

Community-Based Interventions for Youth with a History of Developmental Trauma

By

Carly E. Holmes

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The dissertation is approved by the following members of the Final Oral Committee:

Eileen K. Kintner, Professor, School of Nursing

Danny G. Willis, Dean and Professor, Trudy Busch Valentine School of Nursing

Traci Snedden, Assistant Professor, School of Nursing

Craig Albers, Associate Professor, Department of Educational Psychology

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Abstract

Developmental trauma, defined as altered developmental function following chronic exposure to physical, sexual, and emotional abuse and neglect, and/or domestic violence within a caregiver relationship, affects youth in the United States and around the globe. Developmental trauma often results in significant negative physical, neurological, emotional, behavioral, and social health outcomes, hereinafter referred to as trauma-associated outcomes, that extend throughout the lifespan. Trauma-associated outcomes are precipitated by (a) altered feelings of attachment, (b) delayed biological development, (c) emotional dysregulation, (d) identity dissociation, (e) difficulty controlling behaviors, (f) diminished cognitive abilities, and (g) limited feelings of self-efficacy. Although first line interventions delivered in clinic settings are available, access for youth is limited. To address access barriers, neurosequential model of therapeutics-informed interventions delivered in community settings are being considered. To improve trauma-associated outcomes, community-based interventions should incorporate the attachment, regulation, and competency framework (ARC). To ensure sustainability of community-based interventions, the exploration, preparation, implementation, and sustainment framework (EPIS) should be used to guide adoption of interventions. EPIS specifies interventions must be perceived as acceptable, appropriate, and feasible to stakeholders implementing them. Therefore, the purpose was to identify and examine community-based interventions, determine the congruence between eligible interventions and ARC, and assess stakeholders' perceptions of interventions. Aim 1 identified and examined community-based interventions for youth with a history of developmental trauma using a mixed-methods integrative review to synthesize data from peer-reviewed literature across disciplines published between 1998 and 2019. Aim 2 determined the congruence between eligible interventions and ARC using a mixed-methods

analytic design to extract descriptive content about selected interventions and triangulate extracted content with the theoretical concepts of ARC. Aim 3 assessed stakeholder perception of interventions using a mixed-methods, cross-sectional, descriptive, relational design. A self-report survey elicited information about stakeholders' perceptions of acceptability, appropriateness, and feasibility of three types of community-based interventions. Findings guide implementation of theory- and evidence-informed community-based interventions for youth with a history of developmental trauma and advance implementation science in the offering of three revised measures. Successful implementation and sustainability of effective ARC-congruent and positively perceived community-based interventions can improve access to treatment youth deserve.

Introduction

Background and Significance

Approximately 47.9% of youth in the United States have experienced one or more instances of adverse childhood experiences, including complex interpersonal trauma (National Survey of Children's Health, 2012). Complex interpersonal trauma is defined as physical, sexual, and emotional abuse and neglect, and/or domestic violence, which is long-term and perpetrated by someone with whom an individual has regular contact or a close personal relationship (Cohen et al., 2010; Herman, 1992). When youth are chronically exposed to complex interpersonal trauma, growth and development are adversely affected (van der Kolk, 2005), culminating in sequelae referred to as developmental trauma.

Trauma-associated outcomes develop because youth with a history of developmental trauma must invest their time and energy in surviving their circumstances rather than attaining age-appropriate developmental milestones (Briere, 1988; Felitti et al., 1998; Herman, 1992). When youth experience developmental trauma and lack adequate support or resources to deal with the trauma, toxic stress may develop. Toxic stress activates stress response systems for extended periods of time that may result in permanent developmental brain changes such as a smaller brain size, lower stress threshold, and altered learning and memory. Without effective and timely intervention youth with toxic stress are at increased risk for alcoholism and drug use and abuse, depression and suicide ideation, and liver and heart disease across the lifespan. The societal cost and burden of developmental trauma in youth is estimated at \$120 billion annually in the United States (Fang et al., 2012). Early intervention has the potential to prevent and mitigate existing and long-term trauma-associated outcomes.

Clinic-Based Interventions

Cognitive-behavioral therapy (CBT) is the primary intervention for trauma-associated outcomes (Beck, 1997; Beck & Weishaar, 1989; Courtois, 2004). The goal of CBT is to restructure thoughts in an effort to mitigate feelings related to the trauma experience, which requires higher-order cognitive processing of information. However, developmental trauma often leads to reflexive brainstem function which activates the fight/flight/freeze response system in youth when they experience a stressful situation or misinterpret a perceived stressful situation (Perry, 2006). They are unable to process their experience using higher-order cognitive information procession regions, rendering CBT ineffective. Clinic-based mental health interventions for trauma-associated outcomes other than CBT are offered; however, youth are often unwilling or unable to participate due to the stigma of mental health, lack of access to services, and issues with third-party reimbursement (Briere & Spinazzola, 2005; Chu, 1992; Courtois, 2004; Kaushik et al., 2016; Merikangas et al., 2011). Therefore, theory- and evidence-informed community-based interventions must be considered to ensure youth receive the care and treatment they deserve.

Theory- and Evidence-Informed Community-Based Interventions

Theory- and evidence-informed community-based interventions are increasingly used in the treatment of trauma-associated outcomes for youth with a history of developmental trauma (Perry, 2006, 2009). Experiencing trauma over time and/or in different ways alters brain structures and connections. Brain changes, limited or poor relationships with others, and cognitive deprivation during formative years alters age-appropriate developmental capacity. For theory- and evidence-informed community-based interventions to be successful, cognitive, emotional, self-regulatory, personal, and interpersonal developmental age of youth must be considered. In addition, theory- and evidence-informed community-based interventions (a)

should be relevant, relational, repetitive, rewarding, rhythmic, and respectful (Perry & Hambrick, 2008; Perry & Ludy-Dobson, 2010) and (b) address the theoretical concepts of attachment, regulation, and competency (Blaustein & Kinniburgh, 2010, 2019).

The neurosequential model of therapeutics (NMT) provides definitions for the concepts of relevance, relational, repetition, rewarding, rhythmic, and respectful, also known as the *Six R's* (Perry, 2006; Perry & Hambrick, 2008; Perry & Ludy-Dobson, 2010). *Relevance* ensures interventions are age- and development-appropriate. *Relational* experiences provide safety and structure. *Repetition* patterns consistency. *Rewarding* captivates interest. *Rhythmic* reorders brain connections. *Respectful* considers personal values and culture. Theory- and evidence-informed community-based interventions that address these concepts include sports activity, artistic expression, and animal interaction interventions.

Implementation of Theory- and Evidence-Informed Community-Based Interventions

Disseminating and implementing theory- and evidence-informed community-based interventions in real-world settings is challenging (Grayson et al., 2012; Greenhalgh et al., 2004; Rabin & Brownson, 2012). Due to the active participation of stakeholders in the implementation process, attitudes towards an intervention are an important antecedent to its successful adoption and sustainability (Greenhalgh et al., 2004). Increasing understanding of adoption of effective interventions requires identification of facilitators and barriers that impact stakeholder attitudes. Assessment of stakeholders' perceptions of intervention acceptability, appropriateness, and feasibility is the logical first step (Proctor et al., 2011; Weiner et al., 2017).

Acceptability is the personal belief among stakeholders that an intervention is agreeable, palatable, and/or satisfactory (Proctor et al., 2011; Weiner et al., 2017). *Appropriateness* is the perception among stakeholders that an intervention is fit, relevant, and/or compatible with the

phenomena of interest, goals of the organization, and community setting. *Feasibility* is the perception among stakeholders that an intervention can easily be adopted using existing resources. Before a decision is made to adopt a community-based intervention, stakeholders' values must convey a positive perception of the intervention's acceptability, appropriateness, and feasibility.

Identified Gaps in Current Research

Lack of Comparison between Community-Based Interventions

Studies of community-based interventions for youth with a history of trauma have been conducted, yet there is a lack of consistency between study design and outcome categories used to examine study results, making comparison difficult and therefore unaccomplished. Study designs included quantitative-only, qualitative-only, and mixed-methods designs. Current studies varied in examining outcome categories of mental, behavioral, and physical health, attachment, executive functioning, and well-being. Within outcome categories, measures were inconsistently used. For example, analyses of mental health outcomes included 16 different measures. Regardless, there is a strength to comparing studies that use different study designs (Pluye, 2009), and examining only those outcome categories that exist across all studies would diminish the value of our analyses (Light & Smith, 1971). In order to examine the effectiveness of community-based interventions, all study designs and outcome categories and measures must be included.

Incomplete Examination of Congruence between Community-Based Interventions and ARC

Triangulation of data sources includes comparing information collected within qualitative methods (Patton, 1999). Community-based interventions for youth with a history of developmental trauma should incorporate the theoretical concepts of the attachment, regulation,

and competency framework (ARC) that recognize the value of individual, cultural, and contextual approaches (Arvidson et al., 2011; Blaustein & Kinniburgh, 2010, 2019; Kinniburgh et al., 2005). However, identified studies failed to mention specific incorporation of ARC, and examining congruence of community-based interventions with ARC remains unaccomplished.

Limited Understanding about Stakeholders' Perceptions of Community-Based Interventions

For community-based interventions to be successfully adopted and ultimately sustainable in practice settings, stakeholder involvement and representation in the implementation process is critical (Proctor et al., 2012). During the exploration phase of the exploration, preparation, implementation, and sustainment framework (EPIS), individual adopter characteristics of relevant stakeholders represent facilitators and barriers to intervention adoption (Aarons et al., 2011; Moullin, 2019). Stakeholders' perceptions of acceptability, appropriateness, and feasibility that remain scarce are crucial facilitators and barriers of adopting community-based interventions (Proctor et al., 2011; Weiner et al., 2017).

Specific Aims

To address critical gaps in the literature—(a) lack of comparison between types of community-based interventions, (b) incomplete examination of congruence between community-based interventions and ARC, and (c) limited understanding about stakeholders' perceptions of community-based interventions—the purpose of my dissertation was to identify and examine community-based interventions, determine the congruence between eligible interventions and ARC, and assess stakeholders' perceptions of interventions.

Study Aim 1: To (a) identify studies that used quantitative, qualitative, and mixed-methods designs to evaluate theory- and evidence-informed community-based interventions for youth aged 6–18 years with a history of developmental trauma, (b)

examine the effectiveness of the interventions, (c) describe qualitative experiences of intervention participants, and (d) summarize the convergence and divergence of findings across studies by intervention type.

Study Aim 2: To determine the congruence between content of eligible interventions for youth aged 6–18 years with a history of developmental trauma and the theoretical concepts of attachment, regulation, and competency.

Study Aim 3: To (a) assess stakeholders' perceptions of acceptability, appropriateness, and feasibility of theory- and evidence-informed, community-based sports activity, artistic expression, and animal interaction interventions for youth aged 6–18 years with a history of developmental trauma, (b) determine between and within group differences in stakeholders' perceptions, and (c) explore stakeholders' perceptions of facilitators and barriers to implementation of the interventions.

Proposed Theoretical Frameworks

Attachment, Regulation, and Competency Framework

The attachment, regulation, and competency framework (ARC) is a theory-based intervention model (Arvidson et al., 2011; Blaustein & Kinniburgh, 2010, 2019; Kinniburgh et al., 2005). ARC informs which interventions are designed to improve trauma-associated outcomes in youth with a history of developmental trauma, while recognizing the value of individual, cultural, and contextual approaches. ARC recommends the following three concepts be incorporated into developmental trauma-informed interventions: (a) *attachment*, defined as the quality of connection or bond that generates feelings of safety between youth and their caregivers, (b) *regulation*, defined as the ability to recognize and moderate one's emotions, and (c) *competency*, defined as the ability to increase resilience through empowerment, personal

choice, decision-making, and self-identity. ARC's outcomes are demonstrated by (a) distress tolerance and regulation; (b) curiosity and reflection; and (c) engaging in purposeful action.

Evaluation, Preparation, Implementation, and Sustainment Framework

Successful dissemination and implementation of theory- and evidence-informed community-based interventions is needed to decrease trauma-associated outcomes in youth with a history of developmental trauma. The exploration, preparation, implementation, and sustainment framework (EPIS; Aarons et al, 2011; Moullin et al., 2019) is used to guide implementation of effective interventions in a variety of settings. EPIS includes four phases: (a) *exploration*, in which an organization decides whether to adopt a specific evidence-based practice (EBP); (b) *preparation*, in which stakeholders create a plan to utilize facilitators, address barriers, and assess adaptation needs; (c) *implementation*, in which the EBP is incorporated into an organization; and (d) *sustainment*, in which oversight of the EBP is conducted to ensure it is being delivered as intended. Within each EPIS phase, implementation components include the outer context, inner context, bridging factors, and innovation factors. The *outer context* encompasses the environment external to an organization in which an EBP is being implemented. The *inner context* encompasses the characteristics within an organization. *Bridging factors* include the relationships between the outer and inner contexts. *Innovation factors* ensure that the EBP is adapted to fit the needs of individuals receiving the intervention.

Overview of Methods

In pursuit of these aims, I conducted a mixed-methods integrative review of the literature (Aim 1) and analyzed congruence between integrative review data sources and ARC (Aim 2). Studies were identified through a thorough online database search and included if they (a) were quantitative experimental or observational, qualitative, and/or mixed-methods and (b) assessed

theory- and evidence-informed community-based interventions intended for youth with a history of developmental trauma. A total of 17 studies were included in the analysis. Vote counting and textual narrative synthesis (Aim 1), and data source triangulation (Aim 2) were used to examine studies that met specified inclusion criteria and were analyzed according to published guidelines.

Following judgment of community-based interventions in Aim 1 and Aim 2, I conducted a cross-sectional survey comprised of revised implementation measures of stakeholders' perceptions of acceptability, appropriateness, and feasibility of interventions (Aim 3). I recruited public health, school mental health, and child welfare professional stakeholders across Wisconsin through public, private, and Tribal health departments, public and private school systems, child welfare organizations, and organizations with a mission focused on youth with trauma histories. Inclusion criteria for participation was (a) be a public health, school mental health, or child welfare professional and (b) work with youth who have been or are currently involved in the Child Protective Services system. A total of 77 stakeholders took the online survey via Qualtrics [Computer Software] (2020). Reliability and exploratory factor analysis were conducted for each implementation measure. Parametric statistics were used to analyze data between and within stakeholder groups.

Introduction to Three Manuscripts

The three manuscripts that follow represent a cohesive body of work about community-based interventions for youth with a history of developmental trauma for my dissertation study. The mixed-methods integrative review paper describes the effectiveness of community-based interventions and experiences of participants engaged in them. The data source triangulation paper examines the congruence between community-based interventions and ARC. The data-based paper describes results of stakeholders' perceptions of community-based interventions.

Manuscript 1: “Integrative Review of Community-Based Therapies for Children and Adolescents with a History of Developmental Trauma”

This review paper describes findings of Aim 1 of this dissertation study following Whittemore and Knafl’s (2005) strategies to enhance rigor in an integrative review. Data sources identified in this paper are the basis for comparing congruence in Aim 2 and stakeholders perceptions in Aim 3. The findings of this paper highlight effectiveness of community-based interventions and experiences of those participating in them.

Manuscript 2: “Representations of Attachment, Regulation, and Competency (ARC) Framework Concepts in Community-Based Interventions for Youth with a History of Developmental Trauma”

This paper describes findings of Aim 2 of this dissertation study following an adapted decision-making flow-chart (Haase et al., 1999). Findings describe the degree of congruence between sports activity, artistic expression, animal interaction, and camp experience interventions identified in Aim 1 and ARC’s theoretical concepts of attachment, regulation, and competency.

Manuscript 3: “Professional Stakeholder Perceptions on Acceptability, Appropriateness, and Feasibility of Community-Based Interventions for Youth with a History of Developmental Trauma”

This final paper describes findings of Aim 3 of the dissertation study (to assess stakeholders’ perceptions on community-based interventions). The adapted Aaron’s et al. (2011) exploration, preparation, implementation, and sustainment framework inner context variable of individual adopter characteristics guided the examination of stakeholder perceptions’ of community-based interventions identified and examined in Aims 1 and 2. Camp experience

interventions were excluded from the implementation survey due to overlap with the other intervention types.

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Manuscript 1

Integrative Review of Community-Based Therapies for Children and Adolescents with a History of Developmental Trauma

Abstract

Developmental trauma is a systemic issue that may lead to a variety of adverse immediate and long-term mental and physical health outcomes in youth. Community-based interventions offer an alternative avenue for treating trauma-associated outcomes. An integrative review of the literature was conducted to determine the effectiveness of available community-based interventions and describe the experiences of youth who participated in them. Vote-counting for quantitative outcomes and textual narrative synthesis for qualitative outcomes were used to analyze the data. The results indicated stable or positive changes on mental, behavioral, and physical health, attachment, executive functioning, and well-being measures, and described themes of facilitation, person-centered, usable tool, attachment, unfavorable attitudes, hesitation, appreciation, and outcomes. School nurses have a unique opportunity to address trauma-associated outcomes by referring youth to available and effective community-based interventions.

Integrative Review of Community-Based Therapies for Children and Adolescents with a History of Developmental Trauma

Approximately 47.9% of youth in the United States have experienced one or more instances of adverse childhood experiences, including complex interpersonal trauma (National Survey of Children's Health, 2012). Complex interpersonal trauma is defined as physical, sexual, and emotional abuse and neglect, and/or domestic violence, which is long-term and perpetrated by someone with whom an individual has regular contact or a close personal relationship (Cohen et al., 2010; Herman, 1992). When youth are chronically exposed to complex interpersonal trauma, growth and development are adversely affected (van der Kolk, 2005), culminating in sequelae referred to as developmental trauma.

Developmental trauma affects physical, psychological, social, and spiritual growth and development and leads to long-term negative trauma-associated outcomes (van der Kolk, 2005). Developmental trauma stems from failed caregiving systems which lacked appropriate coregulation and educational experiences needed for youth to obtain tools helpful for seamless assimilation into society (Briere, 1988; Briere & Spinazzola, 2005; Felitti et al., 1998; Herman, 1992; Perry, 2006). When youth with developmental trauma are unable to regulate internal states associated with stress and distress, they frequently enter a fight/flight/freeze (FFF) response mode (Porges, 1994; 2009). The FFF response mode is compounded by a substantially conditioned and often unconscious distrust of others who might be able to help them. The FFF response mode renders impacted youth unable to effectively respond to situations or to learn from their experiences so that they might be better able to respond when confronted with similar situations in the future. Without the capability to self-regulate or the support of trusted others to assist in coregulation, a highly active FFF response mode can lead to toxic stress. Toxic stress, in

turn, may result in permanent structural changes in the developing brain resulting in a smaller brain size, a lower stress threshold, or altered learning and memory (McEwen, 2005, 2006; Shonkoff et al., 2012). Without effective and timely intervention, youth with toxic stress are at increased risk for negative trauma-associated outcomes such as alcoholism and drug use and abuse, depression and suicide ideation, and liver and heart disease as they age across their lifespan (Briere, 1988; Felitti et al., 1998; Herman, 1992; Perry, 2006). The societal cost and burden of complex interpersonal trauma in youth in the US has been estimated at approximately \$120 billion annually (Fang et al., 2012). Yet, evidence indicates that developmentally appropriate interventions can prevent and mitigate existing and long-term trauma-associated outcomes (Perry, 2006; van der Kolk, 2005).

