GLOBAL JOURNAL OF
Community Psychology Practice
PROMOTING COMMUNITY PRACTICE FOR SOCIAL BENEFIT

The Impact of Surf Therapy on Risk-Taking and Interpersonal Closeness Among Violence-Exposed Youth

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Keywords: Surf-therapy, community mental health, risk-taking, violence, South Africa

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Recommended Citation: Beranbaum, S., Kouri, N., Van der Merwe, N., & Andrea, W. D. (2024). The Impact of Surf Therapy on Risk-Taking and Interpersonal Closeness Among Violence-Exposed Youth. *Global Journal of Community Psychology Practice, 15*(2), 1 - 19. Retrieved Day/Month/Year, from (https://www.gjcpp.org/).

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Abstract

Objective:
The impacts of the sport-based, psycho-social intervention, surf therapy, have thus far yielded promising results based on self-reported and qualitative assessments. The purpose of this study is to use a multi-method evaluation to investigate the effects of Waves for Change's surf therapy program for at-risk youth according to the primary intervention aims.

Method:
Two-hundred thirty-three violence-exposed youth from South Africa participated in a multi-method program evaluation of Waves for Change's surf therapy program. Participants who were either enrolled in surf therapy or in the waitlist comparison group completed self-report assessments of perceived stress, sensation-seeking, and interpersonal closeness, as well as behavioral measures of risk-taking and self-esteem. Data were collected at two time points, six months apart.

Findings:
Participation in surf therapy among participants, each of whom endorsed exposure to violence, led to significant reductions in risk-taking behaviors and sensation seeking. Data also suggests that Waves for Change's surf-therapy increased participants' sense of interpersonal closeness. There were no significant changes observed in participant stress or self-esteem, which were both assessed with measures that yielded low internal consistency.

Conclusion:
Findings suggest that Waves for Change's surf therapy program is an efficacious, trauma-informed intervention for violence-exposed youth. The intervention has been found to strengthen interpersonal connectivity and reduce impulsivity.

Introduction

Even if you have never surfed, you likely know that riding a wave takes bravery, perseverance, focus, and an optimistic outlook. Such skills are beneficial in many sports and translate to the rest of life. Physical activity is consistently found to benefit physical, psychological, and social health (e.g., Biddle & Mutrie 2008; Reed & Buck, 2009). One such sport-based intervention is surf therapy. Surf therapy is defined by the International Surf Therapy Organization (2019) as an intervention that combines surf instruction and activities that promote psychological, physical, and psychosocial wellness, conducted individually or as a group. In addition to surf instruction, programs often incorporate mentoring, social skills development, psycho-social education,

and group discussion, fostered in a safe interpersonal environment. Surf therapy is well situated to deliver these intervention elements in part because participants can practice learned coping skills in response to in-the-moment physiological and emotional stressors (e.g. a wipe out). Furthermore, in order to stay safe while on the beach and in the ocean, a culture of caring for one another and speaking up for oneself is cultivated (Marshall et al., 2020).

In a recent review of the academic literature on surf therapy, Benninger et al., (2020) found consistent evidence that surf therapy increases self-concept, emotional regulation and social competency skills, engagement with school, and reductions in behavioral problems among youth in need of social and emotional support (Colpus & Taylor, 2014; Hignett et al., 2018; Matos et al., 2017). Through surf therapy, participants also have the opportunity to be outdoors. Evidence demonstrates the psychological benefits of combining physical activity and being in natural environments (Eigenschenk et al., 2019; Mitchell, 2013), which builds on knowledge that being in nature nurtures well-being (Hansen-Ketchum & Halpenny, 2011).

One such context where surf therapy is provided is South Africa, which at present, is faced with social, health, and economic inequity, with over half of South Africa's children living in conditions of poverty (Unicef, 2020). Widespread poverty and unemployment are two social factors that support violence (Seedat et al., 2009) and despite widespread exposure to adverse social and environmental influences, government-wide programs and psycho-social interventions are limited (Marshall et al., 2020; van der Merwe & Yarrow, 2020). Instead, non-governmental organizations have been the primary leaders in developing psycho-social programming to safeguard against violence and support those who have been victimized (Seedat et al., 2009).

