, psychological flexibility, and self-efficacy; and (3) improve ability to handle intrusive thoughts and manage stress among nonincarcerated adults with PTSD.[23–30]

Similar mindfulness- and yoga-based interventions have also demonstrated effectiveness among incarcerated adults and youth. For example, several studies with incarcerated adults have documented a positive effect of mindfulness- and yoga-based interventions on both externalizing and internalizing problems, including aggression,[31] impulsivity,[32] stress,[33] psychological distress,[33] hostility,[34] mood disturbance,[34,35] sleep,[31] self-esteem,[34] positive affect,[33] and the likelihood of behavioral infractions[35] and recidivism.[36–38] Among at-risk or incarcerated youth, these interventions have also been associated with improvements in self-regulation.[39–41]

Although results from these studies are promising, most of the programs were not specifically developed for individuals with a history of trauma, nor were they guided by an understanding of trauma, which evidence suggests is critical for this population. Furthermore, there is an absence of published research describing the systematic development, implementation, and evaluation of mindfulness interventions with JJ-involved youth, limiting dissemination and widespread adoption of such programs if they are demonstrated to be effective.

Therefore, the purpose of the present study was to adapt and pilot a trauma-informed, mindfulness-based yoga (TIMBY) intervention focused on enhancing cognitive, emotional, and behavioral self-regulation among youth in the Georgia Department of Juvenile Justice (DJJ) system. In this article we (1) describe the process by which we systematically adapted a trauma-informed, evidence-based intervention specifically for this population; (2) describe the nature of and rationale for those adaptations; (3) present some preliminary qualitative findings based on interviews with youth participants during the pilot study; and (4) briefly summarize how the adapted intervention will be evaluated in the subsequent feasibility trial.

Methods

Original Intervention

We began the iterative drafting and revision process with a well-established, protocolized Trauma-Informed Yoga program developed by the Center for Trauma and Embodiment at the Justice Resource Institute: Trauma Center Trauma Sensitive Yoga (TCTSY). The TCTSY protocol incorporates the central elements of Hatha Yoga—physical postures/“forms,” breathwork, and meditation—and was developed by trained yoga professionals with master’s- and doctoral-level degrees in psychology. Within the Hatha Yoga tradition, mindfulness practice occurs during both the physical postures and the formal attention to the

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breath, where "the object of mindfulness practice might include proprioceptive (awareness of one's body in relation to external objects) or interoceptive sensations (awareness of the internal state of one's body) stemming from physical posture or respiration, respectively."[42] This protocol was grounded in (1) a clinical understanding of trauma-related diagnoses, sequelae, and treatment; (2) the history, practice, and teaching of yoga; and (3) the history of and research about Buddhist meditation practices.[43,44]

Four key themes guided the development of the TCTSY protocol (Table 1). The first theme, "Present-Moment Experience," directly addresses the fact that trauma survivors often are oriented toward traumatic events rather than to the present. Paying attention to the felt sensation in the body, also called interoception, is one method by which individuals can practice present-moment attention and can be a valuable coping tool to manage dissociation.[44] The second theme, "Practice Making Choices," fundamentally addresses the notion that trauma is often an experience involving no choice and thus prioritizes opportunities for individuals to practice making small, manageable choices with their bodies, including which postures to take, how long to hold them, and how to modify them. The third theme, "Taking Effective Action," focuses on helping individuals with a history of trauma who have likely experienced helplessness in the face of threatening or stressful situations to redevelop an ability to take effective action. Individuals are encouraged to identify and make the modifications that they need to be more comfortable in that moment, which creates a sense of self-efficacy and personal agency. The fourth theme, "Creating Rhythms," addresses the disconnection between the mind and the body often experienced by trauma survivors. Breathwork, postures, and meditation provide opportunities for recreating those

