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Enhancing Risk Detection Among Homeless Youth: A Randomized Clinical Trial of a Promising Pilot Intervention

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Abstract

Homeless youth frequently experience victimization, and youth with histories of trauma often fail to detect danger risks, making them vulnerable to subsequent victimization. The current study describes a pilot test of a skills-based intervention designed to improve risk detection among homeless youth through focusing attention to internal, interpersonal, and environmental cues. Youth aged 18 to 21 years (N = 74) were recruited from a shelter and randomly assigned to receive usual case management services or usual services plus a 3-day manualized risk detection intervention. Pretest and posttest interviews assessed youths' risk detection abilities through vignettes describing risky situations and asking youth to identify risk cues present. Separate 2 (intervention vs. control) × 2 (pretest vs. posttest) mixed ANOVAs found significant interaction effects, as intervention youth significantly improved in overall risk detection compared with control youth. Post hoc subgroup analyses found the intervention had a greater effect for

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youth without previous experiences of indirect victimization than those with previous indirect victimization experiences.

Keywords
homeless youth, risk detection, intervention

Introduction

Youth homelessness is federally defined to include any "individual who is less than 21 years of age, for whom it is not possible to live in a safe environment with a relative, and who has no other safe alternative living arrangement" (42 U.S.C. § 5732). A highly vulnerable population, this group faces extreme risk for victimization. Victimization often begins early for these youth, with 84% reporting some form of physical or sexual abuse before becoming homeless (Fisher, Florsheim, & Sheetz, 2005) and 42% screening positive for *both* sexual and physical abuse (Keeshin & Campbell, 2011). Although many youth report leaving home to escape such victimization, they often face additional dangers on the streets (Coates & McKenzie-Mohr, 2010) where they are 5 times more likely to be physically attacked and 2.5 times more likely to witness a violent attack when compared with their housed peers (Ensign & Santelli, 1998). While experiences of sexual assault are relatively less prevalent, they are still quite common; among samples of homeless youth, at least 15% of homeless youth reported having been sexually assaulted, with rates ranging as high as 52% in some samples (Alder, 1991; Kipke, Simon, Montgomery, Unger, & Iversen, 1997; Whitbeck, Hoyt, & Ackley, 1997). Youth at greatest risk for victimization include those who move frequently (Ferguson, Bender, Thompson, Xie, & Pollio, 2012), engage in criminal acts (Tyler & Johnson, 2004), spend time with delinquent peers, remain on the streets for longer periods of time (Yoder, Whitbeck, & Hoyt, 2003), abuse substances (Bender, Ferguson, Thompson, Komlo, & Pollio, 2010), or engage in survival behaviors as a means of earning money or obtaining resources on the streets (Tyler, Hoyt, Whitbeck, & Cauce, 2001a, 2001b; Whitbeck, Hoyt, & Bao, 2000; Whitbeck, Hoyt, & Yoder, 1999).

Experiences of victimization often have serious consequences for homeless youth (Gaetz, 2004; McManus & Thompson, 2008; Melander & Tyler, 2010; Stewart et al., 2004; Whitbeck, Hoyt, & Yoder, 1999). Victimization is associated with posttraumatic stress symptoms (Boney-McCoy & Finkelhor, 1996), and nearly one quarter of homeless youth meet criteria for posttraumatic stress disorder (PTSD) diagnosis (Bender et al., 2010). Victimization is also associated with elevated rates of depressive symptoms among homeless

youth (Whitbeck, Hoyt, & Yoder, 1999), as well as myriad other risk behaviors and health concerns, including increased rates of HIV risk behaviors (Melander & Tyler, 2010), alcohol abuse and dependence (Bender et al., 2010; Rytwinski, Avena, Echiverri-Cohen, Zoellner, & Feeny, 2013), criminal activity and arrests (Ferguson et al., 2012), and disruptive residential changes (Gaetz, 2004). Considering the high rates of victimization and serious health consequences, the current study tested a skills-based intervention for enhancing risk detection to prevent victimization among homeless youth.