A non-governmental organization that provides much needed services in the form of surf therapy to youth is Waves for Change (W4C; https://waves-for-change.org/). Built on trauma-informed principles and a child-friendly approach, W4C founder, Tim Conibear, describes surf therapy as providing participants with: 1) a safe space and caring adults (i.e. social connection); 2) the challenging and interesting activity of surfing (i.e. confidence building); and 3) psycho-education (i.e. emotion-regulation skills). By incorporating these elements, W4C aims to improve self-regulation, increase children's ability to form meaningful and protective relationships among people of similar and different identifies (e.g. gender, race), and strengthen their positive outlook on the future (personal communication, March 16, 2021).

Existing research on W4C suggests that participants perceive the program to be a trauma-informed physical activity. As a community-based intervention based in a community with insufficient access to highly qualified professionals such as psychotherapists (World Health Organization, 2022), W4C's surf therapy sessions are facilitated by non-specialist workers who have less extensive training so as to increase access to mental health care (Patel, 2009). Within W4C "surf coaches" or "coaches" implement the intervention. Surf coaches are young adults who come from the same township communities as the youth participants and may have previously participated in surf therapy themselves. Surf coaches receive training in a wide variety of topics that include trauma-informed care and water safety prior to facilitating surf therapy and receive regular training and supervisory team meetings throughout programming.

South African participants reported W4C to be a safe space where youth can establish social connections and support through psycho-social education about coping, and pro-social communication, and participate in a fun activity collectively (Marshall et al., 2020). Youth participants' reports of W4C surf therapy are aligned with elements of trauma-informed care. Darroch et al. (2020) define trauma-informed physical activity as an appealing and accessible program that includes: safety, collaborative and clear communication, caring instructors trained in trauma-informed care, emotion-awareness, and regulation exercises.

According to regular internal evaluations, W4C surf therapy has been associated with positive self-esteem and self-regulation among participants. Furthermore, a qualitative study from W4C's program in Liberia revealed that surf therapy produced a supportive, familial environment of physical and emotional safety, fostered new positive social connections, and cultivated coping skills (Marshall et al., 2020). A randomized controlled trial, conducted as part of a master's project on the impact of W4C's surf therapy, however, found no statistically significant changes in self-reported psycho-social well-being (Snelling, 2016).

While quantitative self-report measures have thus far not revealed statistically significant change, qualitative research by Marshall et al., (2020) demonstrated surf therapy benefits. Qualitative findings revealed that surf therapy cultivated emotional and physical safety, which was attributed by participants to their caring coaches who assumed a nonjudgemental stance. Their study also revealed increased awareness of emotion states and willingness to communicate such feelings and needs by participants. Given the discordance between promising qualitative outcomes and insignificant qualitative findings the question of how to measure and interpret change throughout surf therapy is raised. Accordingly, W4C commissioned an external program evaluation, which incorporated self-report measures and objective behavioral measures that were matched to their intended program outcomes. The current study presents the findings from such evaluation.

To develop the evaluation, the study's authors considered W4C's program aims and consulted with W4C personnel. The intervention intends to combat social exclusion by helping young people from communities with high rates of violence develop a skill set necessary to better regulate their emotions, identify and maintain positive life choices, and create meaningful relationships. As such, the evaluation sought to examine changes in participants' perceived stress, self-regulation and risk-taking, self-esteem, and social cohesion.

The evaluation implemented a multimodal method of data collection. Self-report measures for child participants, although time and cost efficient, have significant limitations, that include inconsistent reports of well-being due to developing abstract thinking and memory recall (Going et al., 1999) and frequent underreporting of "bad" behaviors (e.g., risk taking) and feelings (e.g., stress) and overreporting of "good" behaviors (e.g., exercise) and emotions (e.g., happiness) to please adults (Camerini, 2017). As such, the evaluation incorporated behavioral and self-report measures

The present study builds off of existing surf-therapy research, including the baseline findings of the present evaluation (Beranbaum et al., 2022), by assessing the impacts of surf-therapy using a multi-method evaluation that incorporates self-report and behavioral measures. Exposure to violence, sensation seeking, stress, self-esteem, interpersonal closeness, and risk taking tendencies were examined over the course of W4C's surf-therapy program among child

participants who speak different languages and come from various subcultures within Cape Town, South Africa. The evaluation aims to assess the impact of W4C surf therapy using a multi-method assessment and methodologically investigate the benefits and drawbacks of various assessment approaches for youth psychosocial programming. A secondary aim of the present study was to determine the feasibility and utility of behavioral and self-reported measures administered in a naturalistic setting.