Table 1. Session Themes

Theme	Description	Sample Intervention Staff Introductory Language
Present-Moment Experience	This theme directly addresses the fact that trauma survivors often are oriented toward traumatic events rather than to the present. Breathwork is one method by which individuals can practice present-moment attention and can be a useful coping tool to manage dissociation.	*"Yoga provides many opportunities to practice being present. The main way we can do that is by noticing what we feel in our body in the different forms. This is called interoception. In this session I will invite us to practice interoception in different forms."*
Practice Making Choices	This theme fundamentally addresses the notion that trauma is often an experience involving no choice and thus prioritizes opportunities for individuals to practice making small, manageable choices with their bodies.	*"Choice is a key part of yoga, and you always have a choice in this class. Throughout this session I will emphasize choice and try to give us several opportunities to practice making choices in the forms."*
Taking Effective Action	This theme is focused on helping individuals with a history of trauma who have likely experienced helplessness in the face of threatening or stressful situations to redevelop an ability to take effective action. Individuals are encouraged to identify and make the modifications that they need to be more comfortable in that moment, which creates a sense of self-efficacy and personal agency.	*"We can use our yoga practice as a way of taking effective action. Mostly this will be ways that we use our body, our muscles, to change what we are doing so that we are more comfortable in the forms. We might each come up with our own ways to take effective action, but I will try to call attention to specific opportunities where we might make adjustments within forms so that the form becomes more comfortable."*
Creating Rhythms	This theme addresses the disconnection between the mind and the body often experienced by trauma survivors. Breathwork, postures, and meditation provide opportunities for recreating those rhythms.	*"There are different kinds of rhythm. One is noticing when things begin and end—like a yoga form. Another kind of rhythm is when we do something together, and another is when we move and breathe at our own pace. In this session I will give us opportunities to practice these different kinds of rhythms."*

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rhythms—for example, using breath and movement to explore a sense of flow and timing, both matching one's breath to movement and moving rhythmically with others.[44]

Adaptation Procedures

All modifications were identified by the project advisory board (AB), which consisted of a Center for Trauma and Embodiment expert (DE), the lead interventionist (HB), DJJ leadership (DJ), and project investigators (AO-S, JF, LD, MH, and RD). The AB met routinely throughout the drafting and revision process and were tasked with planning and refining the intervention in the context of JJ settings. A clear record of meeting minutes, decisions, and issues to consider during implementation was maintained. Additionally, formal interviews were conducted by the project director (MC, who has extensive experience with conducting in-depth interviews) with the lead interventionist (HB) and intervention staff (VT, AR, and IM) to identify (1) their perspectives regarding aspects of the original protocol that were difficult to implement as specified with incarcerated youth, and (2) how adaptations could be made to address these challenges. These interviews were conducted using rapid assessment procedures (RAP), a focused and efficient approach for obtaining and analyzing stakeholder feedback. The hallmarks of the RAP process include that it is action-oriented (focused explicitly on facilitating decision-making), holistic (prioritizes context), collaborative (emphasizes collective judgments through consensus), empowering (shares all information learned and decisions made with the stakeholders for whom research results are intended), interactive, and promotes dialogue through listening and learning.[45] The analysis involved the following steps, consistent with prior rapid identification of themes processes[46–48]: (1) identifying pre-specified core domains/themes of interest based on discussion questions/topics, (2) creating a brief coding form using these themes, (3) iteratively refining the code form as needed, (4) coding for themes, and (5) sharing findings and debriefing with stakeholders (the intervention staff). Initial coding was conducted by the lead author (AO-S), who has previous training in RAP, then refined and finalized through discussions with intervention staff.

Pilot Test of the Adapted Protocol

Setting

The Georgia DJJ operates short- and long-term facilities for youth ages 13 to 21 awaiting trial or who have been committed to DJJ custody by the juvenile courts. Regional youth detention centers (RYDC) are secure short-term centers for youth awaiting trial in juvenile or superior court or awaiting a community-based placement; youth development campuses (YDC) are long-term rehabilitation facilities for youth sentenced or committed to DJJ custody by juvenile courts. Within 2 hours of admission, all youth are screened for mental illness, substance abuse, suicide risk, and traumatic experiences (trauma is assessed using the Structured Trauma-Related Experiences and Symptoms Screener [STRESS] measure).[49] Youth screened in the past 3 months (n = 228) were found to have been exposed to an average of eight adverse childhood experiences, and 82% met probable criteria for PTSD. The two sites included in this study, the DeKalb RYDC and the Atlanta YDC, are the largest RYDC and YDC facilities in Georgia, respectively. Approval for human subjects research was obtained through Georgia State University and DJJ institutional review boards.

Inclusion Criteria and Recruitment

Youth were eligible to participate in the TIMBY program if they were on the mental health caseload and (1) written informed assent and (2) verbal parental/guardian or youth advocate informed consent were obtained. All youth at these two facilities were male. Youth who had recent (within the last week) serious noncompliant behavior (e.g., episodes of violent behavior requiring restraints or resulting in legal charges); current, untreated psychosis; or were wards of the state of Georgia were excluded from participating in the program.