Cognitive-behavioral therapy (CBT), typically delivered in inpatient or clinic settings, often is the intervention of choice for managing negative trauma-associated outcomes (Beck, 1997; Beck & Weishaar, 1989; Courtois, 2004). The goal of CBT is to restructure thoughts to mitigate feelings related to the trauma experience using higher-order cognitive processing. However, the FFF response mode, typically experienced with developmental trauma and toxic stress, can inhibit the higher-order cognitive processing required for CBT (Perry, 2006). Therefore, alternative theory- and evidence-informed interventions designed to reorganize the brain, address the ability to self-regulate, and escape the FFF response mode must be considered.

From a clinically focused, neurobehavioral perspective, Perry and colleagues, following the neurosequential model of therapeutics, theorized that interventions for youth with a history of developmental trauma should be relevant, relational, repetitious, rewarding, rhythmic, and respectful (6 Rs; Perry, 2006, 2009; Perry & Hambrick, 2008; Perry & Ludy-Dobson, 2010). *Relevance* ensures interventions are based on age and development. *Relational* experiences

provide safety and structure. *Repetition* patterns consistency. *Rewarding* captivates interest. *Rhythmic* reorders brain connections. *Respectful* considers personal values and culture. Theory- and evidence-informed interventions that incorporate the 6 Rs appear to be more appropriate for youth with a history of developmental trauma.

Bronfenbrenner (1974) posited that youth development is affected by the immediate and an enduring environment. The *immediate environment* includes physical space and resources, interpersonal relationships, and activities in which youth are engaged. The *enduring environment*, encompassing geographic location and social policy, promotes or limits what can occur in the immediate environment. Immediate and enduring environmental barriers that make receiving clinic-based mental health services challenging include issues related to (a) access, (b) stigma of mental health, (c) difficulties in navigating health systems, and (d) challenges with third-party reimbursement (Briere & Spinazzola, 2005; Chu, 1992; Courtois, 2004; Kaushik et al., 2016; Merikangas et al., 2011). Additionally, complex scheduling issues associated with clinic-based therapy often results in fragmented care (Perry, 2006). School nurses play a vital role in addressing immediate and enduring environmental barriers to access through their unique ability to connect with youth and refer them to services in the community setting (National Association of School Nurses [NASN], 2015). Because the framework for 21st century school nursing practice encourages the identification of evidence-based practices, it is crucial to identify community-based interventions that can be used as options for referral.

Theory- and evidence-informed community-based interventions that are relevant, relational, repetitious, rewarding, rhythmic, and respectful (Perry, 2006) must be considered to ensure youth receive the care and treatment they deserve. Community-based interventions address the immediate and enduring environmental barriers by increasing access, decreasing

stigma, eliminating the need to navigate health systems, and alleviating complex scheduling issues (Konanur et al., 2015). Such community-based interventions include sports activity, artistic expression, animal interaction, and camp experience. To our knowledge, no studies or reviews compare the effects of different types of community-based interventions for the treatment of developmental trauma.

Purpose of Current Study

The purpose of this mixed-methods integrative review was to (a) identify studies that used qualitative, quantitative, and mixed-methods designs to evaluate theory- and evidence-informed community-based interventions for youth aged 6–18 years with a history of developmental trauma; (b) examine the effectiveness of the interventions; (c) describe qualitative experiences of intervention participants; and (d) summarize the convergence and divergence of findings across studies by intervention type. Findings of this integrative review will help researchers, clinicians, and community partners, including school nurses, determine which types of community-based interventions could be implemented to address trauma-associated outcomes in youth with developmental trauma histories.

Methods

A mixed-methods integrative review of the literature was conducted. An integrative review includes multiple methodologies to understand the depth, breadth, scope, and prevalence of evolving phenomena (Pluye et al., 2009; Pluye & Hong, 2014; Sandelowski et al., 2006). This integrative review was exempt from institutional review board approval or informed consent.

Identification of Studies

Working in collaboration with a professional health librarian, the first author conducted a systematic search of 18 databases (i.e., Academic Search Premier, Alt HealthWatch, CINAHL,

Consumer Health Complete – EBSCOhost, ERIC, Family & Society Studies Worldwide, Health and Psychosocial Instruments, Health Source – Nursing/Academic Edition, MEDLINE, PsycARTICLES, PsycINFO, PTSDpub, PubMed, Science Reference Center, Social Work Abstracts, SocINDEX, SPORTDiscus, Urban Studies Abstracts) to obtain review materials.

Table 1 outlines our search criteria. Materials included peer-reviewed research publications. We began by reviewing article titles and abstracts to screen for relevance. Then, we thoroughly reviewed the full text of each article to determine relevance. In addition, we expanded the search using reference lists of selected articles. The iterative process continued until saturation was achieved.

Criteria for Inclusion/Exclusion

Inclusion criteria included peer-reviewed research articles published in English between 1998 and 2019 in which the majority of study participants were aged 6–18 years. The year 1998 was selected as it was the year the Adverse Childhood Experiences (Felitti et al., 1998) study was published, with a subsequent research boom on mental health and physical health outcomes related to developmental trauma experience. Research articles were included if the studies (a) used qualitative, quantitative experimental or observational, and/or mixed-methods designs; and (b) assessed community-based interventions intended for youth with a history of developmental trauma. An article with the highest level of evidence was selected to represent community-based interventions with more than one research report. Research reports were excluded if (a) the type of trauma was unspecified, (b) the intervention was delivered as a supplement to the primary research intervention of CBT, (c) the intervention was delivered in an in-patient setting, or (d) the outcomes were unspecified.

Quality Assessment

We used the 2018 version of the Mixed Methods Appraisal Tool (MMAT; Hong et al., 2018, 2019; Pace et al., 2011) to determine the quality of each study design. MMAT is used to evaluate qualitative, quantitative, and mixed-methods study designs when performing an integrative review (Pluye et al., 2009; Souto et al., 2015). Each criterion in MMAT is scored as 0 (absence) or 1 (presence), and the final quality score is calculated as a percentage of relevant criteria (qualitative, quantitative randomized-controlled trials, quantitative non-randomized, quantitative descriptive, or mixed-methods). Whichever score is lowest in a mixed-methods study determines the overall quality of that study. For this review, a score of 1 was rated as low quality, a score of 2 or 3 was rated as medium quality, and a score of 4 or 5 was rated as high quality. Content validity, efficiency, and reliability of the MMAT are confirmed. Content validity was confirmed using an integrative review of mixed-methods studies. Results indicated that completion of the tool required approximately 14 minutes per article. Interrater reliability was estimated at 0.72 before discussion and 0.94 after discussion.

Data Extraction and Analysis

Vote counting was used to analyze the findings of the quantitative data (Hedges & Olkin, 1980; Hong et al., 2017; Light & Smith, 1971). Vote counting is a type of modal categorization used to determine the relationship between a dependent variable and a specific independent variable. We first categorized each research report by intervention type as sports activity, artistic expression, animal interaction, or camp experience. Then, we extracted the results from the text sections and tables of the reports and organized data based on the following categories: mental health, behavioral health, physical health, attachment, executive functioning, and well-being. Study outcomes were scored as (a) significant positive, (b) significant negative, (c)

nonsignificant, or (d) not applicable. Finally, scores were tallied and computed for each category to examine the effectiveness of each individual intervention.

To analyze the qualitative outcomes, we developed an extraction guide using textual narrative synthesis (Hong et al., 2017; Lucas et al., 2007). Textual narrative synthesis describes concepts related to the following aspects of an intervention for this study: (a) *characteristics*, which include intervention type, intervention format, and sample; (b) *context*, which include residence and country; (c) *quality*, which is the MMAT score; and (d) *findings*, which include measures and main outcomes. We organized articles within homogenous groups by intervention type. Results were compared for similarities and differences.

We used parallel-results-convergent-design to synthesize the findings (Hong et al., 2017). This design allows for separate examination of qualitative and quantitative results. The evidence is reviewed separately and integrated in the discussion section of this manuscript.

Addressing Potential Threats to Design Validity

Potential threats to design validity were addressed using trustworthiness (Guba & Lincoln, 1989). Trustworthiness of the study and rigor of findings were based on confirmability, dependability, credibility, and transferability. Techniques used included prolonged engagement, persistent observation, data emersion, expert examination, and peer confirmation, as well as the use of thick descriptions, an audit trail, and outside reviewers to evaluate the process, judge decisions, and interpret findings. All data can be traced to their original sources.

Results

Overview of Studies

Seventeen studies met the eligibility criteria and were included in this mixed-methods integrative review. Figure 1 depicts the flow of articles through the review process. Of the

included studies, one used a qualitative research design, 13 used a quantitative research design, and three used a mixed-methods research design. One intervention was sports activity, taking place at a sports facility using team basketball as the therapeutic agent. Five interventions were artistic expression, taking place at a therapy office, community center, or residential facility using improvisation, expressive mixed media, poetry, song writing, and/or visual arts. Nine interventions were animal interaction, taking place at a local farm, public park, animal shelter, or therapy office using either equines or canines. Two interventions were camp experience, taking place at a local university or day camp site using daily interaction with adult counselors and structured activities. Intervention format included group only, individual only, and combined group and individual sessions, and included female only, male only, or female and male combined samples in eight countries around the world. Table 2 presents specifics of the (a) research design, (b) intervention type, (c) intervention format, (d) sample, residence, and country, (e) measures, (f) main outcomes, and (g) MMAT quality score.

Quality Assessment

Using the MMAT scoring criteria guide (Hong et al., 2018, 2019; Pace et al., 2011), eight studies were rated high quality and nine studies were rated medium quality. No studies were rated low quality. Table 2 provides each intervention's ratings. Specific criteria included in the MMAT scoring guide for each design led to the deduction of points across interventions, as outlined below.

Qualitative Design

Three of five criteria accounted for the deduction of points across interventions, specifically: (a) are the findings adequately derived from the data, (b) is the interpretation of

results sufficiently substantiated by data, and (c) is there coherence between qualitative data sources, collection, analysis, and interpretation?

Quantitative Randomized-Controlled Trial Design

Two of five criteria accounted for the deduction of points across interventions, specifically: (a) are the outcome assessors blinded to the intervention provided, and (b) did the participants adhere to the assigned intervention?

Quantitative Non-Randomized Design

Five of five criteria accounted for the deduction of points across interventions, specifically: (a) are the participants representative of the target population, (b) are the measures appropriate regarding both the outcome and intervention (or exposure), (c) are there complete outcome data, (d) are the confounders accounted for in the design and analysis, and (e) during the study period, is the intervention administered (or exposure occurred) as intended?

Quantitative Descriptive Design

No MMAT criteria led to the deduction of points.

Mixed Methods Design

Three of five criteria accounted for the deduction of points across interventions, specifically: (a) is there an adequate rationale for using a mixed methods design to address the research question, (b) are the outputs of the integration of qualitative and quantitative components adequately interpreted, and (c) do the different components of the study adhere to the quality criteria of each tradition of the methods involved?

Quantitative Results

Measures used to determine quantitative results included (a) mental health, (b) behavioral health, (c) physical health, (d) attachment, (e) executive functioning, and (f) well-being. Mental

health outcomes comprised of one alexithymia measure (Children's Alexithymia Measure; Naste et al., 2018), one anxiety measure (Beck Anxiety Inventory; Kemp et al., 2014), four different depression measures (e.g., Short Center for Epidemiologic Studies Depression Scale; Brillantes-Evangelista, 2013; Signal et al., 2013), one dissociation measure (Adolescent Dissociative Experiences Scale; Naste et al., 2018), one internalizing/externalizing measure (Child Behavior Checklist; e.g., Kim, 2017; Purvis et al., 2007), five different post-traumatic stress measures (e.g., Trauma Symptoms Checklist; Brillantes-Evangelista, 2013; Dietz et al., 2012; Pifalo, 2006; Signal et al., 2017), one self-esteem scale (Rosenberg Self-Esteem Scale; e.g., Visser & Plessis, 2015), and two different measures that combined the above mental health outcomes (e.g., Children's Global Assessment of Functioning; Pretorius & Pfeifer, 2010). Behavioral health outcomes were comprised of five different measures (e.g. Child Behavior Checklist; Balluerka, et al., 2015; Schultz et al., 2007) and one chart review (D'Andrea et al., 2013). Physical health outcomes were comprised of one measure (Somatic Awareness Measure; Naste et al., 2018). Attachment outcomes were comprised of six different measures (e.g., Beech Brook Attachment Disorder Checklist; Mueller & McCullough, 2017). Executive functioning outcomes were comprised of two different measures (e.g. Abbreviated Dysregulation Index; Naste et al., 2018). Well-being outcomes were comprised of two different author-designed scales (e.g., coping with stressful life events; Hamama et al., 2011).

Intervention types by category used various outcome measures. Table 3 presents outcome measures and vote-counting results. The sports activity intervention measured mental health, behavioral health, and attachment outcomes and reported statistically significant positive change. The artistic expression interventions measured mental health, behavioral health, and attachment outcomes and reported either statistically significant positive change or no change. Animal

interaction interventions measured mental health, behavioral health, physical health, attachment, executive functioning, and well-being outcomes and reported either statistically significant positive change, clinically significant positive change, or no change. The camp experience intervention measured mental health, behavioral health, physical health, and attachment outcomes and reported either statistically significant positive change or no change.

Qualitative Results

Qualitative results were determined using (a) interviews (Bademci et al., 2015; Brillantes-Evangelista, 2013; Visser & Plessis, 2015), (b) observation (Bademci et al., 2015; D'Andrea et al., 2013), and (c) notes/journaling (Visser & Plessis, 2015). Qualitative themes included (a) facilitation, (b) person-centered, (c) usable tool, (d) attachment, (e) unfavorable attitudes, (f) hesitation, (g) appreciation, and (h) outcomes. Table 4 provides descriptions of the themes. Artistic expression interventions portrayed the themes of facilitation, person-centered, usable tool, attachment, and outcomes. The animal interaction intervention portrayed the themes of facilitation, person-centered, usable tool, attachment, and outcomes. The camp experience intervention portrayed the themes of facilitation, person-centered, attachment, unfavorable attitudes, hesitation, appreciation, and outcomes.

Discussion

Community-based interventions are shown to improve a multitude of outcomes in youth with a history of developmental trauma. Using a mixed-methods integrative review to analyze qualitative, quantitative, and mixed methods research reports was useful when comparing outcome measures that were nonhomogeneous and reported on statistical significance. However, most outcomes measures did not mention clinical significance, which may be useful in determining moderate outcomes. Due to the relevance of community-based interventions with

the neurosequential model of therapeutics (Perry, 2006), stakeholders should consider these interventions when intervening with youth who have experienced trauma.

Various outcome measures were used for each outcome category, and each individual research report did not examine all outcome categories. Within outcome categories, specific measures were completed by a variety of subjects, including youth, parent, teacher, and physician. Additionally, quantitative vote counting results showed statistically positive results or no change, but only one report examined clinically significant change. To address these issues, we examined qualitative results to glean information that may not have been captured in quantitative outcome measures.

Community-based interventions should be considered when employing the neurosequential model of therapeutics to address trauma-associated outcomes in youth. Following an implementation framework, next steps should include administering a survey developed to understand personal beliefs about community-based interventions of professionals that in their practice setting work with youth who have experienced trauma. Once adapted for individuals, communities, and cultures, convenient and accessible community-based interventions should be made readily available to ensure youth who have experienced developmental trauma have access to beneficial and necessary services.

The National Association of School Nurses (NASN) posited that school nurses are vital to addressing the behavioral and mental health of students through programs in schools and communities (NASN, 2018). NASN's Framework for 21st Century School Nursing Practice underscores the importance of care coordination, leadership, quality improvement, and community/public health as necessary standards of practice (NASN, 2015). These principals of practice allow school nurses the unique opportunity to interact with youth who have been

identified to have trauma-associated outcomes, but also assist in the assessment and identification of students who have previously undisclosed behavioral and mental health concerns. Additionally, school nurses have the ability to connect students to resources to address these issues. Interventions that are implemented in community settings and are more readily accessible to youth have the opportunity to be an important avenue of referral for school nurses.

Conclusion

Experiencing developmental trauma can lead to a variety of negative adverse mental and physical health outcomes that may affect an individual throughout their life. Community-based interventions relevant to the neurosequential model of therapeutics present an opportunity to address these outcomes for youth where clinic-based therapies are (a) difficult to access due to their immediate and enduring environments or (b) potentially unsuccessful due to their reliance on higher-order cognitive processing that is inhibited when in a FFF mode. An integrative review of the literature was useful in determining the effectiveness of community-based interventions. Results show either stable or positive changes on a variety of health-related measures; no community-based interventions led to negative changes. NASN's Framework for 21st Century School Nursing Practice principle of community/public health includes outreach, which involves the identification of students at risk and related services (NASN, 2015). Through outreach, schools nurses have a unique opportunity to address trauma-associated outcomes by referring youth to available community-based interventions. Implementation of community-based interventions should be conducted to expand treatment opportunities for youth who have experienced developmental trauma.