Given the dangers to which homeless youth are exposed, an important and understudied factor in preventing victimization is homeless youth's methods for detecting risks. Only recently, a large multisite qualitative study was conducted to investigate youths' perspectives on how they identify risks and respond to protect themselves (Bender, Thompson, Ferguson, Yoder, & DePrince, 2015). In describing their risk detection strategies, youth mentioned utilizing *internal cues*, such as their affective responses to danger, to identify that they may be in an unsafe situation. Internal cues were described as physical and physiological reactions that, in the moment, alerted them to danger, including tingling sensations, racing hearts, and feelings of panic (Bender et al., 2015). Youth also described *external cues*, or interactions that suggested others were suspicious or unstable. Specific facial expressions, eye contact, body language, and mannerisms were indicators of others' suspicious behaviors (Bender et al., 2015). Finally, youth identified certain contexts, or *environmental cues*, that were most dangerous (e.g., places that were dark, unfamiliar to youth, or difficult to escape when necessary; situations in which youth were outnumbered or surrounded by people they did not know or where people were using substances; Bender et al., 2015).

Consistent with the aforementioned study, the broader risk detection literature points to multiple ways of detecting risk and suggests different methods are used in different contexts. For example, in low-risk situations, individuals rely on organized and logical thought processes to assess danger levels and make decisions; however, when in heightened danger, instinctual or intuitive responses often inform risk level and drive one's reaction (Slovic & Peters, 2006). For instance, the emotion of fear—an instinctual response—typically occurs in situations where the individual has little control and is uncertain of his or her surroundings; this fear response elicits perceptions of high risk (Lerner, Gonzalez, Small, & Fischhoff, 2003). Subtler feelings, often experienced in calmer states before crisis situations arise, can be assessed more logically and guide risk detection, thereby increasing one's sense of safety (Slovic & Peters, 2006). Thus, for effective risk detection and self-protection, instinctual/emotion-laden reactions, as well as a logical analysis of one's situation, can be helpful in avoiding risk (Slovic & Peters, 2006).

Despite discussing several risk detection strategies, many homeless youth describe danger as unanticipated as well as undetectable (Bender et al., 2015), suggesting many youth struggle to detect victimization before it occurs. As a result, youth describe an unpredictable world where they must always be on guard, as risks can occur anytime or anywhere (Bender et al., 2015). Such hypervigilance may not be sustainable and may dull one's ability to attend to threatening cues.

In addition, previous victimization and related cognitive processes may further reduce youths' abilities to detect risk, as documented in the larger literature. For example, victimization is linked with attention and memory problems in youth (Cromer, Stevens, DePrince, & Pears, 2006; DePrince & Freyd, 1999; DePrince, Weinzierl, & Combs, 2009), which may compromise youths' abilities to notice and effectively respond to danger cues. Indeed, research with youth exposed to violence documents that they often fail to detect danger cues (DePrince, 2005; DePrince, Chu, & Combs, 2008; DePrince et al., 2009), making them vulnerable to subsequent victimization (DePrince, 2005; DePrince, Combs, & Shanahan, 2009). Even when youth detect risk accurately, strategies for self-protection may be unhelpful (Sandberg, Matorin, & Lynn, 1999).

Considering homeless youths' high rates of childhood victimization and revictimization on the streets, the current pilot study tested a mindfulness-based, cognitive, skill-building intervention designed to train homeless youth to better detect risk. The intervention trained youth to focus attention to *internal cues* (physiological responses, cognitions), *interpersonal cues* (controlling, suspicious behavior by others) and *environmental cues* (dark, isolated, unfamiliar situations) to detect risk. Thus, we hypothesized that the intervention would result in increased overall risk detection, including improved detection of internal, interpersonal, and environmental risk cues.

Method

Sampling and Recruitment

Using purposive sampling, a total of 97 street youth (aged 18-21 years old) were recruited from a homeless youth shelter, located in an urban metropolitan city, offering short-term (40-day) stay as well as case management, referral services, and basic subsistence items (e.g., food, hygiene supplies). Youth were selected for participation if they were staying in the host shelter at the time of recruitment, as the aim was to study effectiveness with shelter-seeking youth. Age was restricted to 18 to 21 years old as this was the age group primarily served by the host agency, and the few minors in the shelter system

received more intensive services aimed at expedient reunification or permanent housing. Human subjects' approval was received at the Principal Investigator's university, and recruitment and data collection occurred between September 2012 and August 2013.