Method

Program Characteristics

The present study evaluated the surf-therapy intervention conducted by W4C, which is designed to provide violence and trauma-exposed children and adolescents with social support and skills to strengthen their emotion regulation and positive self-esteem. Through surfing paired with psychosocial-education and a coping skills curriculum, within a supportive social environment, W4C aims for youth participants to build confidence, strengthen their self-regulation, and develop hopeful views of the future. The 10-month long curriculum is distributed weekly sessions by surf coaches held at local beaches. W4C picks up children from their township communities by bus and drives them to the beach where they receive a nutritious meal, participate in surfing, psycho-social education, and community building activities, and then are brought back home.

Study Design

A multi-method program evaluation was conducted between 2018 and 2019 that included a comparison group of children who were on the W4C waitlist. Participants' exposure to surf therapy varied widely; some participants had not yet begun surf therapy whereas others had already participated in 33 weeks of the surf therapy curriculum. All intervention and comparison participants were assessed at two time points (i.e., "baseline" and "endline"), 6 months apart. Data collection occurred in participants' schools or in W4C facilities.

Participant recruitment and characteristics

South African youth (N = 233, 57.5% female), aged 9-17 years old (M = 11.26) from Ocean View, Khayelitsha, Lavender Hill, and Hangberg townships[4] participated in the evaluation. Participants were referred to W4C by school personnel based on perceived vulnerability to anxiety, depression, attention deficits, and aggression, as well as known exposure to traumatic events or loss. Referred participants needed to meet inclusion criteria: age criteria, interest in joining surf therapy, available during times of data collection, and parents consented to research and surf therapy participation.

Measures

Self-report measures and behavioral task instructions were translated and back-translated into Xhosa and Afrikaans from English by multi-lingual W4C staff.

Trauma and Stress

Violence Exposure. Exposure to violence was evaluated with the 25-item *Community Experiences Questionnaire* (CEQ; Schwartz & Proctor, 2000). Participants rated on a scale

[4] South African townships are communities developed to identify 'non-White' neighborhoods during apartheid. They were established in the peripheries of cities as part of the segregationist doctrine that aimed to minimize interactions between people of different skin colors (Jürgens et al., 2013)

from 1 (never) to 4 (lots of times) how often they had witnessed or directly experienced violence. The CEQ has subscales that assess exposure to violence through witnessing and direct victimization.

Stress. The *Perceived Stress Scale for Children* (PSS; White, 2014) was administered to assess self-reported stress during the past week on a scale of 0 (never) to 3 (a lot). Items are summed with the highest possible score being 39. The scale had poor consistency determined by Cronbach's alpha of .58.

Self-Concept

Self-Esteem. Self-esteem was measured with a seven-block *Implicit Association Test* (IAT; Greenwald et al., 1998). For the Self-Esteem IAT (Greenwald et al., 2002), participants were presented with alternating positive and negative words or images (i.e. attributes) alongside first or second person pronouns (i.e. categories of "self" or "other"). Faster performance is expected when highly associated concepts and attributes share the same response computer key. Thus, positive self-esteem is inferred if a child more quickly associated themselves with something positive than negative, whereas negative scores on the IAT indicate associating the self with negative attributes, suggesting poor self-esteem.

Due to child-level literacy and limited familiarity with a computer keyboard, certain elements of the task were modified: 1) Positive or negative emojis, or simple pictures, replaced positive and negative attribute words; 2) Color-coded stickers were placed on the two keyboard keys participants were instructed to press to minimize reaction time, unrelated to the measured construct. The outcome variable is the IAT summary 'D' score, which includes practice and test trials. Positive values are indicative of positive associations with the self and negative values indicate negative associations with the self.

Interpersonal Closeness. The *Inclusion of Other in the Self* (IOS; Aron et al., 1992) questionnaire was administered to assess participants' closeness with others. See appendix A for scale imagery. Participants selected the picture that best depicts their relationship from a series of circular diagrams that represent degrees of overlap between two circles. A couple of items were modified to address perception of closeness within the context of surf therapy programming: "The people in your surf group" and "Your surf coach." Additionally, questions were modified to assess changes in perceived closeness with individuals identified to be within the same or different social group, namely someone of the same or different gender or race: "Friends who are boys (or girls)," and "A person with the same (or different) skin color as you." The scale measured closeness and connection at an individual item level to examine specific changes in relationships and had acceptable internal consistency of .74.