A recruitment/retention coordinator traveled between facilities to screen, consent, and enroll interested youth. Using standardized research protocols already in place at the facilities, the staff at each facility notified the coordinator of each eligible participant, and the coordinator then set up a time to meet with him and implement standardized consent procedures.

TIMBY Sessions

The TIMBY sessions were held up to twice weekly at each facility and were led by one of three yoga instructors. Instructors received formal training by Center for Trauma and Embodiment expert DE and by the lead interventionist (HB), who has completed the 300-hour TCTSY certification program; all three individuals also had extensive previous experience teaching yoga in the JJ system. Both a qualified mental health professional and a guard attended all classes; the mental health professional also occasionally participated in the sessions with the youth. Sessions lasted approximately 1 hour. Classes were held in classrooms or recreational areas and were scheduled between 3 and 6 pm (after mandatory school sessions end each day) on days/times when other programmatic offerings (group counseling, Structured Psychotherapy for Adolescents Responding to Chronic Stress [SPARCS], physical education, etc.) were not occurring concurrently.

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Instructors selected one or more themes that informed each class. The decision about which theme(s) to incorporate was based on instructors' assessments of the class's needs that day and what issues arose for participants that day. An example of the language that instructors used to explain the theme is provided in Table 1. The theme(s) chosen for each session were typically identified at the beginning of the session and revisited periodically throughout the session; however, if an issue/question arose during the class and an instructor felt that a different theme was relevant to that issue/question, instructors could decide to incorporate another theme at that time. Themes could be repeated, and there was no a priori order in which themes were incorporated into the sessions.

Instructors selected approximately five to seven postures to include in each session. Following a brief check-in lasting approximately 5 minutes, sessions typically began with a more vigorous practice (e.g., warrior postures) and ended with more gentle postures (e.g., twists). Instructors used the postures to emphasize mindfulness and the mind-body connection. Using a mindfulness approach, the instructor guided the class into noticing a concept while practicing the posture. For example, participants were cued to notice feelings of strength while in a challenging posture such as warrior I or II and to notice feelings of softness after releasing.

Instructors also used the postures to reinforce the concept of stability/distress tolerance. Participants were brought into any position to hold in the asana practice, such as warrior II or a lunge. Instructors asked participants to hold the position, bring their focus back into their body and the posture, find their breath again, and notice what they were feeling and where they were feeling challenged in their bodies as they held the pose. The instructor asked participants to hold the pose a little longer if they could, then move on, congratulating the participants for overcoming the physical and mental challenge and using their breath to focus and help overcome a challenge. This process also brought awareness to the concept of reactivity and participants' desire to react when experiencing discomfort. Using a "difficult" yoga form can offer an opportunity to experience the urge to react (stop/end the posture) and create the opportunity to not give in to the impulse, whether through encouraging participants to focus on breathing while holding the posture or to notice the sensations that arise while maintaining the posture; this creates a pause between urge and action. For participants working on anger issues and impulse control, this technique allowed for embodied experience of that idea. This process also helps connect the mind and body, which is particularly important for those participants who have sustained physical trauma and have reacted by dissociating themselves from their bodies.

Finally, instructors selected at least one of the breathing/meditation techniques listed in Table 2 to include in each session and ended with a body scan meditation and *savasana* (rest in corpse pose). Savasana allowed an opportunity for participants to close their eyes and relax. This may have been the only such opportunity these participants had to do so in the course of a day. However, some people have great difficulty with savasana. Instructors were asked to recognize this. If they had participants who were not able to or did not want to do savasana, instructors allowed them to sit quietly or even help by doing something like turning off the lights or distributing eye pillows. The idea was to be quiet and still.

Using themes, postures, and breathing/meditation techniques together, instructors could bring the themes out of a theoretical concept and into something the participants felt and could use again. Instructors identified feelings that participants might have experienced (e.g., balanced, centered, strong, focused, calm, open) and asked participants to remember these feelings. Instructors told participants that the next time they felt out of balance, stressed, uncentered, weak, closed, or angry, they may want to remember the feeling of being balanced, etc., and know that they will always have that inside of them and accessible through breathing and mindfulness.