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Table 1*Initial Review Categories with Associated Search Terms*

Outcomes	Terms
Type of Trauma	PTSD / posttraumatic stress disorder / post traumatic stress disorder "intentional trauma" / "intentional violence" "chronic trauma" "developmental trauma" "nonaccidental trauma" / "nonaccidental violence" "interpersonal trauma" / "interpersonal violence" "complex trauma" "physical abuse" "emotional abuse" "sexual abuse" maltreatment neglect ACE / "adverse childhood experiences"
Community-Based Interventions	complementary / alternative / CAM integrative theory- and evidence-informed community-based community-focused public health physical activity / exercise / fitness / sport "animal therapy" / "pet therapy" / "equine therapy" / AAT / animal-assisted "writing" "performance art" "visual art" / "art therapy" / "art practice" music / drum* dance / "movement therapy" drawing singing drama / acting nature / wilderness bibliotherapy mindfulness cooking / culinary
Age	children / child minor adolescen* / teenager youth "6–12 years" "13–18 years" "6–18 years"

Table 2

Evidence Chart

Source	Research Design	Intervention Type	Intervention Format	Sample/Residence/ Country	Measures	Main Outcomes	MMAT Quality Score
Bademci (2015)	Qualitative	Camp Experience	Group/individual sessions at local university using mentors facilitating various activities	n = 48 (48M; 14–17yo) Residential facility in Turkey	-experiences: participant observation and interview -QOL: participant observation and interview	make sense of experiences and quality of life	High
Balluerka (2015)	Quantitative	Animal Interaction	Group/individual sessions at local farm using canines/equines	n = 67 (25F, 42M; 12–17yo) Residential facility in Spain	-adjustment: self-, parent-, residential care staff-report instrument -behavioral health: parent-, residential care staff-report instrument	-adjustment *maladjustment *personal adjustment *adaptive skills *school maladjustment -behavioral health	High
Brillantes-Evangelista (2013)	Mixed-Method	Artistic Expression	Group sessions at therapist office using poetry and visual arts	n = 33 (21F, 12M; 13–18yo) Residential facility in Philippines	-mental health: self-report instruments -participant experiences: participant interviews	-mental health *depression: cognitive, affective, psychomotor, somatic, social, interpersonal *PTSD -participant experiences	Medium
D'Andrea (2013)	Quantitative	Sports Activity	Group sessions at sports facility using team basketball	n = 88 (88F; 12–21yo) Residential facility in United States	-mental health: therapist-, caregiver-, teacher-report instrument -behavioral health: chart review -attachment: coach, participant observation	-mental health (internalizing, externalizing) -behavioral health (physical restraints, timeouts) -attachment *interpersonal adult relationships *interpersonal peer relationships	Medium
Dietz	Quantitative	Animal	Group sessions at therapist	n = 153 (143F, 10M; 7–17yo)	-mental health: self-report	-mental health	High

(2012)	Interaction	office using canines	Home of legal guardian in United States	instrument -behavioral health: self-report instrument	*anxiety *depression *PTSD *dissociation *sexual concerns -behavioral health *anger	High
Hamama (2011)	Quantitative	Group sessions at public park using canines	$n = 18$ (18F; 14–17yo) In custody of Child Protective Services in Israel	-well-being: self-report instrument -coping with stressful life events: self-report instrument -mental health: self-report instruments	-well-being -coping with stressful life events -mental health *PTSD *depression	High
Kemp (2014)	Quantitative	Group sessions at local farm using equines	$n = 30$ (24F, 6M; 8–17yo) Home of legal guardian in Australia	-mental health: self-report instruments -behavioral health: caregiver-report instrument	-mental health *depression *anxiety *trauma symptoms (depression, anxiety, posttraumatic stress, sexual concerns, dissociation) -behavioral health (maladaptive social, emotional, overt behaviors)	High
Kim (2017)	Quantitative	Group sessions at community center using music	$n = 26$ (11F, 15M; 7–12yo) Home of legal guardian in South Korea	-mental health: self-, teacher-report instrument -behavioral health: self-, teacher-report instrument	-mental health *depressed/anxious -behavioral health *withdrawn *attention	Medium
Mueller (2017)	Quantitative	Group sessions at local farm using equines	$n = 54$ (9F, 45M; 10–18yo) Residential facility in United States	-mental health: self-report instrument -attachment: self-report instrument	-mental health *trauma symptoms (intrusion, avoidance, arousal) -attachment *human/animal bond	Medium
Naste (2018)	Mixed-Method	Individual sessions at local farm using equines	$n = 3$ (3F; 10–12yo) Home of legal guardian in United States	-trauma impaired domains: self-, clinician-, and caregiver-report instruments -mental health: self- and parent-	-trauma impaired domains (biological regulation, affect regulation, behavioral control,	High

Pifalo (2006)	Quantitative	Artistic Expression	Group sessions at therapist office using visual art	<i>n</i> = not specified (8–17yo) Home of legal guardian in United States	<p>report instruments</p> <p>-physical health: self-report instrument</p> <p>-behavioral health: caregiver-report instrument</p> <p>-psychosocial functioning: clinician interview</p> <p>cognition, self-concept, attachment)</p> <p>-mental health</p> <p>*PTSD (intrusions, avoidance, alterations in cognitions and mood, alterations in arousal and reactivity)</p> <p>*depression</p> <p>*dissociation</p> <p>*alexithymia</p> <p>-dysregulation (cognitive, affective, behavioral)</p> <p>-physical health</p> <p>*somatic awareness (somatic sensory sensitivity, somatic problems, body awareness)</p> <p>-behavioral health (functioning/behavior problems, behavioral regulation, metacognition)</p> <p>-psychosocial functioning</p>	Medium
Pretorius (2010)	Quantitative	Artistic Expression	Group sessions at residential facility using visual art, drama/theatre, & storytelling	<i>n</i> = 25 (25F; 8–11yo) Residential facility in South Africa	<p>-mental health: self-report instrument</p> <p>-behavioral health: self-report instrument</p> <p>-mental health</p> <p>*anxiety</p> <p>*depression</p> <p>*PTSD</p> <p>*dissociation</p> <p>*sexual concerns</p> <p>-behavioral health</p> <p>*anger</p> <p>-mental health</p> <p>*depression</p> <p>*anxiety</p> <p>*sexual concerns</p> <p>*self-esteem</p>	High
Purvis (2007)	Quantitative	Camp Experience	Group/individual sessions at camp location using mentors facilitating various activities	<i>n</i> = 19 (10F, 9M; 4–9yo) Home of legal guardian in United States	<p>-mental health: parent-report instrument</p> <p>-behavioral health: parent-report instrument</p> <p>-mental health</p> <p>*anxious/depressed</p> <p>*thought problems</p> <p>-behavioral health</p>	Medium

Schultz (2007)	Quantitative	Animal Interaction	Individual sessions at local farm using equines	$n = 63$ (24F, 37M; 4–16yo) Home of legal guardian in United States	-attachment: parent-report instruments , self-report drawings with assessment criteria	*withdrawn *attention problems *delinquent behavior *aggressive behavior -physical health *somatic complaints -attachment *social problems *views *disturbance	Medium
Signal (2013)	Quantitative	Animal Interaction	Group sessions at local farm using equines	$n = 30$ (24F, 6M; 8–17yo) Home of legal guardian in Australia	-mental health: treatment team-report instrument -behavioral health: treatment team-report instrument -attachment: treatment team-report instrument	-mental health *psychological functioning -behavioral health *school functioning -attachment *social functioning	High
Signal (2017)	Quantitative	Animal Interaction	Group sessions at animal shelter using canines	$n = 20$ (8F, 12M; 5–15yo) Home of legal guardian in Australia	-mental health: self-report instruments	-mental health *depression	Medium
Visser (2015)	Mixed-Method	Artistic Expression	Group sessions at community clinic using visual art, songwriting, & poetry	$n = 8$ (8F; 13–18yo) Home of legal guardian in South Africa	-mental health: caregiver-report instrument -attachment: self-report instrument and participant interviews -group process: facilitator journals and participant interviews	-mental health *total PTS *intrusion *avoidance *arousal *dissociation -mental health *self-esteem -attachment (interpersonal closeness) -group process (group process/personal growth)	Medium

Note. Chart includes the *characteristics* (i.e. intervention type, intervention format, and sample), *context* (i.e. residence and country), and *findings* (i.e. measures and main outcomes) of qualitative articles per textual narrative synthesis methodology.

F = female sex. M = male sex. yo = years old. QOL = quality of life. PTSD = posttraumatic stress disorder. PTS = posttraumatic symptoms. Medium = 2 or 3 MMAT quality criteria met. High = 4 or 5 MMAT quality criteria met.

Table 3*Vote-Counting Results: Change Scores on Measures Used*

Intervention Type	Concepts					
	Mental Health	Behavioral Health	Physical Health	Attachment	Executive Functioning	Well-being
Sports Activity						
D'Andrea (2013)	Positive Change	Positive Change	–	Positive Change	–	–
Artistic Expression						
Brillantes (2013)	Positive Change	–	–	–	–	–
Visser (2015)	No Change	–	–	Positive Change	–	–
Kim (2017)	No Change	Positive Change	–	–	–	–
Pifalo (2006)	Positive Change	Positive Change	–	–	–	–
Pretorius (2010)	Positive Change	–	–	–	–	–
Animal Interaction						
Balluerka (2015)	–	No Change	–	–	–	–
Dietz (2012)	Positive Change	Positive Change	–	–	–	–
Hamama (2011)	No Change	–	–	–	–	No Change
Kemp (2014)	Positive Change	Positive Change	–	–	–	–
Mueller (2017)	Positive Change	–	–	No Change	–	–
Naste (2018)	Positive Change*	Positive Change*	No Change	–	No Change	–
Schultz (2007)	No Change	No Change	–	No Change	–	–
Signal (2013)	Positive Change	–	–	–	–	–
Signal (2017)	Positive Change	–	–	–	–	–
Camp Experience						
Purvis (2007)	Positive Change	Positive Change	No Change	Positive Change	–	–

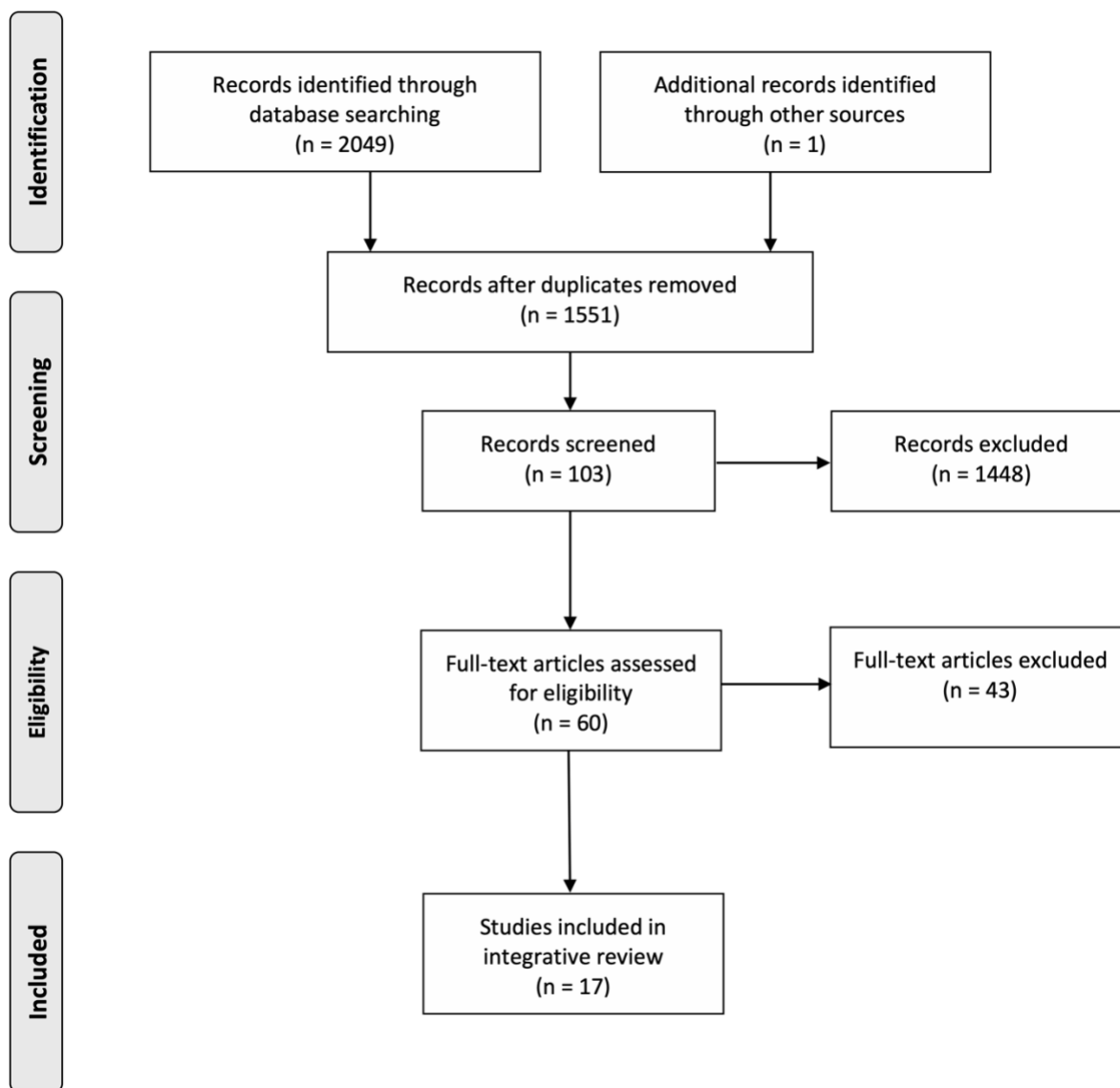
* = clinical significance. – = measure not included in study

Table 4
Textual Narrative Synthesis Results

		Themes						
Intervention Type	Facilitation	Person-Centered	Usable Tool	Attachment	Unfavorable Attitudes	Hesitation	Appreciation	Outcomes
Artistic Expression								
Brillantes (2013)	Facilitators serve as a guide & provide a comfortable atmosphere	Ensuring youth feel in control & empowered to work at their own pace	Art used to understand & accept personal experiences; express thoughts, feelings, & emotions; interact with others					Improved emotional self-regulation, self-concept, self-awareness, & interpersonal relationships
Visser (2015)	Facilitators create a safe group atmosphere	Following youth lead and understanding preference about art & other treatment types	Art used to enable understanding and expression of thoughts, feelings, & emotions	Working in a peer group improved learning and feelings of comfort, support, & loneliness over time				Improved self-concept, emotional expression, interpersonal skills, quality of life, & risk-taking behaviors
Animal Interaction								
Naste (2018)	Facilitators provide safety & routines	Importance of following youth lead	Animal used to enable understanding of self & encourage participation	Positive attachment to animal is therapeutic & allows improvements in other personal relationships				Short-term engagement led to outcome regression. Long-term engagement led to improved regulation, self-concept, self-awareness; increased understanding of thoughts, feelings, & emotions
Camp Experience								
Bademci	Mentors support,	Allowing youth to be		Close	Youth viewed	Takes time to	After hesitation,	Improvements in self-

(2015)

<p>encourage, & foster safety; are consistent & accountable; promote active participation</p>	<p>active participants; ensuring feelings are supported & encouraged; following youth lead</p>	<p>relationships develop between youth & mentors improves other personal relationships</p>	<p>camp experience & mentors as better than care homes/staff</p>	<p>open up & feel comfortable participating. Mentors initially concerned</p>	<p>youth became grateful for relationships & camp experience.</p>	<p>concept, regulation, & awareness, cognitive skills, outlook & quality of life, and decreased risk-taking behavior</p>
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Figure 1*PRISMA Flow Diagram*

This figure represented the flow of articles through the different stages of the mixed-methods integrative review. Adapted from “Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement” by D. Moher, A. Liberati, J. Tetzlaff, & D.G. Altman, 2009, *PLoS Medicine*, 6(7), e1000097. (<https://doi.org/10.1136/bmj.b2535>).

Manuscript 2

Representations of Attachment, Regulation, and Competency (ARC) Framework Concepts in Community-Based Interventions for Youth with a History of Developmental Trauma

Abstract

Approximately 47.9% of youth in the US are impacted by at least one adverse childhood experience, including complex chronic trauma, which is defined by: (a) repeated exposure to neglect or maltreatment; (b) emotional, physical, or sexual abuse; and/or (c) domestic violence in a caregiver setting. These trauma effects can be long-lasting due to adaptive structural brain changes referred to as developmental trauma. Without effective and timely intervention, affected youth are at increased risk of engaging in unsafe behaviors, experiencing drug/alcohol dependency, enduring mental health issues, and living with chronic illness. Cognitive-behavioral therapy (CBT) is the primary intervention for youth with trauma-associated outcomes. However, CBT is less effective for developmental trauma. Trauma-informed psychologists and providers are promoting community-based therapies that are instead guided by the neurosequential model of therapeutics (NMT) and that are congruent with the theory-based attachment, regulation, and competency framework (ARC). The aim of this study, guided by the exploration, preparation, implementation, and sustainment framework (EPIS), was to determine congruence between content of NMT community-based interventions for youth with a history of developmental trauma and the theoretical concepts of ARC. A mixed-methods descriptive design was used to: (a) examine 17 quantitative, qualitative, or mixed-methods research reports of NMT community-based interventions; (b) extract intervention components; and (c) determine the level of congruence between intervention components and ARC concepts. One camp experience was designated as congruent; one sports activity as potential incongruence-acceptable; five animal interactions, one artistic expression, and another camp experience as potential incongruence-

unacceptable; and four animal interactions and four artistic expressions as incongruent. Findings confirm that stakeholders can identify, augment, and evaluate trauma-informed NMT community-based interventions that are congruent with ARC concepts.

Representations of Attachment, Regulation, and Competency (ARC) Framework Concepts in Community-Based Interventions for Youth with a History of Developmental Trauma

1. Introduction

Nearly all children and adolescents experience one or more traumatic events at some point in their life. Although many youth experience isolated traumatic events that are time limited without any deleterious effects, 47.9% of youth in the United States encounter one or more adverse childhood experience, including complex chronic trauma (National Survey of Children's Health, 2012). Complex chronic trauma is defined as repeated exposure to harrowing events in a caregiver setting such as ongoing neglect or maltreatment; emotional, physical, or sexual abuse; and/or domestic violence (Cohen et al., 2010; Herman, 1992). The effects of complex chronic trauma are lingering due to adaptive structural brain changes referred to as development trauma (van der Kolk, 2005). When individuals with developmental trauma perceive a situation as threatening, their stress response mode of fight, flight, or freeze is activated, and their cognitive and reasoning abilities are altered.

The effects of developmental trauma, hereinafter referred to as trauma-associated outcomes, occur when youth must invest their time and energy in surviving their circumstance rather than attaining age-appropriate developmental milestones (Briere, 1988; Felitti et al., 1998; Herman, 1992; Perry, 2006). This leads to significant physical, neurological, emotional, behavioral, and social negative health outcomes that can extend throughout the lifespan. Without effective and timely intervention, youth with developmental trauma are at increased risk of engaging in unsafe behaviors, experiencing drug and alcohol dependency, enduring mental health issues, and living with chronic illness. Developmentally appropriate, effective, and timely

intervention can prevent and mitigate existing and long-term trauma-associated outcomes (Perry, 2006; van der Kolk, 2005).

Cognitive-behavioral therapy (CBT), delivered in clinic-based settings, is currently the primary intervention for youth with trauma-associated outcomes (Amaya-Jackson, 2018; Beck, 1997; Beck & Weishaar, 1989; Courtois, 2004). However, clinic-based mental health interventions for youth are often unrealistic due to the stigma associated with mental illness, difficulties in accessing services, and issues related to third-party reimbursement (Briere & Spinazzola, 2005; Chu, 1992; Courtois, 2004; Kaushik et al., 2016; Merikangas et al., 2011). Additionally, CBT is less effective in youth with developmental trauma and altered brain function when the stress response mode is activated, and cognitive and reasoning abilities are regressed. Examined using the neurosequential model of therapeutics (NMT; Perry & Hambrick, 2008), alternative community-based therapies that employ repetitive and relational avenues (*6R's*, consisting of relevant, relational, repetitious, rewarding, rhythmic, and respectful; Perry, 2006) designed to restore safety and organize regulatory parts of the brain tend to be more effective than CBT and should be initiated to ensure youth receive the care and treatment they deserve.