Risk- and Sensation-Seeking

Risk Taking. Risk-taking propensity was assessed with the *Balloon Analogue Risk Task for Youth* (BART-Y; Lejuez et al., 2007). Participants were asked to inflate a computer-generated balloon to earn an unspecified prize. With each pump of the balloon, participants earn a point and can choose to stop pumping the balloon and transfer the points to a permanent prize meter. If the balloon explodes when it is pumped, all of the points for that balloon are lost. There is a set number of balloons, and participants are presented with a new balloon after a prize transfer or balloon explosion. Based on prior research demonstrating nearly identical results using the first 10 balloons compared to 30 balloons (Lejuez et al., 2003), the present study set the number of balloons at 15 due to time constraints of collecting data in a naturalistic

environment. For each non-popped balloon, the number of pumps is recorded and averaged into the typical outcome variable, adjusted average pump count. Larger values are suggestive of higher risk-taking.

Sensation Seeking. The *Brief Sensation Seeking Scale for Children* (BSSS-C; Jensen et al., 2011) was used to measure propensity toward risk taking and sensation seeking behaviors. Two sensation seeking items were eliminated due to lack of relevance and replaced by the items: "I would like to surf big waves even if there are sharks" and "I would like to surf at night." Items on the scale are averaged with the highest possible score being 4. Cronbach's alpha was acceptable (.68), though was significantly lower than the internal validity (a = .82) found in Jensen and colleagues' (2011) development paper.

Procedure

Psychologists at The New School for Social Research with expertise in program evaluation were recruited to design and conduct a program evaluation for Waves for Change in order to understand the target population needs and program effects. As the program evaluation aimed to use a data-driven assessment to examine W4C's surf therapy to inform and improve upon its practices, IRB approval was not required. The New School's IRB approval affirmed this understanding at the outset of the project. After data were analyzed and appeared to be of larger interest, The New School's IRB was consulted. It determined that use of the present data for publication were exempt from IRB approval as they were de-identified, archival program evaluation data.

Parents or guardians of child participants provided consent to participate in assessment and evaluation as part of the consent to participate in surf-therapy. Participants verbally assented in English, Xhosa, or Afrikaans to participate in the evaluation at the start of the evaluation session. As part of the consent, youth participants were informed that they could discontinue the assessment at any time and that all information would be kept private, including from parents and teachers.

Participants completed data collection at two timepoints: at the start of the W4C surf therapy curriculum and after six months, at the end of the curriculum. In groups of eight to ten, physically spaced to ensure privacy, participants completed the self-report. Data were collected by W4C staff and Peer Youth Researchers who were W4C surf coaches who had exhibited strong interpersonal skills and interest in research. Peer Youth Researchers were trained in the theoretical concepts being assessed (e.g. risk, social closeness), task administration, and data organization, de-identification, and security. These research assistants read questions aloud in English, Xhosa, and or Afrikaans depending on participants' preferred language and participants answered questionnaires on paper surveys. After the self-report questionnaires, participants, facilitated by a research assistant, completed the behavioral tasks on Windows 8 tablets using the Inquisit Lab 5 software.

Physiological data were collected but there was not enough data of interpretable quality to observe physiological change.

Analysis Plan and Accounting for Ecological Circumstances of Data Collection

It was envisaged that data would be collected from participants from various neighborhoods in the W4C program, at three time points (baseline, mid- and post-surf therapy) and from a comparison group, at two time points. Data collection time points were planned to be at least two months apart. Various factors created challenges for the team to collect data at the exact times and intervals envisaged. As such, baseline data for

some participants would have been before the participants came to their first surf therapy session, while baseline data for other participants would have been after they have been to four surf therapy sessions already. While the W4C program builds up slowly during the first month of the program, technically the baseline data for some participants could not be considered 'true baseline' data. Similarly, time point two data for some participants would have been at a significantly different time than time point two data for participants in the same cohort.

To account for the complicated ecological circumstances of data collection, the evaluation's analyses required an atypical approach. IBM SPSS Statistics Version 24 was used for all statistical analyses. Independent and paired-samples t-tests were used to examine differences in self-report and behavioral data collected at baseline and endline between participants who were new to surf therapy and participants who had already been enrolled in surf therapy for at least seven weeks. Seven weeks was determined based on the W4C curriculum and the participant sample size. Repeated measures ANOVAs were conducted to examine change in self-report and behavioral data from the first and second data collection periods. Participant interactions between W4C participants and comparison were also assessed.