Youth Interviews

An essential aspect of the intervention drafting and revision process was feedback from individual youth participants concerning intervention credibility and satisfaction. Ten youth (5 per site) were interviewed by the project manager (HS), who received training from the lead author; this training involved completing an ethics curriculum, reviewing basic qualitative methods and data-collection procedures, and mock interviews.[50] We selected the 10 youth (out of the 30 enrolled) based on their attendance: We wanted to interview 2–3 youth at each site who had not consistently participated in the sessions (e.g., came to 1–2 sessions but stopped coming) and 2–3 youth at each site who had more consistently participated and/or participated for a longer duration so that we could understand the diversity of experiences with the program. Youth were asked about their satisfaction with the duration of the session(s); session details such as the types of breathing exercises, postures, and meditations included; and whether they intended to continue with the program for their stay at the facility. Youth reflected on whether they observed any personal or symptomatic changes through their experience in the program and, if so, whether they perceived the TIMBY program as having an impact on those changes. Interviews were audiorecorded with participants' permission, were conducted in the facility's interview room, and lasted approximately 30 minutes.

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Table 2. Breathing/Meditation Techniques

Technique	Description
Focus on breath	An interoceptive mindful technique. Noticing breath is always available as a way to calm thoughts by focusing on sensation of breath and where the sensation moves in the body. This technique is used to notice the difference between thoughts and sensations. Reactive minds tend to focus on thoughts. Interoception, or noticing sensations, helps to teach the mind focus.
Golden thread/ratio breath	A breathing technique that focuses on lengthening the exhale. The breathing techniques the study focuses on are for lengthening and therefore (often) calming the breath. When the body is in "fight-or-flight mode," breathing is rapid with an emphasis on inhaling. Evidence suggests that lengthening the breath has a direct effect on calming the nervous system. Golden thread and ratio breath are both breathing techniques that focus on lengthening the exhale and calming the mind.
Calm abiding	A meditation technique to teach the mind focus. An object (e.g., a stone, marble, flower, etc.) is held in the hand. The object can be seen, moved, or simply held as an alternative point of focus to thoughts; when distracting thoughts arise, focus is returned to the object. This is a foundational meditation and helps to teach the practice of focus.
So hum (I am that)	A mantra meditation. Mantra is used to replace the looping intrusive thoughts characteristic of anxiety and stress. This technique combines the focus of breath with the mantra. Instructors may instruct participants, "When breathing in silently, fill the mind with the sound of *so.* When breathing out silently, fill your mind with the sound of *hum;* let the breath be easy and natural. If you notice thoughts arise to distract you, go back and start again: Breathing in, fill your mind with the sound of *so;* breathing out, fill your mind with the sound of *hum."* This technique is excellent if the class emphasis is on techniques for sleep.
Alternate-nostril breath	A breathing technique that focuses the mind and helps the breath become even and steady, which can have a calming effect on both the mind and the nervous system. The action gives the mind something to do. Specifically, participants are instructed to: 1. Using the right thumb, softly close the right nostril, and inhale as slowly as you can through the left nostril, then close it with your ring finger. Pause. Open and exhale slowly through the right nostril. 2. With the right nostril open, inhale slowly, then close it with the thumb. Pause. Exhale through the left nostril. Once your exhalation is complete, inhale through the left. Pause before moving to the right.

Interview data were transcribed verbatim, and standard qualitative content-analysis techniques were used to analyze the resulting transcript text.[51] First, a coding dictionary was developed and applied to the transcripts in collaboration with the two trained coders. The initial development of the coding dictionary was concept-driven, such that the following codes were identified a priori: (1) satisfaction with/reactions to the class (subcodes: positive/negative/neutral comments about the format, the breathing exercises, the postures, or the meditations), (2) satisfaction with/reactions to instructors (subcodes: positive/negative/neutral comments), (3) how yoga classes compare to other classes at the facility (subcodes: positive/negative/neutral comments), (4) perceived impact of classes (subcodes: impact psychologically/emotionally, impact cognitively, impact behaviorally, impact interpersonally), and (5) intentions to continue yoga (subcodes: continue at the facility, continue after release). Using a data-driven procedure, codes and subcodes were updated as needed throughout the coding process to ensure clarity and maximize mutual exclusivity and exhaustiveness.[52] All text pertaining to a specific topic was coded individually by coders trained by the lead author (AO-S); this training involved completing an ethics curriculum, reviewing basic qualitative methods, reviewing the codebook, team coding, and independent coding.[50] Intercoder reliability was ensured by using an iterative process of coding the same text, comparing codes, and discussing/resolving discrepancies. Interpretation of the interview data involved analysis of the frequency and content of responses and the vocabulary that participants use to describe concepts and experiences. Data management and analysis were supported by using NVivo text-analysis software (QSR International) for coding, organization, searching, and retrieval of qualitative data.