Effective community-based interventions reveal their increasing importance and relevance for youth with developmental trauma when (a) guided by the NMT (Perry & Hambrick, 2008) and (b) congruent with the theory-based attachment, regulation, and competency framework (ARC; Blaustein & Kinniburgh, 2010, 2019; Kinniburgh et al., 2005). Because youth exhibit symptoms consistent with their self-regulatory, emotional, and interpersonal developmental stage or phase when changes in the brain occurred (Perry 2006), NMT is used to adapt interventions so that they are relevant, relational, repetitious, rewarding,

rhythmic, and respectful to that developmental stage or phase. In addition, developmentally appropriate trauma-informed community-based interventions should incorporate the theoretical concepts of attachment, regulation, and competency that recognize the value of individual, cultural, and contextual approaches (Arvidson et al., 2011; Blaustein & Kinniburgh, 2010, 2019; Kinniburgh et al., 2005).

Attachment is defined as the quality of connection or bond that generates feelings of safety between youth and their caregivers (Blaustein & Kinniburgh, 2010, 2019; Kinniburgh et al., 2005). *Regulation* is defined as the ability to recognize and moderate one's emotions. *Competency* is defined as the ability to increase resilience through empowerment, personal choice, decision-making, and self-identity. Figure 1 illustrates a depiction of ARC. ARC's outcomes are demonstrated by: (a) distress tolerance and regulation; (b) curiosity and reflection; and (c) engaging in purposeful action. Examples of adaptable NMT and ARC-congruent community-based interventions include sports activity, artistic expression, animal interaction, and camp experience.

The aim of this implementation study was to determine the congruence between content of trauma-informed NMT community-based interventions, hereinafter referred to as community-based interventions, for youth aged 6–18 years with a history of developmental trauma and the theoretical concepts of attachment, regulation, and competency. Our research question consisted of the following: “What is the congruence between content of eligible NMT interventions for youth aged 6–18 years with a history of developmental trauma and the theoretical concepts of attachment, regulation, and competency?” An enhanced understanding of which community-based interventions incorporate ARC concepts can offer organizations valuable information about which interventions to incorporate in their setting.

2. Framework

The exploration, preparation, implementation, and sustainment framework (EPIS; Aarons et al, 2011; Moullin et al., 2019) is used to guide implementation of effective interventions in a variety of settings. EPIS includes four phases: (a) *exploration*, in which an organization decides whether to adopt a specific evidence-based practice (EBP); (b) *preparation*, in which stakeholders create a plan to utilize facilitators, address barriers, and assess adaptation needs; (c) *implementation*, in which the EBP is incorporated into an organization; and (d) *sustainment*, in which oversight of the EBP is conducted to ensure it is being delivered as intended. Within each EPIS phase, implementation components include the outer context, inner context, bridging factors, and innovation factors. The *outer context* encompasses the environment external to an organization in which an EBP is being implemented. The *inner context* encompasses the characteristics within an organization. *Bridging factors* include the relationships between the outer and inner contexts. *Innovation factors* ensure that the EBP is adapted to fit the needs of individuals receiving the intervention. This implementation study focused on the innovation factors component labelled as EBP fit. *EBP fit* is defined as the extent to which the intervention meets the needs of the population served and its appropriateness for the context in which it will be implemented (Moullin et al., 2019). EPIS was used to assess the EBP fit of community-based interventions for youth with a history of developmental trauma based on their level of congruence with the theoretical concepts of attachment, regulation, and competency.

3. Methods

3.1 Design

We used a mixed-methods descriptive analytic design. University Education and Social/Behavioral Science Institutional Review Board determined this work met the criteria for exempt human subjects research.

3.2 Sample

Seventeen quantitative, qualitative, or mixed-methods research reports were selected based on a systematic search of 20 databases (e.g. CINAHL, ERIC, PsychINFO, and PTSDpub) to obtain review materials. Keywords and PRISMA flowchart are contained in a companion publication (XXXX). We began by reviewing article titles and abstracts to screen for relevance. Then, we thoroughly reviewed the full text of each article to determine relevance. In addition, we expanded the search using reference lists of selected articles. The iterative process continued until saturation was achieved.

Inclusion criteria included peer-reviewed research articles published in English between 1998 and 2019 in which the majority of study participants were aged 6–18 years. The year 1998 was selected as the year the Adverse Childhood Experiences (Felitti et al., 1998) study was published, with a subsequent research boom on mental and physical health outcomes related to developmental trauma experience. Research articles were included if the studies (a) used quantitative experimental or observational, qualitative, and/or mixed-methods designs and (b) assessed community-based interventions intended for youth with a history of developmental trauma. An article with the highest level of evidence was selected to represent community-based interventions with more than one research report. Research reports were excluded if: (a) the type of trauma was unspecified; (b) the intervention was delivered as a supplement to the primary research intervention of CBT; (c) the intervention was delivered in an in-patient setting; or (d) the outcomes were unspecified.

3.3 Data Extraction

We used the ARC Tracking Tool contained in the ARC training manual (Blaustein & Kinniburgh, 2019) to guide extraction of data from research reports describing each community-based intervention. The ARC Tracking Tool is used by clinicians when developing ARC-based treatment plans and interacting with clients to ensure that all appropriate intervention components and building blocks are addressed. We used the ARC Tracking Tool to determine if community-based interventions incorporated the components and building blocks represented by ARC concepts.

The ARC Tracking Tool contains three concepts, each with two to three building blocks (Blaustein & Kinniburgh, 2019). Each building block consists of four to six intervention components. *Attachment* is comprised of three building blocks and 14 components, *regulation* is comprised of two building blocks and nine components, and *competency* is comprised of three building blocks and 14 components. For example, the building blocks of attachment include caregiver affect management, attunement, and effective response. Caregiver affect management consists of the following intervention components: (a) psychoeducation, normalization, and depersonalization; (b) identifying difficult situations; (c) building self-monitoring skills; (d) enhancing self-care/caregiver toolbox; and (e) identifying support resources.

Using the intervention components of the ARC Tracking Tool as a guide, we searched the research reports for descriptions of interventions that were consistent with representative elements of ARC building blocks. When found, we entered an X in the box indicating component representation and noted the component in the comments section of the ARC Tracking Tool. When most of the intervention components were represented, then building

blocks were verified. When all building blocks were verified, then the concept was represented in the community-based intervention.

3.4 Data Analysis

We used a data source triangulation approach (Carter et al., 2014; Haase et al., 1999; Patton, 1999) to determine the level of congruence between extracted content of identified community-based interventions and ARC concepts. The Haase decision-making flowchart for combining qualitative data and existing theory was adapted for use. Figure 2 depicts the adapted flowchart. Intervention content and ARC concepts were rated as: (a) congruent; (b) potential incongruence-acceptable; (c) potential incongruence-unacceptable; and (d) incongruent. Congruence was confirmed when all intervention components and building blocks of all three ARC concepts were included and appropriately operationalized regardless of the terminology. Potential incongruence-acceptable was confirmed when the intervention incorporated most of the intervention components of all three ARC concepts. Potential incongruence-unacceptable was confirmed when the intervention incorporated less than 50% of the intervention components of all three ARC concepts, or when the intervention included all three concepts but did not operationalize them consistent with ARC. Incongruent was confirmed when ARC concepts were missing in the intervention. Total congruence was determined based on the lowest score of each ARC concept. Congruence ratings determined which community-based interventions were consistent with ARC.

3.5 Addressing Potential Threats to Design Validity

Potential threats to design validity were addressed using trustworthiness (Guba & Lincoln, 1989). Trustworthiness of the study and rigor of findings were based on confirmability, dependability, credibility, and transferability. Techniques used included prolonged engagement,

persistent observation, data emersion, expert examination, and peer confirmation as well as the use of thick descriptions, an audit trail, and outside reviewers to evaluate the process, judge decisions, and interpret findings. All data can be traced to their original sources.

4. Results and Discussion

The aim of this implementation study was to determine the congruence between content of community-based interventions for youth with a history of developmental trauma and the theoretical concepts of attachment, regulation, and competency. The following integrated results and discussion section presents: (a) classifications of eligible interventions; (b) congruency of individual interventions; and (c) intervention components mapped to ARC concepts and building blocks by their intervention type. ARC concepts were present in some but not all community-based interventions.

4.1 Classifications of Eligible Interventions

Seventeen interventions met eligibility requirements. Nine interventions were animal interactions using either equine or canine as therapeutic agents. Five interventions were artistic expressions using improvisation, expressive mixed media, poetry, song writing, and/or visual arts. Two interventions were camp experiences using daily interaction with adult counselors and structured activities. One intervention was a sports activity using team basketball.

4.2 Congruency of Individual Interventions

One camp experience intervention was designated as congruent with ARC concepts and their building blocks. One sports activity intervention was designated as potential incongruence, yet acceptable. Five animal interaction, one artistic expression, and one camp experience intervention were designated as potential incongruence and therefore unacceptable. Four animal

interaction and four artistic expression interventions were designated as incongruent. Table 1 contains the congruence ratings for specific interventions.

4.3 Intervention Components Represented by ARC Concepts and Building Blocks

4.3.1 Animal Interaction Interventions

The following section summarizes which intervention components of the ARC Tracking Tool were used across all animal interaction interventions by ARC concepts and their building blocks. Thirty of 37 ARC intervention components were included in animal interaction interventions. Table 2 contains the adaptive representations of animal interaction intervention components by ARC concepts and their building blocks.

4.3.1.1 Attachment. Seven of 14 attachment intervention components were represented in animal interaction interventions. One of five caregiver affect management intervention components, specifically, psychoeducation, normalization, and depersonalization, was represented. Four of five attunement intervention components, specifically, parallel attunement/understanding caregiver perspective, observing/validating youth experience/mirroring skills, use of attunement to support youth regulation, and positive dyadic engagement, were represented. Two of four effective response intervention components, specifically, use of regulation or addressing needs to prevent/reduce behaviors and support concrete skill building in behavior management strategies, were represented.

4.3.1.2 Regulation. All nine regulation intervention components were represented in animal interaction interventions. All four identification intervention components, specifically, language for emotions and energy/arousal, understanding trauma response/triggers/body's alarm system, connection (body/thought/behavior), and contextualization (internal/external factors leading to emotions/energy), were represented. All five modulation intervention components,

specifically, understanding of degrees of feeling and energy, understanding of comfort zone/effective modulation, exploring/experimenting with regulation tools, identifying helpful strategies/building a toolbox, and building external supports for modulation strategies, were represented.

4.3.1.3 Competency. All 14 competency intervention components were represented in animal interaction interventions. All six relational connection intervention components, specifically, explore goals of connection/relational history, identifying/establishing safe resources, create opportunities for connection and communication, build skills to support effective use of resources, teach appropriate physical/emotional boundaries, and support effective verbal and nonverbal communication skills, were represented. All four executive function intervention components, specifically, support active recognition of choices/choice situations, support active evaluation of situations and goals, use of regulation skills to delay/inhibit responses, and support in generating alternatives/identifying solutions, were represented. All four self-development and identity intervention components, specifically, help children identify personal attributes (unique self), build internal resources and identification of positive attributes (positive self), integrate self across states and time (past/present, multiple aspects of self (cohesive self)), and support capacity to imagine and work toward future goals/outcomes (future self), were represented.

4.3.2 Artistic Expression Interventions

The following section summarizes which intervention components of the ARC Tracking Tool were used across all artistic expression interventions by ARC concepts and their building blocks. Twenty-four of 37 ARC intervention components were included in artistic expression

interventions. Table 3 contains the adaptive representations of artistic expression intervention components by ARC concepts and their building blocks.

4.3.2.1 Attachment. One of 14 attachment intervention components was represented in artistic expression interventions. One attunement intervention component, specifically, use of attunement to support youth regulation, was represented. No caregiver affect management or effective response intervention components were represented.

4.3.2.2 Regulation. All nine regulation intervention components were represented in artistic expression interventions. All four identification intervention components, specifically, language for emotions and energy/arousal, understanding trauma response/triggers/body's alarm system, connection (body/thought/behavior), and contextualization (internal/external factors leading to emotions/energy), were represented. All five modulation intervention components, specifically, understanding of degrees of feeling and energy, understanding of comfort zone/effective modulation, exploring/experimenting with regulation tools, identify helpful strategies/building a toolbox, and building external supports for modulation strategies, were represented.

4.3.2.3 Competency. All 14 competency intervention components were represented in artistic expression interventions. All six relational connection intervention components, specifically, explore goals of connection/relational history, identifying/establishing safe resources, create opportunities for connection and communication, build skills to support effective use of resources, teach appropriate physical/emotional boundaries, and support effective verbal and nonverbal communication skills, were represented. All four executive function intervention components, specifically, support active recognition of choices/choice situations, support active evaluation of situations and goals, use of regulation skills to

delay/inhibit responses, and support in generating alternatives/identifying solutions, were represented. All four self-development and identity intervention components, specifically, help children identify personal attributes (unique self), build internal resources and identification of positive attributes (positive self), integrate self across states and time (past/present, multiple aspects of self (cohesive self)), and support capacity to imagine and work toward future goals/outcomes (future self), were represented.

4.3.3. Camp Experience Interventions

The following section summarizes which intervention components of the ARC Tracking Tool were used across both camp experience interventions by ARC concepts and their building blocks. All 37 ARC intervention components were included in both camp experience interventions. Table 4 contains the adaptive representations of camp experience intervention components by ARC concepts and their building blocks.

4.3.3.1 Attachment. All 14 attachment intervention components were represented in camp experience interventions. All five caregiver affect management intervention components, specifically, psychoeducation, normalization, and depersonalization, identify difficult situations, build self-monitoring skills, self-care/caregiver toolbox, and identify support resources, were represented. All five attunement intervention components, specifically, parallel attunement/understanding caregiver perspective, engage caregiver active curiosity, observing/validating youth experience/mirroring skills, use of attunement to support youth regulation, and positive dyadic engagement, were represented. All four effective response intervention components, specifically, proactive identification of behaviors/active planning, use of attunement skills to understand behavior patterns and needs, use of regulation or addressing

needs to prevent/reduce behaviors, and support concrete skill building in behavior management strategies, were represented.

4.3.3.2 Regulation. All nine regulation intervention components were represented in camp experience interventions. All four identification intervention components, specifically, language for emotions and energy/arousal, understanding trauma response/triggers/body's alarm system, connection (body/thought/behavior), and contextualization (internal/external factors leading to emotions/energy), were represented. All five modulation intervention components, specifically, understanding of degrees of feeling and energy, understanding of comfort zone/effective modulation, exploring/experimenting with regulation tools, identify helpful strategies/building a toolbox, and building external supports for modulation strategies, were represented.

4.3.3.3 Competency. All 14 competency intervention components were represented in camp experience interventions. All six relational connection intervention components, specifically, explore goals of connection/relational history, identifying/establishing safe resources, create opportunities for connection and communication, build skills to support effective use of resources, teach appropriate physical/emotional boundaries, and support effective verbal and nonverbal communication skills, were represented. All four executive function intervention components, specifically, support active recognition of choices/choice situations, support active evaluation of situations and goals, use of regulation skills to delay/inhibit responses, and support in generating alternatives/identifying solutions, were represented. All four self-development and identity intervention components, specifically, help children identify personal attributes (unique self), build internal resources and identification of positive attributes (positive self), integrate self across states and time (past/present, multiple

aspects of self (cohesive self)), and support capacity to imagine and work toward future goals/outcomes (future self), were represented.

4.3.4 Sports Activity Intervention

The following section summarizes which intervention components of the ARC Tracking Tool were used by the sports activity intervention by ARC concepts and their building blocks. Twenty-four of 37 ARC intervention components were included in the sports activity intervention. Table 5 contains the adaptive representations of sports activity intervention components by ARC concepts and their building blocks.

4.3.4.1 Attachment. Ten of 14 attachment intervention components were represented in the sports activity intervention. Four of five caregiver affect management intervention components, specifically, psychoeducation, normalization, and depersonalization, identify difficult situations, build self-monitoring skills, and identify support resources, were represented. Three of five attunement intervention components, specifically, engage caregiver active curiosity, use of attunement to support youth regulation, and positive dyadic engagement, were represented. Three of four effective response intervention components, specifically, proactive identification of behaviors/active planning, use of regulation or addressing needs to prevent/reduce behaviors, and support concrete skill building in behavior management strategies, were represented.

4.3.4.2 Regulation. Five of nine regulation intervention components were represented in the sports activity intervention. Two of four identification intervention components, specifically, connection (body/thought/behavior) and contextualization (internal/external factors leading to emotions/energy), were represented. Three of five modulation intervention components, specifically, exploring/experimenting with regulation tools, identifying helpful

strategies/building a toolbox, and building external supports for modulation strategies, were represented.

4.3.4.3 Competency. Nine of 14 competency intervention components were represented in the sports activity intervention. Four of six relational connection intervention components, specifically, explore goals of connection/relational history, identifying/establishing safe resources, create opportunities for connection and communication, and build skills to support effective use of resources, were represented. Three of four executive function intervention components, specifically, support active evaluation of situations and goals, use of regulation skills to delay/inhibit responses, and support in generating alternatives/identifying solutions, were represented. Two of four self-development and identity intervention components, specifically, help children identify personal attributes (unique self), and build internal resources and identification of positive attributes (positive self), were represented.

4.4 Limitations

An extensive literature search revealed a limited number ($n = 17$) of published reports; of those published, some may have contained incomplete descriptions of the interventions, possibly due to space constraints. We sent email inquiries to fourteen first authors questioning if they had more complete descriptions than were provided in their published report. Of the six who responded, four sent additional information (i.e., Dietz et al., 2012; Kim, 2017; Mueller & McCullough, 2017, Visser, 2015). Although additional theoretical and atheoretical community-based interventions may have been developed and implemented, reports describing and evaluating them have not yet been published in peer reviewed journals. We monitored for new publications monthly. Finally, the lack of consistency in reporting the interventions at times challenged our ability to classify the level of congruence between intervention components and

ARC concepts and building blocks. We used the ARC training manual as a reference guide to better understand how intervention components can be classified before making a final determination of congruence based on best evidence.

4.5 Implications for Theory, Practice, Research, and Policy

Findings revealed the need to encourage researchers, stakeholders, and facilitators to use ARC, its concepts, and their building blocks as well as the ARC training manual and the ARC Tracking Tool when developing and evaluating community-based trauma-informed NMT interventions. In addition, researchers, stakeholders, and facilitators should confirm the congruence between the intervention's components and ARC concepts and building blocks or augment the intervention components to achieve congruence before adapting the intervention for the target population and community setting. Finally, health policy should dictate how individuals and organizations use ARC and its training manual and Tracking Tool when developing, implementing, and evaluating interventions to ensure youth receive the care and treatment they deserve.