Changes in participants' perceived closeness with surf coaches, community, family, people of the same and different race, and people of the same and different gender were assessed using an item analysis of IOS items. Aligned with the W4C surf therapy aim to cultivate a supportive community for participants of different identities, analysis of IOS items were examined across all participants and between female and male.

Results

Trauma and Stress

Trauma. Participants endorsed high rates of exposure to violence, such that 100% of participants had witnessed violence and all but two participants (98.2%) had directly experienced violence. For endorsed direct violence experiences see Table 1 and for witnessed violence experiences see Table 2.

Table 1
Community Experiences Questionnaire, Experienced Violence

Direct Violence Type	Never	Once	A Few Times	Lots of Times
Somebody broke in/tried to force their way into your home	68.8% (n = 75)	25.7% (n = 28)	4.6% (n = 5)	.9% (n = 1)
Somebody threatened to hurt you really badly	55% (n = 60)	31.2% (n = 34)	8.3% (n = 9)	5.5% (n = 6)
You have been chased by gangs, other kids, or adults	65.7% (n = 71)	18.5% (n = 20)	9.3% (n = 10)	6.5% (n = 7)
Somebody hit, punched or slapped you	26.4% (n = 28)	42.5 (n = 45)	19.8% (n = 21)	11.3% (n = 12)
Somebody stole something from you using	67.9%	20.2%	6.4%	5.5%

violence	(n = 74)	(n =22)	(n = 7)	(n = 6)
Somebody fired a gun at you or at your home	85.3% (n = 93)	10.1% (n = 11)	3.7% (n = 4)	.9% (n = 1)
Somebody tried to hurt you with a knife or other sharp object	78.9% (n = 86)	11% (n = 12)	5.5% (n = 6)	4.6% (n = 5)
Somebody tried to hurt you by hitting you with a stick, bat, pole or club	61.1% (n = 66)	26.9% (n = 29)	5.6% (n = 6)	6.5% (n = 7)
Somebody threw a bottle, rock or other object at you	28.3% (n = 30)	26.8% (n = 39)	16% (n = 17)	18.9% (n = 20)
Somebody tried to use violence or threats to get you to do something that you didn't want to do	61.8% (n = 68)	22.7% (n = 25)	10% (n = 11)	5.5% (n = 6)
You have been arrested or taken away by the police	91.7% (n = 100)	5.5% (n = 6)	2% (n = 1.8)	.9% (n = 1)

Table 2
Community Experiences Questionnaire, Witnessed Violence

Witnessed Violence Type	Never	Once	A Few Times	Lots of Times
You have seen or heard somebody else get threatened	21.5% (n = 23)	34.6% (n = 37)	19.6% (n = 21)	24.3% (n = 26)
You have seen somebody else get chased by gangs other kids or adults	24% (n = 25)	28.8% (n = 30)	25% (n = 26)	22.1% (n = 23)
You have seen somebody trying to break in or force their way into somebody else's home	43.4% (n = 46)	24.5% (n = 26)	19.8% (n = 21)	12.3% (n = 13)
You have seen somebody else get hit, punched, or slapped	10.1% (n = 11)	18.3% (n = 20)	38.5% (n = 42)	33% (n = 36)
You have seen somebody get robbed or have something stolen from them by force	33.9% (n = 37)	22% (n = 24)	25.7% (n =28)	18.3% (n = 20)
You have seen somebody carrying a gun or other weapon (besides police, etc)	31.8% (n = 34)	32.7% (n = 35)	15% (n = 16)	20.6% (n = 22)
You have seen or heard gunshots	13% (n = 14)	17.6% (n = 19)	24.1% (n = 26)	45.4% (n = 49)
You have seen someone try to hurt another	33%	24.5%	19.8%	22.6%