Results

Intervention Adaptations

Several needed modifications were identified so that the intervention would be contextually appropriate for justice-involved youth (Table 3).

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Table 3. Protocol Adaptations

Challenges, Rationale for Adaptation		TIMBY Protocol Adaptation	Theme Addressed
Space-related issues	Some sessions held in classroom spaces: Youth must move desks at the beginning of class and put desks back at the end of class.	Integrate these activities into the class, using the process as a tool to (1) prepare students mentally for the class and to return back to DJJ environment, and (2) provide them with some sense of agency.	Taking Effective Action
Prop-related issues	Youth are provided with mats and other props (they cannot have their own).	Integrate mat cleaning into the class, using this process as a tool to create an environment of respect; youth are often protective of the mats/other props because they are responsible for caring for them.	Taking Effective Action
Noise-related issues	Some sessions held in gym/recreation areas are particularly noisy; even more private rooms can be noisy due to disruptions from guards, alarms, etc.	Use noise as a tool for noticing the present moment, observing the noise without labeling as “good” or “bad”; use disruptions as a way to engage with youth.	Present-Moment Experience
Unique power dynamics	Guards required to attend sessions, thus reinforcing a power dynamic that can be counterproductive.	Ask youth to choose and even teach forms they want to practice, thereby providing them with some agency and empowerment.	Practice Making Choices
Including a “check-in” and “check-out”	Youth have few opportunities to reflect on their current physical, psychological, and emotional states in nonjudgmental setting.	Provide time for youth to notice how they are feeling and identify whether any changes have taken place.	Present-Moment Experience
Reordering of forms	Detained male youth have high energy levels and often have strong physical fitness. Prior protocol started with forms using a chair, then moved to standing and then floor-based forms.	Sessions begin with standing postures that are more physically demanding to release pent-up energy and engage the youth more effectively.	NA
Teaching breathing techniques	Need for concrete self-regulation tools that can be used without detection.	Include imagery-based breathing techniques as primary focus area.	Creating Rhythms
Unpredictable attendance/high participant turnover	Wide variation in how long youth are detained (some may only be in the facility for several days, others for years).	Sessions cannot be taught sequentially/cannot build on content taught in prior classes. Each session begins with an introduction; forms are always taught without assuming any prior exposure.	NA

First, DJJ facilities often did not have additional space that could be solely dedicated for yoga classes, which created both space- and noise-related issues that warranted attention. When classes were held in classroom spaces, the youth had to spend some portion of the dedicated hour moving desks out of the way before class and then putting them back at the end of class. Instead of experiencing this as a nuisance and worrying that it was detracting from the limited class time, we purposefully integrated these activities into the intervention so they could serve as much-needed transition periods for the youth (i.e., mentally prepare them to begin class as well as return to the DJJ environment after class) and provide them with a sense of agency and responsibility for the physical space (an otherwise uncommon experience for incarcerated youth). For example, intervention staff explicitly incorporated these activities into the sessions by articulating how participants might use that time as a mental and physical transition and consider the experience as one through which they can “own” the space they are creating for themselves. These adaptations are consistent with the Taking Effective Action theme, whereby participants can engage in self-motivated behaviors. Similar to the moving of classroom desks, youth were asked to clean the yoga mats and props as needed; this process, too, was

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formally integrated into the protocol such that it became a tool for creating an environment of respect (and taking effective action) and was another opportunity to practice mindfulness.

When classes were held in recreational spaces, distracting noises were commonplace, as nonparticipants were often using the space simultaneously for other reasons. Instead of this being a source of frustration for both the teachers and the youth, we purposefully integrated a focus on noise and other distractions into the protocol. Intervention staff used these experiences as a tool for engaging youth in the session and underscoring the Present-Moment Experience theme in that particular session (e.g., by encouraging participants to notice the noise, observe it nonjudgmentally, and return to the breath).