5. Conclusion

Although ARC was originally designed to be used in clinic settings, this analysis revealed that ARC concepts and building blocks can be and are represented in NMT community-based interventions. Highly effective, adaptable, acceptable, appropriate, and feasible NMT community-based interventions that are congruent with ARC concepts and building blocks should be considered when intervening with youth. The EBP fit component of the EPIS innovation factor and the adapted triangulation decision-making flowchart were useful when examining and determining congruence between intervention content and ARC concepts and building blocks. Stakeholders should be able to identify, augment, and evaluate NMT

community-based interventions to determine (a) congruence with ARC concepts using the ARC Tracking Tool and training manual and (b) relevance to the individuals who receive them in various community settings. Transitioning from clinics to community settings provides youth with increased opportunities to access services that address and improve long-term outcomes associated with developmental trauma.

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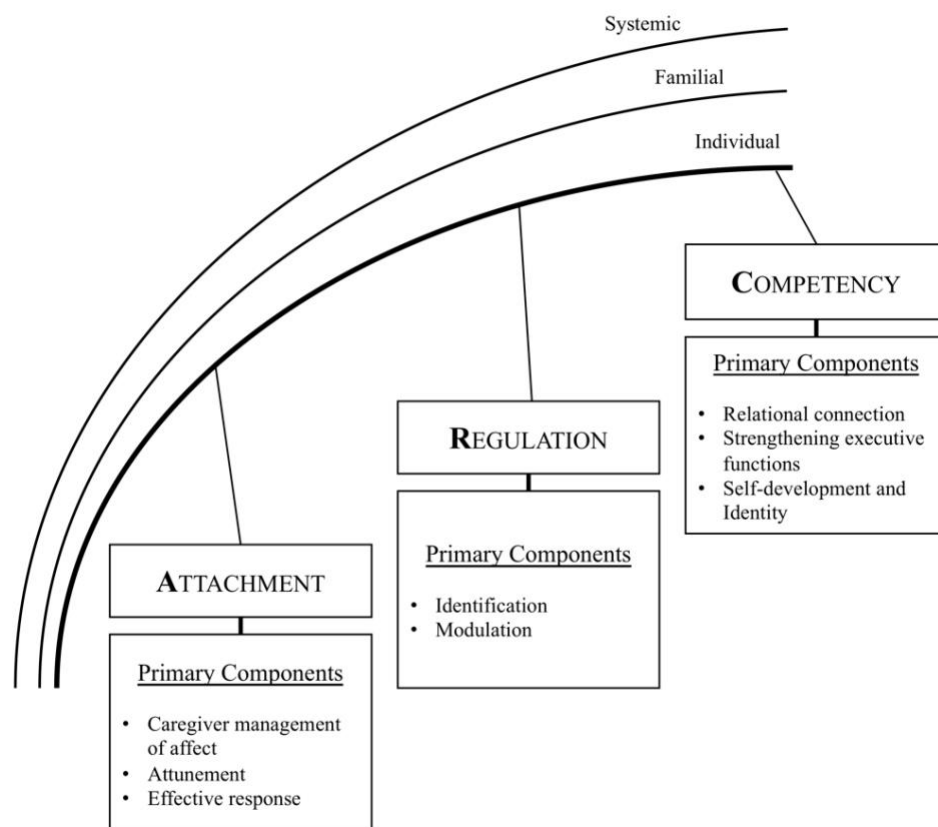
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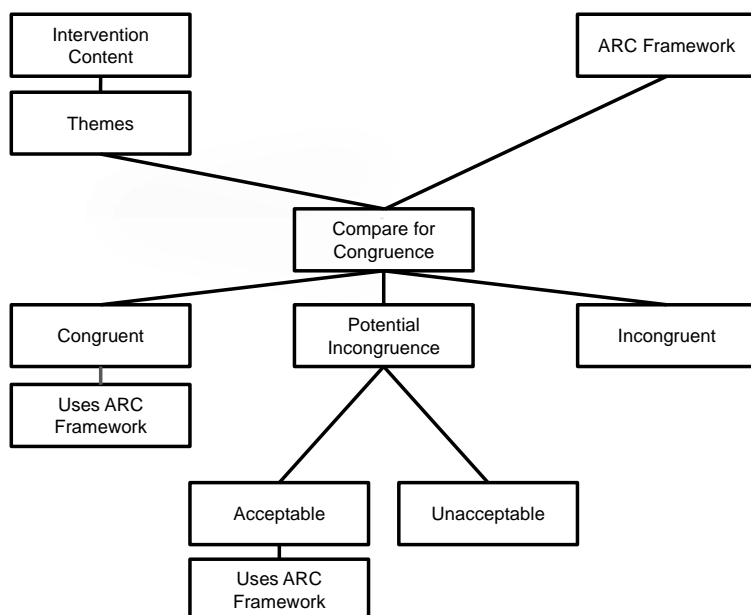
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Figure 1*Attachment, Regulation, and Competency Framework*

ARC: A framework for intervention with complexly traumatized youth. This figure represents the organization of the concepts and definitions of ARC. Adapted from “Attachment, self-regulation, and competency: A comprehensive intervention framework for children with complex trauma” by K. Kinniburgh, M. Blaustein, & J. Spinazzola, 2005, *Psychiatric Annals*, 35(5), p. 426 (<https://doi.org/10.3928/00485713-20050501-08>). Copyright 2005 by Slack Incorporated.

Figure 2

Adapted Triangulation Decision-making Flowchart Used to Rate the Congruence between Descriptions of Intervention and ARC Concepts, Building Blocks, and Intervention Components



Theory-based triangulation decision-making flowchart for combining qualitative data and existing theory. The figure depicts the analysis method for determining congruence between descriptive elements of trauma-informed NMT community-based interventions for youth with a history of developmental trauma and ARC concepts, building blocks, and intervention components. Adapted from “Research triangulation to derive meaning-based quality-of-life theory: Adolescent resilience model and instrument development” by J. Haase, S. Heiney, K. Ruccione, & C. Stutzer, 1999, *International Journal of Cancer Supplement*, 12, p 128 ([https://doi-org.ezproxy.library.wisc.edu/10.1002/\(SICI\)1097-0215\(1999\)83:12+<125::AID-IJC22>3.0.CO;2-7](https://doi-org.ezproxy.library.wisc.edu/10.1002/(SICI)1097-0215(1999)83:12+<125::AID-IJC22>3.0.CO;2-7)). Copyright 1999 by Wiley-Liss Incorporated.

Table 1*Congruent Determinacy of Interventions by Type Based on their Congruence with Each ARC**Concept*

Author	Type	Attachment	Regulation	Competency	Determinant
Bademci (2015)	Camp Experience	Congruent	Congruent	Congruent	Congruent
Balluerka (2015)	Animal Interaction	Unacceptable	Acceptable	Acceptable	Unacceptable
Brillantes-Evangelista (2013)	Artistic Expression	Incongruent	Acceptable	Acceptable	Incongruent
D'Andrea (2013)	Sports Activity	Acceptable	Acceptable	Acceptable	Acceptable
Dietz (2012)	Animal Interaction	Incongruent	Unacceptable	Unacceptable	Incongruent
Hamama (2011)	Animal Interaction	Incongruent	Acceptable	Acceptable	Incongruent
Kemp (2014)	Animal Interaction	Unacceptable	Acceptable	Acceptable	Unacceptable
Kim (2017)	Artistic Expression	Unacceptable	Acceptable	Congruent	Unacceptable
Mueller (2017)	Animal Interaction	Incongruent	Acceptable	Acceptable	Incongruent
Naste (2018)	Animal Interaction	Unacceptable	Congruent	Acceptable	Unacceptable
Pifalo (2006)	Artistic Expression	Incongruent	Acceptable	Acceptable	Incongruent
Pretorius (2010)	Artistic Expression	Incongruent	Acceptable	Unacceptable	Incongruent
Purvis (2007)	Camp Experience	Unacceptable	Acceptable	Acceptable	Unacceptable
Schultz (2007)	Animal Interaction	Unacceptable	Acceptable	Acceptable	Unacceptable
Signal (2013)	Animal Interaction	Incongruent	Unacceptable	Acceptable	Incongruent
Signal (2017)	Animal Interaction	Unacceptable	Acceptable	Acceptable	Unacceptable
Visser (2015)	Artistic Expression	Incongruent	Unacceptable	Acceptable	Incongruent

Table 3

Adaptive Representations of Artistic Experience Intervention Components by ARC Concepts and Their Building Blocks

ARC Concepts and ARC Building Blocks		Adaptive Representations of Intervention Components	Author				
			Brillantes- Evangelista (2013)	Kim (2017)	Pifalo (2006)	Pretorius (2010)	Visser (2015)
Attachment							
Attunement	Co-regulation			X			
Regulation							
Identification	Able to connect emotions & feelings to behaviors	X	X	X	X	X	
	Achieved language for emotions, feelings, & behaviors	X	X	X	X	X	
	Bring forth repressed/unresolved emotions & process them in a non-threatening medium	X		X	X	X	
	Art used as a tool for understanding emotions & behaviors related to trauma	X		X	X	X	
Modulation	Art as a self-regulation tool	X	X	X	X	X	
	Art has safety, calming, & sense of control elements	X	X	X	X		
	Make sense of trauma narrative & its relation to emotional expression			X			
Competency							
Relational Connection	Safety & comfortability		X	X	X	X	
	Improved interpersonal relationships & social interaction	X	X	X	X	X	
	Improved verbal & nonverbal communication & body language	X	X	X	X	X	
	Understanding of boundaries		X	X	X		
	Coping skills			X		X	
Executive Functions	Goals & reflection		X	X	X	X	
	Evaluation of experiences & situations	X			X	X	
	Problem-solving techniques		X	X	X		
	Control & choice		X	X		X	
	Channeling feelings		X				
Self- Development & Identity	Improved views of self & identified personal aspects	X	X	X		X	
	Future goals	X	X	X			
	Integrated whole self, past & present	X	X	X		X	
	Explore painful experiences of past & present	X	X	X		X	

Table 4

Adaptive Representations of Camp Experience Intervention Components by ARC Concepts and Their Building Blocks

ARC Concepts and ARC Building Blocks	Adaptive Representations of Intervention Components	Author	
		Bademci (2015)	Purvis (2007)
Attachment			
Caregiver Affect Management	Building block specific caregiver learning opportunities	X	X
	Caregivers selected with affect management attributes	X	
Attunement	Building block specific caregiver learning opportunities	X	X
	Caregivers selected with attunement attributes	X	
	Dyadic engagement	X	X
	Caregiver support youth positive self-aspects & sense of control through safe space	X	X
Effective Response	Building block specific caregiver learning opportunities	X	
	Caregivers selected with effective response attributes	X	
	Caregivers offer guidance & support for self-regulation & problem-solving	X	X
Regulation			
Identification	Psychosocial & cognitive learning opportunities & evaluation	X	
	Able to connect emotions & feelings to behaviors	X	
	Achieved language for emotions, feelings, & behaviors	X	X
	Personal awareness of situations	X	
Modulation	Learning opportunities	X	
	Using caregivers as a self-regulation tool	X	X
	Self-regulation tools available at camp	X	X
	Safe, comfortable, & loving environment	X	
Competency			
Relational Connection	Safety, comfortability, & trust with caregivers	X	X
	Improved interpersonal relationships & social interaction	X	X
	Improved verbal communication	X	X
	Understanding of boundaries	X	X
Executive Functions	Goals & reflection	X	
	Evaluation of experiences & situations	X	
	Problem-solving & conflict resolution techniques		X
	Control & choice	X	
	Effective coping strategies	X	
Self-Development & Identity	Improved views of self & identified personal aspects	X	
	Future goals & planning	X	X
	Integrated whole self, past & present	X	X
	Improved interaction with others	X	

Table 5

Adaptive Representations of a Sports Activity Intervention Components by ARC Concepts and Their Building Blocks

ARC Concepts and ARC Building Blocks	Adaptive Representations of Intervention Components	Author D'Andrea (2013)
Attachment		
Caregiver Affect Management	Building block specific caregiver learning opportunities	X
	Caregiver consultation & feedback	X
	Goal setting	X
Attunement	Building block specific caregiver training & learning opportunities	X
	Dyadic engagement	X
	Caregiver support youth positive self-aspects	X
Effective Response	Building block specific caregiver learning opportunities	X
	Caregivers offer guidance & support for self-regulation & problem-solving	X
Regulation		
Identification	Able to connect emotions & feelings to behaviors	X
	Identify & utilize external resources for stress	X
Modulation	Understand feelings & work through them	X
	Self-regulation tools (people & objects)	X
Competency		
Relational Connection	Safety, comfortability, & trust with caregivers	X
	Improved interpersonal relationships & social interaction	X
	Caregivers teach important skills	X
Executive Functions	Goals & planning	X
	Evaluation of experiences & situations	X
	Control & choice	X
Self-Development & Identity	Improved views of self & identified personal aspects	X
	Future goals & planning	X
	Team attributes & traits	X

Manuscript 3

Professional Stakeholder Perceptions on Acceptability, Appropriateness, and Feasibility of Community-Based Interventions for Youth with a History of Developmental Trauma

Abstract

Study purposes were to (a) assess stakeholders' perceptions of acceptability, appropriateness, and feasibility of theory- and evidence-informed, community-based sports activity, artistic expression, and animal interaction interventions for youth aged 6–18 years with a history of developmental trauma, (b) determine between and within group differences in stakeholders' perceptions, and (c) explore stakeholders' perceptions of facilitators and barriers to implementation of the interventions. The exploration, preparation, implementation, and sustainment framework (EPIS) guided this mixed-methods study using a cross-sectional, descriptive, relational design. Public health, school mental health, and child welfare professionals in Wisconsin completed an online self-report survey. Professional stakeholders agreed that sports activity, artistic expression, and animal interaction interventions were acceptable and appropriate; and that artistic expression interventions were feasible. However, they shared a somewhat neutral view of the feasibility of sports activity and animal interaction interventions. Public health, school mental health, and child welfare stakeholders' perceptions of acceptability, appropriateness, and feasibility of sports activity, artistic expression, and animal interaction interventions differed between and within groups based on their practice settings. Open-ended prompts soliciting information about facilitators and barriers to implementation of community-based interventions revealed five major themes: safe space, engagement, training/education, partnership/collaboration, and resources. Stakeholders expressed positive perceptions of community-based interventions, with some notable differences based on setting.

Policy should address universally identified resource barriers, such as lack of funding, to improve implementation.

Professional Stakeholder Perceptions on Acceptability, Appropriateness, and Feasibility of Community-Based Interventions for Youth with a History of Developmental Trauma

1. Introduction

Adverse childhood experiences, including developmental trauma, affect 47.9% of youth in the United States (National Survey of Children's Health, 2012), and have the potential to lead to devastating long-term neurological, emotional, physical, behavioral, and social health outcomes (Briere, 1988; Felitti et al., 1998; Herman, 1992; Perry, 2006). Outcomes include increased risk for alcoholism and drug use and abuse, depression and suicidal ideation, and liver and heart disease across the lifespan. Early intervention can mitigate these detrimental effects.

Cognitive-behavioral therapy (CBT), the standard treatment for developmental trauma, is sometimes ineffective, due to its reliance on information processing regions of the brain. Developmental trauma may lead to reflexive activation of the fight/flight/freeze response system in youth when they experience a stressful situation or misinterpret a perceived stressful situation (Perry, 2006). This may lead to the suppression of information processing brain regions, rendering CBT ineffective. Additionally, clinic-based mental health interventions may be difficult to access due to socioeconomic and geographic disadvantages (Briere & Spinazzola, 2005; Chu, 1992; Courtois, 2004; Flisher et al., 1997; Kaushik et al., 2016; Merikangas et al., 2011). Therefore, community-based interventions should be considered as a treatment option.

Experiencing developmental trauma alters brain structures and connections leading to variations in age-appropriate developmental capacity. The cognitive, emotional, self-regulatory, and interpersonal developmental age of youth must be considered for community-based interventions to be successful. This can be accomplished using the *Six Rs* of the neurosequential model of therapeutics (NMT) (Perry, 2006; Perry & Hambrick, 2008; Perry & Ludy-Dobson,

2010). *Relevance* ensures interventions are age- and development-appropriate. Relational experiences provide safety and structure. *Repetition* patterns consistency. *Rewarding* captivates interest. *Rhythmic* reorders brain connections. *Respectful* considers personal values and culture. Community-based interventions that address NMT's *Six Rs* include sports activity, artistic expression, and animal interaction interventions.

Successful implementation of community-based interventions is needed to ensure treatment outcome sustainability. The exploration, preparation, implementation, and sustainment framework (EPIS) is used to guide the implementation of effective interventions (Aarons et al., 2011; Moullin, 2019). The exploration phase of EPIS is the crucial first step. During *exploration*, values of individual adopter characteristics are facilitators and barriers to the adoption of effective interventions. Facilitators and barriers include stakeholders' perceptions of intervention acceptability, appropriateness, and feasibility (Proctor et al., 2011; Weiner et al., 2017). *Acceptability* is the personal belief among stakeholders that an intervention is agreeable, palatable, and/or satisfactory. *Appropriateness* is the perception among stakeholders that an intervention is fit, relevant, and/or compatible with the phenomena of interest, goals of the organization, and community setting. *Feasibility* is the perception among stakeholders that an intervention can easily be adopted using existing resources. Active partnerships between stakeholders and researchers is important to ensure successful adoption of interventions (Aarons et al., 2011; Moullin, 2019). Before a decision is made to adopt a community-based intervention, stakeholders' values must convey a positive perception of the intervention's acceptability, appropriateness, and feasibility. The acceptability of intervention measure (AIM), the intervention appropriateness measure (IAM), and the feasibility of intervention measure (FIM) were designed to examine their respective title constructs (Weiner et al., 2017). Therefore, the

purposes of this study were to (a) assess stakeholders' perceptions of acceptability, appropriateness, and feasibility of theory- and evidence-informed, community-based sports activity, artistic expression, and animal interaction interventions for youth aged 6–18 years with a history of developmental trauma, (b) determine between and within group differences in stakeholders' perceptions, and (c) explore stakeholders' perceptions of facilitators and barriers to implementation of the interventions.

1.1 Research Question One

What are professional stakeholders' perceptions of acceptability, appropriateness, and feasibility of theory- and evidence-informed, community-based sports activity, artistic expression, and animal interaction interventions for youth aged 6–18 years with a history of developmental trauma?

1.2 Research Question Two

Are there between and within group differences in professional stakeholders' perceptions of acceptability, appropriateness, and feasibility of theory- and evidence-informed, community-based sports activity, artistic expression, and animal interaction interventions for youth aged 6–18 years with a history of developmental trauma?