person with a knife or other sharp object	(n = 35)	(n = 26)	(n = 21)	(n = 24)
You have seen somebody get hit with a stick, bat, pole or club	34.9% (n = 38)	27.5% (n = 30)	23.9% (n = 26)	13.8% (n = 15)
You have seen somebody have a bottle rock or other hard object thrown at them	24.5% (n = 27)	30.9% (n = 34)	28.2% (n = 31)	16.4% (n = 18)
You have seen somebody get arrested or taken away by the police	14.7% (n = 16)	33.9% (n = 37)	19.3% (n = 21)	32.1% (n = 35)
You have seen a dead body (besides funerals, etc)	42.2% (n = 46)	22.9% (n = 25)	16.5% (n = 18)	18.3% (n = 20)
You have seen or heard somebody trying to use force or threats to get another person to do something they didn't want to do	41.3% (n = 45)	27.5% (n = 30)	14.7% (n = 16)	16.5% (n = 18)
You have seen somebody get killed	56.9% (n = 62)	19.3% (n = 21)	13.8% (n = 15)	10.1% (n = 11)

Stress. Examining self-report data collected at baseline reveal that length of time in surf-therapy and perceived stress were not significantly correlated, r (93) = .03, p = .760. A repeated measures ANOVA was performed with measurement timepoints as the within subjects' factor and participant type as the between subjects' factor. There was not a significant main effect of time on PSS, F (105) = .18, p = .676, such that there was no significant difference in reported stress depending on the time of data collection. Furthermore, no main effect of participant type on PSS was found, F (105) = .001, p = .977, such that W4C and comparison participants did not differ in their experience of stress.

Self-Concept

Self-Esteem. To assess self-esteem, participants were administered the self-esteem IAT, which yielded inconclusive data due to high inaccuracy rates (i.e., 58% of participants pressed the incorrect key at least 75% of the time). Qualitative testimonials from W4C staff indicated that participants had difficulty understanding the task. These accounts are consistent with IAT data produced.

Independent t-tests reveal there was no significant difference in self-esteem among W4C participants who were new to surf therapy and those who had participated in at least seven weeks of programming according to the IAT summary 'D' score, t (147) = .88, p = .384. Participant gender did not predict IAT responses, r (149) = -.035, p = .669, nor IAT change from baseline to endline data collection, r (67) = -.07, p = .558. Repeated measures ANOVA also yielded no significant within-subjects interaction, F (102) = .20, p = .656, nor between-subjects interaction, F (102) = .008 p = .930, such that that there was no change in self-esteem from baseline to endline data collection periods and there were no differences in W4C and comparison participants' self-esteem.

Interpersonal Closeness. A paired-samples T-test reveals that participants felt significantly closer with people in their lives at endline compared to baseline data collection, $t(94) = -6.20$, $p < .001$. To assess for gender-based differences in perceived interpersonal closeness, including connectedness with female and male friends, the IOS was analyzed according to participant gender. Female participants reported feeling significantly closer to a friend, $t(54) = -3.46$, $p = .040$ and to her closest family member, $t(54) = -.35$, $p = .001$. Male participants reported feeling significantly closer with people who hold similar identities, namely with friends who are boys, $t(36) = 2.08$, $p <= .045$, and people who are from the same racial background, $t(32) = 2.46$, $p = .019$.

Risk- and Sensation-Seeking

Risk-Taking. An independent *t*-test examining differences in BART-Y scores between participants at baseline collection who had just begun surf-therapy and participants who had been enrolled for at least seven weeks demonstrates significant differences in risk-taking. Participants who had experienced at least seven weeks in the program exhibited significantly lower risk-taking behavior ($M = 18.31$, $SD = 10.09$) than participants who were new to the program ($M = 24.38$, $SD = 11.39$) $t(84) = -3.14$, $p = .002$.

Participants' performance on the BART-Y differed according to participant gender over the course of surf therapy, such that scores were negatively correlated with length of time in surf-therapy among female W4C participants, $r(86) = -.22$, $p = .039$, whereas male participants' BART-Y scores were not significantly correlated with length of time in surf-therapy, $r(60) = -.04$, $p = .755$.

Due to the small sample size of W4C participants who completed the BART-Y at both timepoints (n = 57), repeated measures ANOVA was not separated by participant gender. A repeated measures ANOVA was performed with measurement timepoint as the within subjects factor and participant type as the between subjects factor. There was not a significant main effect of time on BART-Y, $F(91) = 1.10$, $p = .298$, and no main effect of participant type on BART-Y, indicating that there were no significant changes in BART-Y scores between baseline and endline data collection and W4C participant data did not differ significantly from comparison participants.