Another issue that was unique to the delivery of yoga classes in JJ facilities is the requirement that a guard attends for the entire duration of the class; this can reinforce a power dynamic that runs counter to the philosophy of trauma-sensitive yoga—namely, that the presence of a guard makes it more difficult for youth to practice making choices, take effective action, and develop a sense of self-efficacy and personal agency within that space. Although this requirement could not be waived, we intentionally identified ways to modify the protocol. Youth would have opportunities for choice-making, for example, by being asked to choose forms and, in some cases, even co-lead the teaching of those forms. It was also critical for the interventionists to incorporate invitational language (that offers students options and emphasizes adaptability, exploration, and individual differences) instead of command language in an effort to be mindful of the power dynamic they may introduce as teachers.[53]

It was clear to intervention staff that youth rarely had the opportunity to reflect on their current physical, psychological, and emotional states in a nonjudgmental setting. Instead, their experiences centered around following JJ staff orders, adhering to various policies, etc. As the lead interventionist put it, "They don't even know how they feel because they're told what to do all the time. They can't take the time even to notice how they're feeling." Thus, we added a "check-in" at the beginning of class and a "check-out" at the end to purposefully create time and space for this practice; during these brief (≈ 5 minutes) pauses, intervention staff asks each attendee about how he is feeling, what is going on for him that day/at that moment, and whether there are any specific practices he wants to do during the session. The check-out also provided an essential opportunity for the interventionists to prompt youth to consider whether any shifts had taken place for them over the hour. This activity served the additional benefits of empowerment—youth could observe that they can shift how they feel and that they do have control over their internal landscapes—and of reinforcing the message that emotions are temporary (in the present moment only). The focus on strengthening interoception, the perception of the body's internal state, is a critical component of enhancing emotional self-regulation.[54]

The order of the forms themselves was another adaptation from the original protocol that was identified early on. The original protocol, often used with community-based adult populations, typically started with seated asana; however, it became evident that youth participants, all of whom were males aged 13–21, often had high energy levels and strong physical fitness. Beginning with more meditative seated positions would not effectively engage them and could result in attention difficulties or even elicit frustration. We revised the protocol to start with standing forms that are more physically demanding (e.g., warrior poses), which allowed participants to more effectively release pent-up energy early on so that they were better able to sit for breathing and meditation exercises later in the class.

Although the original TCTSY protocol incorporated elements of breathwork, it did not include breathing techniques as a primary focus area. The intervention staff felt strongly that this was critical to enhancing self-regulation capabilities for several reasons. First, because breathing is vital for survival, information from the respiratory system must be attended to by the body immediately. Some researchers argue that this is why information about changes in the rate, depth, or pattern of breathing is deemed by the body as the highest priority and can have rapid, profound, and widespread effects on brain function.[55,56] For example, changes in breathing patterns send important messages through the sympathetic and parasympathetic nervous systems, which can positively affect how the brain perceives, interprets, and responds to stress; reduced sympathetic and increased parasympathetic activity, specifically, have been implicated in improvements in a range of stress-related mental and physical health conditions, including those associated with trauma.[56,57] Thus, prioritizing breathing techniques was important for the JJ population, many of whom have histories of trauma and experience myriad trauma-related sequelae, including internalizing and externalizing problems. Second, intervention staff communicated that youth seemed to respond more favorably to the specific breathing techniques included in the revised protocol (Table 3), in part because many of these techniques involve using imagery rather than counting numbers (often used in other breathwork). Given prior research indicating that 60% of justice-involved youth do not meet a minimum level of numeracy skills,[58] incorporating numerically based tasks—even as simple as counting breaths—may be counterproductive. Third, intervention

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staff noted that, unlike yoga postures or meditation techniques, breathing techniques could be employed as a self-regulation tool during interpersonal conflict, providing a sense of calm strength while not being visible to another. Such tools may be particularly important in JJ settings, where physical toughness, strength, and stoicism are often rewarded, and behaviors labeled as "weak" can be a liability.[59]

Finally, the original protocol was typically offered weekly over 10 consecutive weeks in 1-hour classes, with the skills taught in each session building on what was learned the prior week. Our study delivered the classes as part of the facilities' programmatic offerings for youth on the mental health caseload. Thus, class enrollment was open, and participants attended classes for as long as they were in residence, on average 2 times/week. We therefore needed to modify the protocol so that each session included introductory information for new participants and did not rely on any previous yoga exposure.

TIMBY Participants and Intervention Sessions

Thirty youth were enrolled in the pilot study: 77% were Non-Hispanic Black/African-American, 18% were Non-Hispanic White, and 5% were Hispanic White. The average age was 16.45 (range 14–20 y).