1.2.1 Null Hypothesis One

There will be no between group differences in professional stakeholders' perceptions of acceptability, appropriateness, and feasibility of theory- and evidence-informed community-based interventions for youth aged 6–18 years with a history of developmental trauma.

1.2.2 Null Hypothesis Two

There will be no within group differences in professional stakeholders' perceptions of acceptability, appropriateness, and feasibility of theory- and evidence-informed community-based interventions for youth aged 6–18 years with a history of developmental trauma.

1.3 Research Question Three

What are professional stakeholders' perceptions of facilitators and barriers to implementation of theory- and evidence-informed, community-based sports activity, artistic expression, and animal interaction interventions for youth aged 6–18 years with a history of developmental trauma?

2. Methodology

2.1 Design

We used a mixed-methods, cross-sectional, descriptive, relational design. A self-report survey was used to elicit information at one time point about stakeholders' perceptions of acceptability, appropriateness, and feasibility of three types of community-based interventions. The study was determined to meet the criteria for exempt human subjects by the Education and Social/Behavioral Science IRB [Study #2020-0660].

2.2 Power Analysis

Using power analysis to determine sample size for this study was unrealistic because AIM, IAM, and FIM were developed using a homogenous sample when evaluating their psychometric properties (Weiner et al., 2017). Effect sizes required for determining between group differences were unavailable. For psychometric testing, reliability and validity estimates using exploratory factor analysis of developed instruments should include five subjects per item ($N = 6$) in a questionnaire, requiring 30 respondents per stakeholder group ($N = 3$), for a total of 90 respondents for this study (Ferketich, 1990; Nunnally, 1978). Preliminary findings were used

to determine adequacy of sample size based on power analysis using a more heterogeneous sample where variance between groups was anticipated.

To determine sample size for parametric testing, power analysis was conducted to reduce type II error of accepting a false null hypothesis. We calculated effect size needed to detect a statistical power of at least .80 and level of significance alpha at .05 for two-tailed tests. The results of the power analysis indicated that a sample size of 21 professional stakeholders per group, for a total of 63, would be sufficient across all measures.

2.3 Sampling Procedures and Participant Characteristics

We used nonprobability convenience sampling targeting eligible respondents for recruitment, including public health professionals (e.g., public health nurses, public health educators, and public health social workers), school mental health professionals (e.g., school nurses, school counselors, school psychologists, and school social workers), and child welfare professionals in Wisconsin via local and Tribal health departments, public and private school systems, child welfare organizations, and organizations with a mission to help youth with a history of trauma.

Potential respondents clicked on the link to access the Qualtrics Software, Version 022021 [Computer software] (Qualtrics) site. Of 138 clicks on the survey link, 77 respondents completed some or all of the implementation measures. Sixty-five respondents (84%) completed all demographic questions. Respondents who completed some or all of the implementation measures ($n = 77$, 56%) were included in the analysis. Respondents included 19 public health professionals (25%), 27 school mental health professionals (35%), and 31 child welfare professionals (40%).

2.4 Recruitment and Data Collection

We recruited professional stakeholders through an email invitation forwarded by the administrator of their respective professional or employment organizations. Member and employee lists were unavailable to the researchers to protect respondent privacy. Information addressing elements of consent was included in an introduction to the survey. The directions included a statement that non-signature or implied consent was demonstrated by clicking to begin the survey. We administered demographic questions, implementation measures, and open-ended prompts using Qualtrics. The system was accessed using an electronic link embedded in the email recruitment flyer. The survey was estimated to take 10–15 minutes. On average, the survey was open for 47.3 minutes, with a minimum of 2.5 minutes and a maximum of 44.4 hours. It is likely that a respondent left their survey link open before submission while not actively completing the survey, leading to the average time increase compared to estimated time to completion. When the maximum time score was removed, average time to completion was 13.5 minutes.

2.5 Instruments

2.5.1 Implementation Measures

We identified three existing implementation measures: acceptability of intervention measure (AIM), intervention appropriateness measure (IAM), and feasibility of intervention measure (FIM) (Weiner et al., 2017). We augmented each measure to address face and content validity by adding two negatively worded items to each measure, reducing bias due to acquiescence (Spector, 1992). The following sections report the reliability and validity of each revised measure.

2.5.1.1 Revised Implementation Measures. Revised versions of AIM (R-AIM), IAM (R-IAM), and FIM (R-FIM) were used to measure the acceptability, appropriateness, and

feasibility of three interventions, respectively. Each measure used a 6-item, 5-point Likert-type scale. Response options range from 1 (completely disagree) to 5 (completely agree). Mean scores were computed to determine overall acceptability, appropriateness, and feasibility, respectively. Higher scores indicated higher levels of the concept. Instrument evaluation was used to assess the internal consistency reliability and construct validity of R-AIM, R-IAM, and R-FIM. Negatively worded items contained within the measures were reordered prior to psychometric evaluation. Cronbach's alpha correlation coefficient was used to determine if responses to items were internally consistent (Carmines & Zeller, 1979; Cronbach, 1951). Exploratory factor analysis was used to evaluate construct validity of each of the measures for this sample (Kim & Mueller, 1978). Total sample size for this study was 77. Kaiser-Meyer-Olkin (KMO) test of sampling adequacy revealed adequate sample size for construct validity with results between .70–.91. Table 2 includes reports on internal consistency reliability and factor analysis principal components for sports activity, artistic expression, and animal interaction interventions of R-AIM, R-IAM, and R-FIM.

A Pearson correlation addressed the relationship between R-AIM, R-IAM, and R-FIM of sports activity, artistic expression, and animal interaction interventions. The correlations were found to be statistically significant at an alpha level .05, $r(65-70) = .36-78$, $p < .01$, indicating that the paired variables are positively related, for all but one pairing; the correlation was found to not be statistically significant for R-FIM of animal interaction interventions compared to R-IAM of artistic expression interventions. Table 3 presents the associated correlation matrix.

2.5.1.2 Qualitative Information. Open-ended questions solicited information about facilitators and barriers to implementation of each intervention.

2.6 Data Analysis

All data were analyzed at the aggregate level. IBM SPSS Statistics (Version 27) was used for descriptive analysis of all quantitative data as well as instrument evaluation (i.e., reliability and exploratory factor analysis) and hypothesis testing. For those who completed some or all of the implementation measures (N = 77), only 12 completed some (16%). Therefore, we analyzed data from all 77 responses. We excluded 61 of the original 138 clicks on the survey link that lacked any responses. This information is missing completely at random due to the anonymous, unlimited ability to click on the survey link via Qualtrics.

We used descriptive statistics to analyze demographic data. Parametric statistics were used to answer research question one. Independent group t-tests were used to determine differences between stakeholders' perceptions by geographic class, occupation sector, and education level, and one-way between subjects analysis of variance (ANOVA) was used to determine differences between stakeholders' perceptions by years of experience.

Parametric statistics were used for hypothesis testing to examine perceptions of three community-based interventions between and within stakeholder groups. ANOVA tests were used to determine differences between public health, school mental health, and child welfare professionals' scores of community-based interventions. When significance was found, post-hoc tests were conducted to determine specific group differences. Paired group t-tests were used to determine stakeholder perceptions of sports activity, artistic expression, and animal interaction interventions within groups.

Thematic analysis was used to analyze all qualitative data using Microsoft Word by two study team members. Independently determined codes were then compared for likeness and themes were developed through consensus.

2.7 Potential Threats to Design Validity

Construct validity testing of all measures was completed. To address internal validity, EPIS was used to evaluate cause and effect decisions, and the acceptability, appropriateness, and feasibility measures were randomly ordered when administered to respondents. To address external validity, an adequate sample size was obtained. Statistical validity was addressed through consultation with a statistician and addressing violations of normality by recruiting a heterogeneous sample.

3. Results

3.1 Quantitative Results

3.1.1 Respondent Demographics

Table 1 presents demographic information on gender, age, educational level, geographic location, and years of experience of respondents by stakeholder group.

3.1.1.1 Public Health Professionals. For public health professionals, 15 identified as White/European American (78.9%), one identified as American Indian/Alaska Native (5.3%), and three lacked an ethnicity response (15.8%). Of the respondents, 18 worked in the public sector (94.7%) and one in the private sector (5.3%). With regards to experience implementing interventions, 13 respondents implemented interventions for youth (68.4%), five implemented interventions for mental health purposes (26.3%), four implemented interventions for Child Protective Services (21.1%), four implemented other types of interventions (21.1%), and three lacked experience (15.8%).

3.1.1.2 School Mental Health Professionals. For school mental health professionals, 23 identified as White/European American (85.2%) and four lacked an ethnicity response (14.8%). Of the respondents, 27 worked in the public sector (100%). With regards to experience implementing interventions, 22 respondents implemented interventions for mental health

purposes (81.5%), 17 implemented interventions for youth (63.0%), 10 implemented interventions for Child Protective Services (37.0%), and one lacked experience (3.7%).

3.1.1.3 Child Welfare Professionals. For child welfare professionals, 23 identified as White/European American (74.2%), three identified as Black/African American (9.7%), one identified as Hispanic/Latino (3.2%), one identified as Asian (3.2%), one reported their ethnicity was unlisted (3.2%), and two lacked an ethnicity response (6.5%). Of the respondents, 22 worked in the public sector (71.0%) and 9 in the private sector (29.0%). With regards to experience implementing interventions, 29 respondents implemented interventions for Child Protective Services (93.5%), 17 implemented interventions for youth (54.8%), 14 implemented interventions for mental health purposes (45.2%), three implemented other types of interventions (9.7%), and two lacked experience (6.5%).

3.1.2 Research Question One

What are professional stakeholders' perceptions of acceptability, appropriateness, and feasibility of theory- and evidence-informed, community-based sports activity, artistic expression, and animal interaction interventions for youth aged 6–18 years with a history of developmental trauma? Table 2 includes ranges, means, and standard deviations of stakeholders' perceptions of community-based interventions.

A frequency analysis was used to determine perception scores. For sports activity interventions, results revealed that stakeholders agreed they are acceptable ($M = 3.91, SD = .90$) and appropriate ($M = 4.18, SD = .61$), and were neutral that they are feasible ($M = 3.23, SD = .90$). For artistic expression interventions, results revealed that stakeholders agreed they are acceptable ($M = 3.97, SD = .75$), appropriate ($M = 4.24, SD = .56$), and feasible ($M = 3.45, SD = .68$). For animal interaction interventions, results revealed that stakeholders agreed they are

acceptable ($M = 3.75$, $SD = .90$) and appropriate ($M = 4.09$, $SD = .67$), and were neutral that they are feasible ($M = 3.15$, $SD = .73$).

For geographic class, using independent samples t-test, there was a statistically significant difference between respondents living in suburban/rural ($N = 38-40$, $M = 3.32$, $SD = .70$) and inner city ($N = 30-33$, $M = 2.94$, $SD = .71$) locations for feasibility of animal interaction interventions, $t(67) = -2.252$, $p = .03$, Cohen's $d = -.545$, suggesting that respondents working in a suburban/rural setting perceive animal interaction interventions as more feasible than respondents working in an inner city setting. However, power analysis indicated that in order for an effect of this size to be detected (80% chance) with alpha at .05, a sample of 55 respondents per group would be required. No other statistically significant differences were indicated for respondents living in suburban/rural versus inner city locations.

For occupation sector, differences between public ($N = 60-62$) and private ($N = 8-9$) organization could not be analyzed due to the uneven sample size.

For education level, using independent samples t-test, there was a statistically significant difference between respondents who have up to an undergraduate degree ($N = 24$, $M = 3.88$, $SD = .71$) and those with a graduate degree ($N = 45-47$, $M = 4.21$, $SD = .61$) for appropriateness of animal interaction interventions, $t(67) = -2.023$, $p = .05$, Cohen's $d = -.511$, suggesting that respondents with a graduate degree perceive animal interaction interventions as more appropriate than respondents with up to an undergraduate degree. However, power analysis indicated that in order for an effect of this size to be detected (80% chance) with alpha at .05, a sample of 65 respondents per group would be required. No other statistically significant differences were indicated for respondents with up to an undergraduate degree versus a graduate degree.

For years of experience, an ANOVA test was found to be statistically significant for feasibility of animal interaction at an alpha level of .05, $F(2, 65) = 3.55, p < .05$ between 0–5 years ($N = 24$), 5–15 years ($N = 21$), and 15+ years ($N = 23$) of professional experience. A Tukey HSD test indicated that the mean of 15+ years ($M = 3.46, SD = .70$) was significantly greater than the mean for 0–5 years ($M = 2.93, SD = .76$). However, power analysis indicated that in order for an effect of this size to be detected (80% chance) with alpha at .05, a sample of 30 respondents per group would be required.

3.1.3 Research Question Two

Are there between and within group differences in professional stakeholders' perceptions of acceptability, appropriateness, and feasibility of theory- and evidence-informed, community-based sports activity, artistic expression, and animal interaction interventions for youth aged 6–18 years with a history of developmental trauma?

3.1.3.1 Between Groups. An ANOVA test compared the means for acceptability, appropriateness, and feasibility of community-based interventions by stakeholder group. Tables 4, 5, and 6 contain means, standard deviations, and one-way analyses of variance in R-AIM, R-IAM, and R-FIM of sports activity, artistic expression, and animal interaction interventions by stakeholder group, respectively. The following sections describe results for each of the community-based interventions.

3.1.3.1.1 Sports Activity Interventions. An ANOVA test was found to be statistically significant for *acceptability* at an alpha level of .05, $F(2, 67) = 9.76, p < .01$ between public health, school mental health, and child welfare professionals. A Tukey HSD test indicated that the means of acceptability for both school mental health ($M = 4.27, SD = .59$) and child welfare ($M = 4.02, SD = .90$) were significantly greater than the mean for public health professionals (M

= 3.19, $SD = .90$). Power analysis indicated a 94% chance of detecting a medium effect size ($d = .64$) with alpha at .05.

An ANOVA test was found to be statistically significant for *appropriateness* at an alpha level of .05, $F(2, 67) = 5.36, p < .01$ between public health, school mental health, and child welfare professionals. A Tukey HSD test indicated that the means of appropriateness for both school mental health ($M = 4.30, SD = .53$) and child welfare ($M = 4.31, SD = .42$) were significantly greater than the mean for public health professionals ($M = 3.78, SD = .80$). However, power analysis indicated that in order for an effect of this size to be detected (80% chance) with alpha at .05, a sample of 63 respondents would be required.

An ANOVA test was found to be statistically significant for *feasibility* at an alpha level of .05, $F(2, 67) = 8.86, p < .01$ between public health, school mental health, and child welfare professionals. A Tukey HSD test indicated that the means of feasibility for both school mental health ($M = 3.64, SD = .74$) and child welfare ($M = 3.26, SD = .78$) were significantly greater than the mean for public health professionals ($M = 2.57, SD = .94$). Power analysis indicated a 92% chance of detecting a medium effect size ($d = .61$) with alpha at .05.

3.1.3.1.2 Artistic Expression Interventions. An ANOVA test was found to be statistically significant for *acceptability* at an alpha level of .05, $F(2, 68) = 9.78, p < .01$ between public health, school mental health, and child welfare professionals. A Tukey HSD test indicated that the means of acceptability for both school mental health ($M = 4.28, SD = .51$) and child welfare ($M = 4.06, SD = .65$) were significantly greater than the mean for public health professionals ($M = 3.37, SD = .88$). Power analysis indicated a 94% chance of detecting a medium effect size ($d = .65$) with alpha at .05.

An ANOVA test was found to be statistically significant for *appropriateness* at an alpha level of .05, $F(2, 68) = 3.39, p < .05$ between public health, school mental health, and child welfare professionals. However, a Tukey HSD test indicated that there were no significant differences between means for appropriateness by stakeholder group. Power analysis indicated that in order for an effect of this size to be detected (80% chance) with alpha at .05, a sample of 93 respondents would be required.

An ANOVA test was found to be statistically significant for *feasibility* at an alpha level of .05, $F(2, 68) = 5.20, p < .01$ between public health, school mental health, and child welfare professionals. A Tukey HSD test indicated that the mean of feasibility for school mental health ($M = 3.73, SD = .60$) was significantly greater than the mean for public health professionals ($M = 3.08, SD = .74$). However, power analysis indicated that in order for an effect of this size to be detected (80% chance) with alpha at .05, a sample of 66 respondents would be required.

3.1.3.1.3 Animal Interaction Interventions. An ANOVA test was found to be statistically significant for *acceptability* at an alpha level of .05, $F(2, 66) = 7.85, p < .01$ between public health, school mental health, and child welfare professionals. A Tukey HSD test indicated that the means of acceptability for both school mental health ($M = 4.19, SD = .58$) and child welfare ($M = 3.74, SD = .89$) were significantly greater than the mean for public health professionals ($M = 3.13, SD = .98$). Power analysis indicated an 89% chance of detecting a medium effect size ($d = .60$) with alpha at .05.

An ANOVA test was found to be statistically significant for *appropriateness* at an alpha level of .05, $F(2, 66) = 4.72, p < .05$ between public health, school mental health, and child welfare professionals. A Tukey HSD test indicated that the means of appropriateness for both school mental health ($M = 4.28, SD = .49$) and child welfare ($M = 4.17, SD = .63$) were

significantly greater than the mean for public health professionals ($M = 3.68$, $SD = .79$).

However, power analysis indicated that in order for an effect of this size to be detected (80% chance) with alpha at .05, a sample of 66 respondents would be required.

An ANOVA test found no statistically significant differences for *feasibility* at an alpha level of .05 between stakeholder groups. Power analysis indicated that in order for an effect of this size to be detected (80% chance) with alpha at .05, a sample of 144 respondents would be required.

3.1.3.2 Within Groups. Tables 7, 8, and 9 contain means, standard deviations, and paired group t-tests in R-AIM, R-IAM, and R-FIM of public health, school mental health, and child welfare professionals by community-based interventions, respectively.

3.1.3.2.1 Public Health Professionals. Paired samples t-tests compared the means of sports activity by animal interaction, sports activity by artistic expression, and animal interaction by artistic expression for acceptability, appropriateness, and feasibility. For *sports activity by animal interaction*, no statistically significant differences were found for acceptability ($M = 3.19$), appropriateness ($M = 3.67$), and feasibility ($M = 2.64$). Power analysis indicated that in order for an effect of this size to be detected (80% chance) with alpha at .05, a sample of 1089 and 97 respondents would be required for appropriateness and feasibility, respectively; power analysis was not possible for acceptability due to identical mean scores.