Sensation Seeking. A repeated measures ANOVA with measurement timepoints as the within subjects' factor and participant type as the between subjects' factor yielded a significant main effect of time on sensation seeking, $F(135) = 5.15$ $p = .025$, such that there was a significant reduction in reported sensation seeking at endline compared to baseline. No main effect was found of participant type on sensation seeking, $F(135) = .003$ $p = .960$, meaning that comparison and W4C participants did not differ in their sensation seeking. Among W4C participants assessed at the initial data collection period, there were no significant differences in sensation seeking according to length of time in surf therapy, $t(162) = -.19$, $p = .849$.

An item analysis assessed how different types of sensation seeking could be either adaptive or maladaptive. Impulsivity and seeking dangerous experiences may be understood as maladaptive whereas bravery to try new or challenging activities could be adaptive. A paired-samples T-test from baseline to endline data collection reveals that male participants reported significantly less interest in high-risk activities, such as wanting to "surf at night," $t(37) = 2.37$, $p = .023$. By contrast, male participants also exhibited increased confidence as assessed by the item, "I'm the first one of my friends to try new things," $t(38) = -2.41$, $p = .022$. Both male and female participants reported less interest in risky relationships with friends

who "break the rules," t (91) = 4.25, p < .001. Participants' interest in relationships with others who "do what they want" and "break the rules" is related to participants' sense of closeness with others. At baseline, preference towards friends who break the rules was negatively correlated with participants' sense of closeness with "a friend" on the IOS, r (159) = -.21, p = .007, and closeness with "a family member," r (157) = -.26, p = .001.

Discussion

Results from the present program evaluation indicate that W4C's surf-therapy program is an effective, sport-based intervention for trauma-exposed children and adolescents with specific impacts on risk and interpersonal connection. W4C's careful balance of psycho-social education, social support, and emotion regulation skill-building within the outdoor context of surfing strengthens participants' interpersonal closeness and cohesion as well as reduces participants' risk-taking tendencies while encouraging self-confidence and bravery.

There were clear connections between W4C's intended goals and some key findings of the present evaluation. The program aims to foster supportive relationships, which was corroborated with qualitative data by Marshall and colleagues in 2020. One way that interpersonal skills and relationships are fostered by W4C is through surf coaches encouraging participants to check in with their peers to gauge one another's sense of safety and to provide support to their friends while in and out of the water. In addition to cultivating capacity to take care of peers and attend to their own needs, participants received social support from adults trained in trauma-informed care in settings that help youth develop a sense of belonging.

Study findings are reflective of W4C's purposeful process that builds social support as a way to help foster participants' bravery to go in the water and cultivates emotional awareness and regulation. This study suggests participation in surf therapy is associated with increased perceived closeness in meaningful relationships (i.e., friends and family) and decreased interest in relationships with people who do not support the cohesion of the group (i.e., friends who do what they want and break the rules).

Beyond attending to participants' supportive relationships and safety, W4C's surf therapy aims to strengthen participants' emotion regulation capabilities and positive life choices through group-based exercises. A qualitative study by Marshall et al., (2020), indicated that W4C participants' learn regulation skills. This is supported by the current evaluation's quantitative findings, which suggest that participation in surf therapy does strengthen self-regulation. Youth enrolled in surf therapy for at least seven weeks exhibited less behavioral risk taking and after six months displayed less self-reported sensation seeking. At the same time, male participants reported increased bravery and willingness to try new things.

Findings indicate that participation in surf therapy improves self-regulation and encourages positive life choices by strengthening participant inhibition and fostering their bravery and willingness to explore. Surf therapy is a challenging and interesting activity, which Gambone and Abreton (1997) identified as an important element in youth programming. The challenging nature of surfing, facilitated in a trauma-informed manner by caring adults appears to foster participant bravery and agency while also having positive effects on strengthening participant inhibition. Outcomes elucidated in the present evaluation indicate that W4C's surf therapy strengthens safe relationships and self-regulation among violence-exposed youth, which are both widely recognized as fundamental aims in trauma-informed

psychiatric interventions (Ford & Blaustein, 2013).

W4C's surf therapy program operates within a low-resource context that is shaped by social inequality and community violence. As such, all the participants who took part in the program evaluation had experienced violence directly or had witnessed violence. In response to the extraordinarily high rates of interpersonal violence and social inequities that shape many children's lives, W4C fosters a trauma-informed environment where its youth participants can learn and practice surfing with caring mentors who come from the same communities as the participants. W4C's surf therapy is facilitated by non-clinical community members, which enables program scalability, and may foster the intervention's cultural-specificity.