The pilot study was conducted over 8 months; a total of 104 sessions were provided (≈ 3 classes per week). On average, each youth attended 5 TIMBY sessions (range 0–12). On average, intervention staff spent 34.11 minutes on forms (standard deviation [SD] 11.79); the most commonly used forms included crow (practiced in 76.4% of sessions), tree (practiced in 69.8% of sessions), seated or reclining twist (practiced in 68.9% of sessions), plank (practiced in 66% of sessions), and mountain (practiced in 60.4% of sessions). Additional forms often requested by youth included wheel, warrior III, cobra, bow, and pyramid. On average, intervention staff spent 3.88 minutes on a breathing technique (SD 1.71; Table 2) and 8.51 minutes on meditations (SD 3.87). The most commonly used breathing techniques were focus on breath (practiced in 72.6% of sessions), golden thread/ratio breath (practiced in 29.3% of sessions), and alternate-nostril breathing (practiced in 23.6% of sessions).

Youth Interviews

Youth interview participants varied in their intervention session attendance: 5 youth had attended 0-2 sessions, and 5 youth had participated in 8–12 sessions. Youth interviewees were consistently positive in their feedback about the TIMBY intervention sessions. They liked the session duration (or wanted it to be longer), provided only positive feedback about the intervention staff, and indicated that they wanted to spend more time on all three domains: physical postures/forms (asana), breathing techniques, and meditation techniques (e.g., body scans, savasana). All participants indicated that they liked the sessions as much as (n = 4) or more (n = 6) than other classes they took at the facility and found them as helpful (n = 3), if not more helpful (n = 7), than other classes. Youth participants had no criticisms of or suggested improvements for the classes, and those who attended relatively few classes reported stopping for reasons unrelated to the activities and skills involved in the classes.

As described above, we identified several a priori subcodes related to the interview question about how (if at all) the TIMBY sessions affected youth; that impact could be psychological/emotional, cognitive, behavioral, or interpersonal. However, three primary themes emerged regarding youth participants' perspectives about how the TIMBY sessions affected them, and these had psychological/emotional as well as behavioral implications (Table 4). First, most youth reported that the sessions helped them with calming down/relaxing. Second, most youth indicated that the sessions helped modulate anger and facilitate emotion regulation. Third, several participants noted that the sessions helped with experiences of stress and anxiety. Interestingly, several participants' comments highlighted an additional benefit of the intervention: They remembered what they learned and practiced "off the mat."

The youth consistently reported satisfaction with the duration of the sessions and the types of breathing exercises, postures, and meditations included; they also consistently indicated intentions to continue with the program for their stay at the facility. They reported a range of ways they felt that the sessions impacted them in meaningful ways, including that the classes helped them with calming down/feeling relaxed, regulating their emotions, and stress/anxiety.

Discussion

There have been recent calls for tailoring mindfulness-based interventions for the JJ population, as protocols for adults are often not developmentally appropriate for adolescents,[60,61] and community-based or clinically delivered interventions are implemented in qualitatively different settings from criminal justice facilities in myriad and profound ways. Furthermore, scholars in the field have noted a need to incorporate movement (such as yoga) into mindfulness-based practices.[60,62] The present study addressed both mandates by adapting and piloting a trauma-informed, mindfulness-based yoga intervention (TIMBY) focused on enhancing cognitive, emotional, and behavioral self-regulation for youth in the Georgia DJJ system. We were able to systematically develop a trauma-informed adaptation of an

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Table 4. Findings from Youth Interviews

Program Effect	Example Quotes
Helps with calming down, feeling relaxed	• *It makes me relax; it help you expand your mind. You can go on your own little vacation in your mind.* • *They help me calm down. 'Cause I feel like it's helpin' me, keep me out of trouble, keep me motivated and relaxed.* • *On a good day, I could be happy as I could be. I go to yoga, boom, I'm even happier 'cause now I'm more chill. Yoga actually helps.* • *I feel like it help me through the days and stuff. I can be in my room and do it. I be relaxed. They be like, "What wrong with you?" I'm like, "I'm good. I'm relaxed. I've been doin' yoga." "With who?" "Myself."*
Helps with anger and emotion regulation	• *I don't really get mad as easy as I used to. I can understand, just calm down and breathe and stuff.* • *Well, I can't be mad in here, which is a good thing. In a sense, when…you're just mad or something, it makes you wanna, I don't know, do yoga poses. I'd rather sit in the middle of the gym and meditate than play.* • *I wanna continue because, first off, it's helped me a lot with anger here. The littlest thing makes you mad here. It's the littlest thing. You'll be amazed. Also, it comes with a bunch of health issues, so when I'm sad, I'm just—I go straight to yoga. I go in my room. I meditate.* • *I think about things before I do [them].*
Helps with stress/anxiety	• *Teach me a lot about breathing when I'm worrying.* • *'Cause it has taught me really loss of stress. I don't wanna be with lots of stress. I know a way how to relieve it now. I know how to get rid of it.*