For *sports activity by artistic expression*, a paired samples t-test was found to be statistically significant for feasibility ($M = 2.64$) of sports activity by artistic expression at an alpha level of .05, $t(14) = -2.35$, $p < .05$, suggesting that artistic expression interventions are perceived as more feasible than sports activity interventions. However, power analysis indicated that in order for an effect of this size to be detected (80% chance) with alpha at .05, a sample of

30 respondents would be required. No statistically significant differences were found for acceptability ($M = 3.19$) and appropriateness ($M = 3.67$). Power analysis indicated that in order for an effect of this size to be detected (80% chance) with alpha at .05 for acceptability and appropriateness, a sample of 93 and 59 respondents would be required, respectively.

For *animal interaction by artistic expression*, no statistically significant differences were found for acceptability ($M = 3.13$), appropriateness ($M = 3.68$), and feasibility ($M = 2.84$). Power analysis indicated that in order for an effect of this size to be detected (80% chance) with alpha at .05, a sample of 97, 62, and 77 respondents would be required, respectively.

3.1.3.2.2 School Mental Health Professionals. Paired samples t-tests compared the means of sports activity by animal interaction, sports activity by artistic expression, and animal interaction by artistic expression for acceptability, appropriateness, and feasibility. For *sports activity by animal interaction*, this test was found to be statistically significant for feasibility ($M = 3.75$) at an alpha level of .05, $t(22) = 2.77$, $p < .05$, suggesting that sports activity interventions are perceived as more feasible than animal interaction interventions. Power analysis indicated an 88% chance of detecting a medium effect size ($d = .68$) with alpha at .05. No statistically significant differences were found for acceptability ($M = 4.27$) and appropriateness ($M = 4.31$). Power analysis indicated that in order for an effect of this size to be detected (80% chance) with alpha at .05, a sample of 443 and 2538 respondents would be required, respectively.

For *sports activity by artistic expression*, no statistically significant differences were found for acceptability ($M = 4.27$), appropriateness ($M = 4.31$), and feasibility ($M = 3.75$). Power analysis indicated that in order for an effect of this size to be detected (80% chance) with alpha at .05, a sample of 374, 143, and 15584 would be required, respectively.

For *animal interaction by artistic expression*, a paired samples t-test was found to be statistically significant for feasibility ($M = 3.25$) at an alpha level of .05, $t(22) = -2.71$, $p < .05$, suggesting that artistic expression interventions are perceived as more feasible than animal interaction interventions. Power analysis indicated a 91% chance of detecting a medium to large effect size ($d = .72$) with alpha at .05. No statistically significant differences were found for acceptability ($M = 4.19$) and appropriateness ($M = 4.28$). Power analysis indicated that in order for an effect of this size to be detected (80% chance) with alpha at .05, a sample of 89 and 79 respondents would be required, respectively.

3.1.3.2.3 Child Welfare Professionals. Paired samples t-tests compared the means of sports activity by animal interaction, sports activity by artistic expression, and animal interaction by artistic expression for acceptability, appropriateness, and feasibility. For *sports activity by animal interaction*, no statistically significant differences were found for acceptability ($M = 4.02$), appropriateness ($M = 4.31$), and feasibility ($M = 3.26$). Power analysis indicated that in order for an effect of this size to be detected (80% chance) with alpha at .05, a sample of 114, 137 and 12334 respondents would be required, respectively.

For *sports activity by artistic expression*, a paired samples t-test was found to be statistically significant for feasibility ($M = 3.23$) at an alpha level of .05, $t(26) = -2.58$, $p < .05$, suggesting that artistic expression interventions are perceived as more feasible than sports activity interventions. However, power analysis indicated that in order for an effect of this size to be detected (80% chance) with alpha at .05, a sample of 38 respondents would be required. No statistically significant differences were found for acceptability ($M = 4.02$) and appropriateness ($M = 4.32$). Power analysis indicated that in order for an effect of this size to be detected (80% chance) with alpha at .05, a sample of 706 and 772 would be required, respectively.

For *animal interaction by artistic expression*, a paired samples t-test was found to be statistically significant for acceptability ($M = 3.77$) at an alpha level of .05, $t(27) = -2.49$, $p < .05$ and for feasibility ($M = 3.25$) at an alpha level of .05, $t(27) = -2.57$, $p < .05$, suggesting that artistic expression interventions are perceived as more acceptable and feasible than animal interaction interventions. However, power analysis indicated that in order for an effect of this size to be detected (80% chance) with alpha at .05, a sample of 53 and 35 respondents would be required, respectively. No statistically significant differences were found for appropriateness ($M = 4.20$). Power analysis indicated that in order for an effect of this size to be detected (80% chance) with alpha at .05, a sample of 272 respondents would be required.

3.2 Qualitative Results

3.2.1 Research Question Three

What are professional stakeholders' perceptions of facilitators and barriers to implementation of theory- and evidence-informed, community-based sports activity, artistic expression, and animal interaction interventions for youth aged 6–18 years with a history of developmental trauma? A thematic analysis of open-ended prompts revealed five themes: safe space, engagement, training and education, partnership and collaboration, and resources. *Safe space* is defined as the intervention environment in which one can feel comfortable and accepted. *Engagement* is defined as the degree of participation in a given intervention. *Training and education* is defined as the information needed to successfully deliver and implement an intervention. *Partnership and collaboration* is defined as the relationships between stakeholder groups and relevant personnel and organizations necessary to deliver and implement an intervention. *Resources* is defined as the material and nonmaterial supports that affect the ability

to deliver and implement an intervention. Tables 10 and 11 present examples of facilitators and barriers by theme.

3.2.1.1 Facilitators of Community-Based Interventions by Stakeholder Group. Safe space was recommended by school mental health professionals and child welfare professionals on all three community-based intervention types. Engagement was recommended by public health professionals for sports activity and artistic expression interventions, and by school mental health and child welfare professionals for all intervention types. Training and education were recommended by all stakeholder groups for all intervention types. Partnership and collaboration were recommended by all stakeholder groups for all intervention types. Resources was recommended by public health professionals for sports activity and artistic expression interventions, and by school mental health and child welfare professionals for all intervention types.

3.2.1.2 Barriers of Community-Based Interventions by Stakeholder Group. Safe space was identified as an obstacle by public health professionals for sports activity and animal interaction interventions, and by school mental health and child welfare professionals for all community-based intervention types. Engagement was identified as an obstacle by all stakeholder groups for all intervention types. Training and education were identified as an obstacle by public health professionals for artistic expression and animal interaction interventions, and by school mental health and child welfare professionals for all intervention types. Partnership and collaboration were identified as an obstacle by public health professionals for animal interaction interventions, by school mental health professionals for all intervention types, and by child welfare professionals for artistic expression and animal interaction

interventions. Resources was identified as an obstacle by all stakeholder groups for all intervention types.

4. Discussion

Conveying a positive perception, stakeholders agreed that theory- and evidence-informed, community-based sports activity, artistic expression, and animal interaction interventions were acceptable and appropriate, and that artistic expression interventions were feasible. However, they shared a somewhat neutral view of the feasibility of sports activity and animal interaction interventions. When determining similarities and differences between and within stakeholder group, public health, school mental health, and child welfare professionals' perceptions of acceptability, appropriateness, and feasibility of sports activity, artistic expression, and animal interaction interventions differed between and within groups based on their practice setting. Stakeholders' perceptions of facilitators and barriers to implementation of the interventions revealed five major themes: safe space, engagement, training and education, partnership and collaboration, and resources.

A smaller sample size was obtained than we originally intended; however, using exploratory factor analysis, the KMO test of sampling adequacy indicated an adequate sample size for construct validity. Additionally, due to the small sample size, there was a risk of type II errors in the reporting of results; to mitigate this risk power analysis was conducted to determine at least an 80% chance of detecting an adequate effect, and if not achieved, sample size needed for adequate power was calculated. Attempting to reach stakeholders to participate in our survey was understandably challenged by the COVID-19 pandemic plaguing our world. Potential respondents were on the front line working with youth who have been impacted in various ways, such as dealing with loss, experiencing mental health challenges, navigating online learning, and

abiding by distancing orders that decrease social interaction and connection (Margolius et al., 2020). Because of this, we extended the deadline for data collection to allow ample time for those willing to complete our survey.

The EPIS exploration phase should be adapted to include the facilitators and barriers of safe space, engagement, training and education, partnership and collaboration, and resources when implementing community-based interventions for youth with a history of developmental trauma. In addition to examining individual adopter characteristics of acceptability, appropriateness, and feasibility, future research should explore additional EPIS constructs to improve implementation procedures. Organizational leadership can examine stakeholder groups' perceptions of acceptability, appropriateness, and feasibility when planning to adopt or include referral practices for community-based interventions to improve the likelihood of treatment sustainability. Program policies should address ways to mitigate resource barriers, such as lack of funding, which were universally identified across stakeholder groups.

5. Conclusion

Public health, school mental health, and child welfare professionals have a unique opportunity to work with youth who have experienced developmental trauma, address their trauma-associated outcomes, and refer them to necessary services. Many of these professionals have positive perceptions of community-based interventions as a helpful tool. However, notable differences exist between stakeholder groups' perceptions of the acceptability, appropriateness, and feasibility of sports activity, artistic expression, and animal interaction interventions. Applying the EPIS framework exploration factor of individual adopter characteristics and addressing facilitators and barriers when considering adoption of community-based interventions can improve access to treatment youth deserve.

6. Manuscript 3 References

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Table 1*Demographic Characteristics of Respondents by Stakeholder Group*

Baseline characteristic	Public health professionals		School mental health professionals		Child welfare professionals		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Gender								
Female	15	19.5	20	26.0	25	32.5	60	77.9
Male	0	0.0	3	3.9	1	1.3	4	5.2
Other ^b	1	1.3	0	0.0	0	0.0	1	1.3
Missing ^a	3	3.9	4	5.2	5	6.5	12	15.6
Age								
18–24 years	0	0.0	2	2.6	2	2.6	4	5.2
25–34 years	3	3.9	5	6.5	5	6.5	13	16.9
35–44 years	3	3.9	5	6.5	12	15.6	20	26.0
45–54 years	6	7.8	6	7.8	3	3.9	15	19.5
55–64 years	2	2.6	4	5.2	3	3.9	9	11.7
65–74 years	1	1.3	1	1.3	1	1.3	3	3.9
75+ years	1	1.3	0	0.0	0	0.0	1	1.3
Missing ^a	3	3.9	4	5.2	5	6.5	12	15.6
Educational level								
College, no degree	0	0.0	1	1.3	0	0.0	1	1.3
Associate	1	1.3	0	0.0	0	0.0	1	1.3
Bachelor's	8	10.4	4	5.2	11	14.3	23	30.0
Master's	10	13.0	22	28.6	18	23.4	50	64.9
Doctorate	0	0.0	0	0.0	2	2.6	2	2.6
Geographic location								
Urban Area	4	5.2	7	9.1	22	28.6	33	42.9
Urban Cluster	10	13.0	12	15.6	8	10.4	30	40.0
Rural	5	6.5	8	10.4	1	1.3	14	18.2
Years of experience								
< 1 year	6	7.8	2	2.6	1	1.3	9	11.7
1–5 years	7	9.1	6	7.8	5	6.5	18	23.4
5–10 years	1	1.3	3	3.9	5	6.5	9	11.7
10–15 years	0	0.0	5	6.5	8	10.4	13	16.9
15–20 years	3	3.9	5	6.5	7	9.1	15	19.5
21+ years	1	1.3	6	7.8	5	6.5	12	15.6
Missing ^a	1	1.3	0	0.0	0	0.0	1	1.3

Note. Demographic variables by those who completed some or all surveys.

^aThis information was collected at the end of the survey.

^bTransgender female, transgender male, gender variant/non-conforming, and not listed.

Table 2*Psychometric Properties for R-AIM, R-IAM, and R-FIM Scales by Intervention Type*

Scale	Internal Consistency Reliability				Factor Analysis Principal Components			
	<i>N</i>	Range	<i>M</i>	<i>SD</i>	Cronbach's α	KMO Sampling Adequacy	Rescaled Factor Loading	Rescaled Amount of Variance Explained
Sports Activity								
R-AIM	70	1.000–5.000	3.907	.897	.959	.858	.830–.951	82.9%
R-IAM	70	2.333–5.000	4.179	.605	.933	.773	.807–.908	74.7%
R-FIM	70	1.000–5.000	3.226	.899	.937	.836	.798–.947	76.2%
Artistic Expression								
R-AIM	71	1.667–5.000	3.974	.747	.951	.881	.772–.974	80.3%
R-IAM	71	2.883–5.000	4.239	.561	.869	.781	.585–.853	60.4%
R-FIM	71	1.667–5.000	3.479	.678	.881	.760	.509–.871	63.0%
Animal Interaction								
R-AIM	69	1.000–5.000	3.746	.904	.956	.876	.763–.963	82.4%
R-IAM	69	2.500–5.000	4.092	.665	.918	.906	.610–.930	72.1%
R-FIM	69	1.667–4.500	3.152	.725	.863	.824	.503–.950	60.8%

Note. R-AIM = Revised Acceptability of Implementation Measure. R-IAM = Revised Intervention Appropriateness Measure. R-FIM = Revised Feasibility of Implementation Measure.

Table 3*Correlations for Study Scales*

Scale	1	2	3	4	5	6	7	8	9
1. SA Acceptable	–								
2. SA Appropriate	.613*	–							
3. SA Feasible	.778*	.403*	–						
4. AE Acceptable	.773*	.634*	.640*	–					
5. AE Appropriate	.602*	.622*	.429*	.634*	–				
6. AE Feasible	.562*	.523*	.620*	.781*	.403**	–			
7. AI Acceptable	.747*	.506*	.599*	.768*	.559**	.606*	–		
8. AI Appropriate	.594*	.608*	.362*	.715*	.661**	.501*	.714*	–	
9. AI Feasible	.497*	.360*	.449*	.519*	.233	.464*	.692*	.554*	–

Note. SA = Sports Activity. AE = Artistic Expression. AI = Animal Interaction.

* $p < .01$

Table 4

Means, Standard Deviations, and One-Way Analyses of Variance in R-AIM, R-IAM, and R-FIM for Sports Activity by Health Professional Group

Groupings	<i>N</i>	<i>M</i>	<i>SD</i>		Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	<i>p</i>
Acceptability									
Public health	17	3.186*†	.901	Between	12.530	2	6.265	9.760	.000*††
School mental health	25	4.273†	.587	Within	43.006	67	.642		
Child welfare	28	4.018*	.897	Total	55.535	69			
Appropriateness									
Public health	17	3.784*†	.801	Between	3.491	2	1.746	5.364	.007*
School mental health	25	4.300†	.527	Within	21.804	67	.325		
Child welfare	28	4.310*	.425	Total	25.296	69			
Feasibility									
Public health	17	2.569*†	.941	Between	11.656	2	5.828	8.861	.000*††
School mental health	25	3.640†	.743	Within	44.068	67	.658		
Child welfare	28	3.256*	.785	Total	55.724	69			

*† $p < .05$

††power is greater than .80, representing a high probability that there is a difference between groups

Table 5

Means, Standard Deviations, and One-Way Analyses of Variance in R-AIM, R-IAM, and R-FIM for Artistic Expression by Health Professional Group

Groupings	<i>N</i>	<i>M</i>	<i>SD</i>		Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	<i>p</i>
Acceptability									
Public health	17	3.372* [†]	.877	Between	8.721	2	4.361	9.782	.000* ^{††}
School mental health	25	4.280 [†]	.513	Within	30.315	68	.446		
Child welfare	29	4.063*	.646	Total	39.036	70			
Appropriateness									
Public health	17	3.941	.595	Between	1.997	2	.998	3.387	.040*
School mental health	25	4.347	.507	Within	20.044	68	.295		
Child welfare	29	4.322	.542	Total	22.041	70			
Feasibility									
Public health	17	3.078 [†]	.739	Between	4.274	2	2.137	5.200	.008*
School mental health	25	3.727 [†]	.597	Within	27.944	68	.411		
Child welfare	29	3.500	.617	Total	32.218	70			

*[†] $p < .05$

^{††}power is greater than .80, representing a high probability that there is a difference between groups

Table 6

Means, Standard Deviations, and One-Way Analyses of Variance in R-AIM, R-IAM, and R-FIM for Animal Interaction by Health Professional Group

Groupings	<i>N</i>	<i>M</i>	<i>SD</i>		Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	<i>p</i>
Acceptability									
Public health	16	3.125* [†]	.980	Between	10.673	2	5.337	7.852	.001* ^{††}
School mental health	23	4.188 [†]	.585	Within	44.860	66	.680		
Child welfare	30	3.739*	.889	Total	55.534	68			
Appropriateness									
Public health	16	3.677* [†]	.790	Between	3.757	2	1.879	4.720	.012*
School mental health	23	4.283 [†]	.491	Within	26.272	66	.398		
Child welfare	30	4.167*	.633	Total	30.030	68			
Feasibility									
Public health	16	2.844	.780	Between	1.984	2	.992	1.942	.152
School mental health	23	3.254	.796	Within	33.723	66	.511		
Child welfare	30	3.239	.606	Total	35.708	68			

*[†] $p < .05$

^{††}power is greater than .80, representing a high probability that there is a difference between groups

Table 7

Differences in Acceptability, Appropriateness, and Feasibility between Intervention Types for Public Health Professionals

Interventions by Concept	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>	CI Lower	CI Higher	Cohen's <i>d</i>
SA x AI	SA		AI							
Acceptability	3.190	.910	3.190	.980	.000	14	1.000	-.312	.312	.000
Appropriateness	3.667	.769	3.733	.784	-.419	14	.682	-.408	.275	-.108
Feasibility	2.644	.904	2.889	.786	-1.427	14	.175	-.612	.123	-.369
SA x AE	SA		AE							
Acceptability	3.190	.910	3.456	.899	-1.392	14	.186	-.678	.144	-.359
Appropriateness	3.667	.769	3.933	.636	-1.544	14	.145	-.637	.104	-.399
Feasibility	2.644	.904	3.100	.786	-2.347	14	.034*	-.872	-.039	-.606
AI x AE	AI		AE							
Acceptability	3.125	.980	3.396	.900	-1.714	15	.107	-.608	.066	-.428
Appropriateness	3.677	.790	3.938	.614	-1.766	15	.098	-.575	.054	-.441
Feasibility	2.844	.780	3.094	.760	-1.553	15	.141	-.593	.093	-.388

Note. SA = Sports Activity. AI = Animal Interaction. AE = Artistic Expression. For statistically significant t-test scores, Cohen's *d* of $> .5$ and $< .8$ indicates a moderate difference between interventions by concept.