Informed by W4C's approach to surf therapy implementation, the program evaluation also utilized a community member-facilitated, trauma-informed method. The evaluation approach included training surf coaches, who were already trained in trauma-informed care as part of training to be coaches, in data collection methodology. W4C mentors assumed the leadership role of research assistants and collected participants' data so that the participants would feel more comfortable compared to data collection with an unknown adult, particularly of a different culture.

Examining the methodological feasibility and utility of administering behavioral and self-reported measures in a low-resourced context with layperson research assistants was a secondary aim of the evaluation. Participants and program staff reported positive feedback on the BART-Y. In addition to providing reliable data, the BART-Y was also experienced by participants as enjoyable and game-like, which increased participant engagement.

Findings suggest that the self-report stress assessment, PSS, did not reliably measure participants' experienced stress. The scale, which was developed and normed in the United States, may not have been culturally relevant to the South African participants of the present study. The behavioral self-esteem measure, IAT, also yielded unreliable data, although the measure has been successfully administered in various countries with youth (e.g. Bos et al., 2010; Yamaguchi et al., 2007). According to testimonials from on-the-ground surf coaches, the Self-Esteem IAT was confusing for participants and subsequently produced low accuracy rates, which limited the task's interpretability. Limited computer literacy and the use of emoji faces in place of positive or negative attribute words may have contributed to the task's difficulty among participants.

These findings illustrate the importance of administering assessments that are culturally specific rather than relying on a Euro-American centric approach to conceptualizing mental health. Numerous complications emerge when measures are administered in a context where they were not normed, including translational issues of grammatical differences and idioms of distress, and ensuring the validity of measures (Bhui et al., 2003). Considering psychiatric symptom experiences are culturally embedded systems of meaning making (Kirmayer, 2005), the use of psychometric instruments that incorporate local idioms of distress and wellness may better capture individuals' well-being (Jayawickreme et al., 2012). For example, one such cultural idiom of resilience in South Africa is acceptance, or *ukwamukela* (Kim et al., 2019), which was not assessed for in the present evaluation.

Limitations

In addition to the discussed limitations of the perceived stress and self-esteem measures, the study was limited by a highly variable

baseline data collection point. Some participants' baseline data collected before surf therapy began whereas other participants had already been enrolled in surf therapy for up to 33 weeks. As such, the data required analyses to be conducted on the baseline data as well as comparing baseline to endline data, which also varied significantly in weeks of program completed among participants. Because of the inconsistency of participants' time spent in surf therapy at baseline and endline, which was further complicated by not collecting attendance data, the present data may not fully depict the impact of surf therapy on participants' risk-taking, self-esteem, and social cohesion.

Furthermore, complicated ecological factors created challenges for the team to collect data at the exact times and intervals as envisaged. For example, the data collection schedule did not always match school terms and data collection would fall during exam times or school holidays, which meant access to participants was limited during those times.

Future Directions

Given the social and political stressors within South Africa, future research ought to further investigate the social environment's impact on participants and the mediating role of W4C's surf therapy program. Such contextual events that may impact participants' perceived stress, interpersonal closeness, risk-taking, and self-esteem, as well as their ability to engage in surf therapy, include political unrest, unexpected and prolonged school closures, or environmental disaster. Consideration of the interaction between participants' social contexts and their engagement in surf therapy, as assessed through attendance, may help to better elucidate the impact of intervention. Future evaluations may also benefit from collecting follow up data to examine how change observed from start to end of surf therapy may unfold after the conclusion of the intervention.

Furthermore, future research is needed to determine mechanisms that contribute to surf therapy's impact. Surf therapy is comprised of a number of elements, which include being in nature, immersion in water, surfing, psychoeducation, and being in community. Elucidating the role of each element may help to further bolster surf therapy program efficacy.

Conclusions

The results of the program evaluation highlight how W4C's surf therapy can be an effective psycho-social-educational intervention in a high-stress environment for children and adolescents exposed to violence. Findings suggest that W4C provides a community-based intervention that strengthens self-regulation and social cohesion in an under-resourced setting.

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Conflict of Interest

The authors declare no conflicts of interest with respect to the authorship or the publication of this article.

Funding

This work was supported by the Laureus Sport For Good Foundation and Trauma Research Foundation.