evidence-based intervention specifically for this population, in consultation with a project advisory board and through formal interviews with both intervention staff and youth participants. Several necessary modifications were made to the original evidence-based protocol to be contextually appropriate for justice-involved youth. Our preliminary qualitative evidence suggests that the intervention is feasible, highly acceptable to youth participants, and seems to impact the intended intervention target of emotion regulation. This is consistent with prior studies that have similarly identified emotion regulation as a primary focus area for mindfulness-based interventions with this population.[63]

Adaptations to the protocol highlight how mindfulness-based interventions for justice-involved youth need to consider what is developmentally appropriate for youth and feasible in a justice setting. Younger, high-energy male youth may require different types or ordering of postures than adults and need practices that do not cause cognitive load, including those involving numeracy skills (e.g., counting). The physical spaces, noises/distractions, and constant transition in secure facilities may warrant a very different pedagogical approach. These issues are deliberately incorporated into the protocol as opportunities for present-moment practice rather than ignored or downplayed. These types of interventions also need to reflect an understanding of the lived experience of youth in an incarcerated setting—namely, that youth rarely have the opportunity to incorporate critical trauma-sensitive practices such as taking effective action or making choices because of the lack of agency in their day-to-day lives. Trauma-informed interventions in the justice setting need to create opportunities for these practices intentionally. Finally, although many mindfulness-based studies with justice-involved youth involve some breathwork,[63] future interventions should prioritize the teaching of specific breathing techniques. This element is important because of how the breath can affect emotion regulation, aggression, and self-control[64]—key predictors of recidivism in this population—and because youth can employ these techniques in day-to-day interactions covertly, which may increase their utility off the mat.

Limitations

The present study has several limitations. First, although we recruited youth for the interviews who varied in their class attendance (e.g., attended only 1 class vs. attended 12 classes), it is possible that the youth who agreed to participate in the study had more positive attitudes toward and experiences with the TIMBY intervention compared to youth who did not. Therefore, we may not have fully captured the attitudes and experiences of nonparticipants who may have had unique perspectives about the classes. Second, although we used a systematic process for ensuring intercoder reliability, the labeling of emerging themes and judgments about the importance and significance of these themes is a subjective process. While all efforts were made to describe participants' perspectives with accuracy and transparency, this

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work is fundamentally interpretative and influenced by the authors' perspectives and experiences. Third, the study staff (MC and HS) conducted in-depth interviews with the intervention staff and youth participants. The study staff's intimate involvement with the research may have influenced their responses to participants during the interview and their ability to achieve objectivity. However, both individuals had prior experience with interviewing and received additional training as part of the present study. As previous authors have suggested, the "credibility of the reported findings rests not only on the procedures used to generate and analyze findings but on the self-awareness of the researcher throughout the research process."[65]

Future Directions

A pre–post feasibility study using this revised TIMBY intervention is now underway at four Georgia DJJ facilities. The feasibility study aims to enroll a total of 100 youth; collect baseline and follow-up data (after 6 and 12 weeks of the intervention) using audio, computer-administered interview (ACASI) software; and conduct in-depth interviews with a subgroup of youth participants, parents, study staff, intervention staff, and DJJ system stakeholders to formally identify the barriers and facilitators to implementation for the present study as well as for a future, larger-scale trial. During this feasibility phase, the intervention will be administered for approximately 1 hour, twice weekly, for 12 months. Outcomes of interest include information regarding intervention acceptability, adherence, fidelity, dose/duration, participant recruitment, retention and attrition, assessment feasibility, and other barriers and facilitators to large-scale implementation, as well as quantitative information, which will include self-regulation/impulsivity, internalizing and externalizing behaviors, hope, perceived stress, coping skills, trauma-related symptoms, and mindfulness. These data are needed to inform future research to examine the effectiveness of TIMBY programs for justice-involved youth. If effective, adopting such programs into the treatment plans at JJ facilities and in other residential settings could reduce recidivism and enhance emotional and psychological health.

Conflict-of-Interest Statement

None of the authors have any of the following to declare: financial relationships with entities that could be perceived to influence the content of the submitted work; patents, copyrights, or royalties relevant to the submitted work; or other relationships or activities that could have influenced the content of the submitted work.

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