* $p < .05$

Table 8

Differences in Acceptability, Appropriateness, and Feasibility between Intervention Types for School Mental Health Professionals

Interventions by Concept	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>	CI Lower	CI Higher	Cohen's <i>d</i>
SA x AI		SA		AI						
Acceptability	4.268	.613	4.188	.585	.765	22	.452	-.136	.296	.160
Appropriateness	4.312	.547	4.283	.491	.264	22	.794	-.199	.257	.055
Feasibility	3.754	.641	3.254	.796	2.774	22	.011*†	.126	.874	.578
SA x AE		SA		AE						
Acceptability	4.268	.613	4.348	.452	-.983	22	.336	-.248	.088	-.205
Appropriateness	4.312	.547	4.428	.405	-1.133	22	.270	-.328	.096	-.236
Feasibility	3.754	.641	3.768	.605	-.108	22	.915	-.292	.263	-.023
AI x AE		AI		AE						
Acceptability	4.188	.585	4.348	.452	-1.812	22	.084	-.342	.023	-.378
Appropriateness	4.283	.491	4.428	.405	-1.594	22	.125	-.334	.044	-.332
Feasibility	3.254	.796	3.768	.605	-2.712	22	.013*†	-.908	-.121	-.565

Note. SA = Sports Activity. AI = Animal Interaction. AE = Artistic Expression. For statistically significant t-test scores, Cohen's *d* of $> .5$ and $< .8$ indicates a moderate difference between interventions by concept.

* $p < .05$

†power is greater than .80, representing a high probability that there is a difference between groups

Table 9

Differences in Acceptability, Appropriateness, and Feasibility between Intervention Types for Child Welfare Professionals

Interventions by Concept	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>	CI Lower	CI Higher	Cohen's <i>d</i>
SA x AI	SA		AI							
Acceptability	4.018	.897	3.780	.897	1.644	27	.112	-.059	.535	.311
Appropriateness	4.310	.425	4.173	.645	1.266	27	.216	-.085	.359	.239
Feasibility	3.256	.785	3.274	.609	-.117	27	.908	-.331	.295	-.022
SA x AE	SA		AE							
Acceptability	4.019	.914	4.105	.649	-.729	26	.472	-.330	.157	-.140
Appropriateness	4.321	.428	4.272	.527	.655	26	.518	-.106	.204	.126
Feasibility	3.228	.786	3.562	.587	-2.580	26	.016*	-.599	-.068	-.496
AI x AE	AI		AE							
Acceptability	3.774	.897	4.089	.642	-2.485	27	.019*	-.576	-.055	-.470
Appropriateness	4.196	.645	4.298	.535	-1.000	27	.326	-.309	.106	-.189
Feasibility	3.250	.606	3.542	.586	-2.567	27	.016*	-.525	-.059	-.485

Note. SA = Sports Activity. AI = Animal Interaction. AE = Artistic Expression. For statistically significant t-test scores, Cohen's *d* of $> .5$ and $< .8$ indicates a moderate difference between interventions by concept.

* $p < .05$

Table 10

Thematic Analysis Facilitators to the Implementation of Community-Based Interventions by Stakeholder Group

Stakeholder Group and Intervention Type	Safe Space	Engagement	Training/Education	Partnership/Collaboration	Resources
Public Health Professionals					
Sports Activity Interventions		<ul style="list-style-type: none"> • Positive perceptions of sports • Sense of belonging 	<ul style="list-style-type: none"> • Trauma-informed care 	<ul style="list-style-type: none"> • Partnering with outside agency 	<ul style="list-style-type: none"> • Available space • Adequate staffing • Access to youth
Artistic Expression Interventions		<ul style="list-style-type: none"> • Consistent contact • Incentives 	<ul style="list-style-type: none"> • Trauma-informed care • Benefits of artistic expression interventions 	<ul style="list-style-type: none"> • Partnering with outside agency 	<ul style="list-style-type: none"> • Available space • Donations of supplies
Animal Interaction Interventions			<ul style="list-style-type: none"> • Specific intervention education • Provider training to benefit both youth and animal 	<ul style="list-style-type: none"> • Partnering with outside agency 	
School Mental Health Professionals					
Sports Activity Interventions	<ul style="list-style-type: none"> • Diverse staff 	<ul style="list-style-type: none"> • Positive perceptions of sports • Youth and parent interest 	<ul style="list-style-type: none"> • Trauma-informed care • Professional development 	<ul style="list-style-type: none"> • Administrative buy-in • Collaboration with school staff • Partnering with outside agency 	<ul style="list-style-type: none"> • Subsidized programming • Equipment & space available at school • Utilize existing programs
Artistic Expression Interventions	<ul style="list-style-type: none"> • Diverse and bilingual staff 	<ul style="list-style-type: none"> • Identify a marketing champion • Youth and parent interest 	<ul style="list-style-type: none"> • Benefits of artistic expression interventions • Professional development 	<ul style="list-style-type: none"> • Administrative buy-in • Collaboration with school staff • Partnering with outside agency 	<ul style="list-style-type: none"> • Subsidized programming • Equipment & space available at school • Utilize existing programs
Animal Interaction Interventions	<ul style="list-style-type: none"> • Acknowledge fears • Knowledge of allergies • Animal therapy certification 	<ul style="list-style-type: none"> • Staff interest in animals • Youth are comfortable with animals 	<ul style="list-style-type: none"> • Benefits of animal interaction interventions • Professional development • Evidence-based practice 	<ul style="list-style-type: none"> • Administrative buy-in • Collaboration with school staff • Partnering with outside agency 	<ul style="list-style-type: none"> • Supportive district policy • Subsidized programming
Child Welfare Professionals					
Sports Activity Interventions	<ul style="list-style-type: none"> • Appropriate staff-youth 	<ul style="list-style-type: none"> • Choice of sport 	<ul style="list-style-type: none"> • Trauma-informed care 	<ul style="list-style-type: none"> • Partnering with outside agency 	<ul style="list-style-type: none"> • Subsidized programming

<p>Artistic Expression Interventions</p>	<p>ratio</p> <ul style="list-style-type: none"> • Avoid outcomes based on skill level • Staff knowledge of youth histories • Space for staff to express themselves 	<ul style="list-style-type: none"> • Youth, parent, & staff interest • Committed staff 	<ul style="list-style-type: none"> • Professional development • Evidence-based practice • Benefits of artistic expression interventions • Program delivery 	<p>agency</p> <ul style="list-style-type: none"> • Partnering with outside agency 	<ul style="list-style-type: none"> • Offer a well-developed program • Subsidized programming
<p>Animal Interaction Interventions</p>	<ul style="list-style-type: none"> • Availability during crisis • Youth comfort • Appropriate intervention 	<ul style="list-style-type: none"> • Committed staff 	<ul style="list-style-type: none"> • Benefits of animal interaction interventions • Evidence-based practice • Program delivery • Care of animals 	<ul style="list-style-type: none"> • Administrative buy-in • Partnering with outside agency • Coordination & support 	<ul style="list-style-type: none"> • Subsidized programming • Utilize existing programs

Table 11

Thematic Analysis Barriers to the Implementation of Community-Based Interventions by Stakeholder Group

Stakeholder Group and Intervention Type	Safe Space	Engagement	Training/Education	Partnership/Collaboration	Resources
Public Health Professionals					
Sports Activity Interventions	<ul style="list-style-type: none"> • Liability • Need to adapt for special accommodations • Danger/triggers of physical sports 	<ul style="list-style-type: none"> • Competing priorities • Lack of coach interest 			<ul style="list-style-type: none"> • Lack of staff, time, space, & funding
Artistic Expression Interventions		<ul style="list-style-type: none"> • Inconsistent contact • Lack of youth interest • Competing priorities 	<ul style="list-style-type: none"> • Lack of oversight 		<ul style="list-style-type: none"> • Lack of staff, time, space, transportation, & funding
Animal Interaction Interventions	<ul style="list-style-type: none"> • Safety • Liability 	<ul style="list-style-type: none"> • Limited youth 	<ul style="list-style-type: none"> • Lack of training 	<ul style="list-style-type: none"> • Lack of youth accessibility when at an outside agency 	<ul style="list-style-type: none"> • Lack of staff, time, space, transportation, & funding • Lack of policy in place
School Mental Health Professionals					
Sports Activity Interventions	<ul style="list-style-type: none"> • Concerns over fighting • Body image and shaming • Behavioral issues • COVID-19 	<ul style="list-style-type: none"> • Youth hesitation • Lack of youth & staff interest • Competing priorities 	<ul style="list-style-type: none"> • Lack of training 	<ul style="list-style-type: none"> • Denial from administration 	<ul style="list-style-type: none"> • Lack of staff, time, space, transportation, & funding • Sustainability issues • Insurance-related issues
Artistic Expression Interventions	<ul style="list-style-type: none"> • Gender expectations • Biases towards the arts • Behavioral and emotional health secondary to academics • COVID-19 	<ul style="list-style-type: none"> • Competing priorities • Lack of youth, parent & staff interest 	<ul style="list-style-type: none"> • Unlicensed staff less adequately trained 	<ul style="list-style-type: none"> • Denial from administration 	<ul style="list-style-type: none"> • Lack of staff, time, space, transportation, & funding • Sustainability issues • Focus on academia v.s. extracurricular activities
Animal Interaction Interventions	<ul style="list-style-type: none"> • Fear of animals • Allergies • Liability • Animal therapy certification 	<ul style="list-style-type: none"> • Competing priorities • Lack of family & staff buy-in • Staff resistance 	<ul style="list-style-type: none"> • Lack of belief in efficacy of animal interaction interventions 	<ul style="list-style-type: none"> • Denial from administration 	<ul style="list-style-type: none"> • Lack of staff, time, space, transportation, & funding • Sustainability issues • Insurance-related issues • Supplies to care for animals
Child Welfare Professionals					

Sports Activity Interventions	<ul style="list-style-type: none"> ● Safety ● Concerns over fighting ● COVID-19 ● Inadequate supervision ● Confidentiality 	<ul style="list-style-type: none"> ● Lack of youth & family interest ● Marketing issues 	<ul style="list-style-type: none"> ● Lack understanding of importance of sports activity interventions 	<ul style="list-style-type: none"> ● Lack of staff, time, space, & funding ● Sustainability issues ● Lack of policy in place ● Scope of practice
Artistic Expression Interventions	<ul style="list-style-type: none"> ● Self-confidence issues ● COVID-19 ● Inadequate supervision ● Confidentiality 	<ul style="list-style-type: none"> ● Lack of youth & family interest ● Limited interaction 	<ul style="list-style-type: none"> ● Lack understanding of importance of sports activity interventions 	<ul style="list-style-type: none"> ● Lack of staff, time, space, transportation, & funding ● Insurance-related issues
Animal Interaction Interventions	<ul style="list-style-type: none"> ● Fear of animals ● Allergies ● Inadequate supervision ● Liability 	<ul style="list-style-type: none"> ● Lack of national branding 	<ul style="list-style-type: none"> ● Lack of information on available programs 	<ul style="list-style-type: none"> ● Lack of staff, time, space, transportation, & funding ● Licensing & regulation

Discussion and Conclusion

Developmental trauma is a pervasive issue for youth in the United States and across the globe. Community-based interventions as a treatment option for developmental trauma-associated outcomes are a promising avenue of care. The importance of the attachment, regulation, and competency framework (ARC) when addressing developmental trauma is important for successful outcomes. To improve adoption uptake and sustainability when implementing community-based interventions, relevant stakeholders' perceptions should be considered. In this dissertation, identifying available and effective community-based interventions was explored through a mixed-methods integrative review of the literature, and examining the degree of congruence between identified community-based interventions and ARC was explored using a descriptive analytic design. The cross-sectional study was developed to understand stakeholders' perceptions of the effective aspects of the identified community-based interventions. Examination of community-based interventions are grouped by intervention type: (a) sports activity, (b) artistic expression, (c) animal interaction, and (d) camp experience.

Synthesis of Findings

Sports Activity Interventions

Sports activity interventions, when measuring outcomes of mental and behavioral health and attachment, reported statistically significant positive change. When mapping to the attachment, regulation, and competency framework (ARC), the sports activity intervention was designated as potential incongruence, yet acceptable. Twenty-four of 37 ARC intervention components were included in the sports activity intervention. With regards to public health, school mental health, and child welfare professionals' perception of sports activity interventions, stakeholders agreed that they are acceptable and appropriate, and were neutral that they are feasible. School mental health and child welfare professionals perceived these interventions as

more acceptable, appropriate, and feasible than did public health professionals. School mental health professionals perceived sports activity interventions as more feasible than animal interaction interventions. Facilitators and barriers to implementation included themes of safe space, engagement, training and education, partnership and collaboration, and resources.

Sports activity interventions are a promising avenue for treatment of developmental trauma-associated outcomes. D'Andrea et al. (2013) found team sports positively impacted youth by being fun and engaging, improving social interaction through cooperation, the learning of new skills leading to improved competence, and learning to set and reach goals. Additionally, sports activity interventions constitute an ideal method due to their dissemination cost-effectiveness and modifiability. Sports activity interventions should be adapted to include all intervention components of ARC. Stakeholders' perceptions of feasibility should be addressed to improve intervention adoption.

Artistic Expression Interventions

Artistic expression interventions, when measuring outcomes of mental and behavioral health and attachment, reported either statistically significant positive change or no change. Interventions included themes related to using facilitation, having a person-centered focus, being a usable tool, incorporating attachment, and leading to positive outcomes. When mapping to ARC, one artistic expression intervention was designated as potential incongruence and therefore unacceptable, and four were designated as incongruent. Across all artistic expression interventions, twenty-four of 37 ARC intervention components were included. With regards to public health, school mental health, and child welfare professionals' perception of artistic expression interventions, stakeholders agreed that they are acceptable, appropriate, and feasible. School mental health and child welfare professionals perceived these interventions as more acceptable and feasible than did public health professionals, with no difference between groups

for being appropriate. For public health and school mental health professionals, artistic expression interventions are perceived as more feasible than sports activity and animal interaction interventions. For child welfare professionals, artistic expression interventions are perceived as more feasible than sports activity interventions and are more acceptable and feasible than animal interaction interventions. Facilitators and barriers to implementation included themes of safe space, engagement, training and education, partnership and collaboration, and resources.

Artistic expression interventions can improve mental health challenges, behavioral regulation, and self-concept through accessing and processing memories of trauma experience (American Art Therapy Association, 2012; Howie, 2016). The community-based model for art therapists includes a focus on community readiness, strengths, needs, and resources (Ottmiller & Awais, 2016). With stakeholders collaboration, artistic expression interventions can be implemented following established models when adapted to incorporate ARC.

Animal Interaction Interventions

Animal interaction interventions, when measuring outcomes of mental, behavioral, and physical health, attachment, executive functioning, and well-being, reported either statistically and clinically significant positive change or no change. One intervention included themes related to using facilitation, having a person-centered focus, being a usable tool, incorporating attachment, and leading to positive outcomes. When mapping to ARC, five animal interaction interventions were designated as potential incongruence and therefore unacceptable, and four were designated as incongruent. Across all animal interaction interventions, thirty of 37 ARC intervention components were included. With regards to public health, school mental health, and child welfare professionals' perception of animal interaction interventions, stakeholders agreed that they are acceptable and appropriate, and were neutral that they are feasible. School mental

health and child welfare professionals perceived these interventions as more acceptable and appropriate than public health professionals, with no differences between groups for being feasible. Facilitators and barriers to implementation included themes of safe space, engagement, training and education, partnership and collaboration, and resources.

Animal interaction interventions are shown to be beneficial for youth experiencing trauma-associated outcomes. Interaction, connection, and trust between youth and animal can reduce mental health challenges and improve social interaction and attachment. Animals also facilitate positive cognitive and behavioral changes (Kruger & Serpell, 2010). The tenets of animal interaction interventions have the foundation to support all aspects of ARC; when implementing these interventions in community-based settings, purposeful incorporation of all intervention components must be achieved. Stakeholders' perceptions on feasibility were low compared to other types of interventions. Design issues for animal interaction interventions relate to educated staff, client fear and dislike, animal selection decisions, associated costs, concerns with liability, and infection control concerns (Mallon et al., 2010). Addressing design issues is needed to improve barriers to implementation.

Camp Experience Interventions

Camp experience interventions, when measuring outcomes of mental, behavioral, and physical health and attachment, reported either statistically significant positive change or no change. One intervention included themes related to using facilitation, having a person-centered focus, being a usable tool, incorporating attachment, addressing unfavorable attitudes and hesitation, reaching eventual appreciation, and leading to positive outcomes. When mapping to ARC, one camp experience intervention was designated as congruent and one was designated as potential incongruence and therefore unacceptable. All 37 ARC intervention components were included in both camp experience interventions. Camp experience interventions were excluded

from the implementation survey due to overlap with the other types of interventions. When including sports activity, artistic expression, and animal interaction interventions within camp experience interventions, incorporating ARC and including stakeholders in the implementation process is still salient.

Limitations

The limitations of this study related to each aim can be found in each of the three manuscripts. Overall, the limitations of the first two manuscripts are a limited number of published reports, potentially incomplete intervention descriptions, and lack of consistency in measuring and reporting outcomes. Email inquiries were attempted to gain additional information about each intervention, and we used the ARC training manual as a reference guide. The limitations of the final manuscript related to a small sample size and convenience sampling procedures. However, for the purposes of this study, the small sample size was appropriate. Future work should focus on obtaining a larger and more representative sample in Wisconsin and other states. Although there were limitations to the three studies, the overall aims were accomplished, and findings can serve as a basis for future research.

Future Directions

Next steps for my program of research are to (a) determine the core components and adaptable periphery of the theory- and evidence-informed community-based interventions, (b) adapt the interventions to reflect the resources and wishes of those who will be impacted, and (c) begin the process of implementing the interventions for youth with a history of developmental trauma, following the steps of EPIS.

Characteristics of an evidence-based practice must include core components that were reported to be necessary for successful treatment outcomes, but also consider adaptation to

increase relevance (Chorpita & Daleiden, 2009; Moullin et al., 2019). Comparing to ARC, I will identify aspects of the intervention that follow important theoretical principles necessary to maintain fidelity (Rovniak et al., 2005). Working with members of the community to adapt peripheral components of interventions assures relevance to the population, setting, and community of interest (Holkup et al., 2009) Following EPIS, I plan to examine the outer and inner contexts that ultimately lead to sustainment of community-based interventions (Aarons et al., 2011), while emphasizing youth empowerment through their choice and decision-making when deciding intervention type (Blaustein & Kinniburg, 2010; 2019).

Conclusion

Through this dissertation study, I was able to identify available community-based interventions, examine their degree of congruence with ARC, and examine how relevant stakeholders' perceive these types of interventions in relation to their implementation. Like the do-do bird verdict in psychology states "everybody has won, and all must have prizes" (Rosenzweig, 1936, p. 412). Which type of community-based intervention to use may not be the right question, but rather how does an intervention incorporate ARC concepts, and how relevant is the intervention to the population of interest (Herman, 1992). Settings have diverse needs and resources to support different interventions. Additionally, individuals participating must approve. Future research should be implementation-based and focus on the resources of settings that can support various community-based interventions, determine which interventions would be preferred by individuals participating, and ascertain factors necessary for intervention sustainability.

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