To participate in the study, youth had to be 18 to 21 years of age and provide written informed consent. Our protocol indicated that youth were to be excluded if they were incapable of comprehending the consent form because of cognitive limitations (e.g., psychotic symptoms or developmental delays) or if they were noticeably intoxicated or high at the time of the interview. In the latter case, youth would have been asked to return at a later time when they could more competently answer interview questions. However, no youth were excluded based on either criterion, as all youth were able to comprehend the consent form, and, perhaps due to agency policies that prohibit intoxication in the shelter, no youth were noticeably intoxicated under the influence of substances at the time of the interview. Six cohorts of approximately 15 to 20 youth, respectively, were recruited over the study period. Recruitment occurred every 6 weeks to allow turnover in youth staying at the shelter.

Procedures

Research staff approached youth staying in the shelter, screened for age, explained the study procedures, and secured written consent for youth interested in participation. Researchers administered a 45-min baseline interview. To remain both inclusive and to account for differences in youths' literacy skills, interviewers read questions and response options aloud to participants and youth responded verbally. Interviewers also notified youth that they could choose to refrain from answering any question on which they did not feel comfortable or willing to respond without penalty or risk of being eliminated from study participation. Youth were compensated with a US$20.00 gift card to a local food vendor. At the conclusion of the baseline interview, youth were randomly assigned, using an online random number generator and simple randomization methods, to either the control group ($n = 41$; 42.3% of the total sample) or the intervention group ($n = 56$; 57.7% of the total sample). Youth who were assigned to the intervention group were invited to attend a 3-day intensive group that delivered a manualized risk detection intervention (Safety Awareness for Empowerment or "SAFE"), which occurred in the shelter within the week following baseline interview and is described in more detail below. Conversely, youth who were assigned to the control group received services as usual, which included case management services (e.g., goal setting and resource referral). One week later, after the intervention occurred (or approximately 1 week postbaseline assessment for

control youth), youth participated in a 15-min posttest interview assessing risk detection ability. For participating, youth were again compensated with a US$20.00 gift card.

SAFE Intervention

Participants assigned to the intervention group were invited to participate in Project SAFE, a mindfulness-based, cognitive, skill-building intervention, provided in a group format, with six to eight youth per group, and administered in six iterations (or cohorts). Two group leaders facilitated the groups. The lead facilitator was a female clinical psychologist with several years of experience in mindfulness intervention. The second facilitator was a male, master's in social work intern with personal experience in mindfulness but new to professional mindfulness facilitation, who received a week-long training in the intervention curricula and ongoing supervision.

The manualized intervention was adapted from curricula used in a previous intervention trial with adolescents exposed to violence; the trial sought to prevent revictimization in dating relationships among girls involved in child welfare (DePrince, Chu, Labus, Shirk, & Potter, 2015). The intervention focused on detecting danger cues in interpersonal relationships, using mindfulness-based interventions as a way to help youth learn to notice and respond to internal, interpersonal, and environmental risk cues. Youth who received the intervention demonstrated significantly lower rates of sexual and physical victimization in the 6 months after the intervention compared with youth who received no intervention (DePrince et al., 2015).

The intervention model is guided by mindfulness theory and empirical research. Mindfulness-based behavioral therapies draw on theory and data to describe links between internal experiences and problem behaviors (Roemer & Orsillo, 2003; Segal, Williams, & Teasdale, 2012). In particular, theories highlight serious clinical problems associated with failing to flexibly deploy attention to internal experiences (e.g., perseverating on or avoiding feelings of fear). The ability to respond effectively to risk cues around interpersonal violence requires a range of attention-related skills, including noticing internal (e.g., shame, fear) and external (e.g., dangerous situation or person) cues, shifting attention to risk cues, concentrating on risk cues in the face of distracting information, thinking flexibly about solutions when presented with risk cues, and following through with action by acting assertively and seeking help when necessary. Indeed, from both theory and empirical perspectives, attention is required to notice when help or assertive responses are required as well as to generate and initiate behavioral responses in such situations (DePrince et al., 2015).

The current intervention curriculum builds on this theoretical model and original curricula with adaptations to both content and format changes to increase relevance for homeless youth. In terms of content, adaptations focused on revising the curriculum to reflect homeless youth experiences and unique safety risks on the streets. In terms of format, the 2-hr/session, 12-week curricula were revised to fit an intensive 3-day format. The formatting change was made to be responsive to the transitory nature of homeless youths' lives, making engagement over 12 weeks likely to be difficult to impossible.

Each intervention group met for 3 consecutive days at the shelter, and the intervention included didactic components, group discussions, and experiential exercises. Components of the group included teaching youth about risks associated with prior experiences of violence or abuse; introducing the concept of mindfulness; focusing attention to internal, interpersonal, and environmental cues (Day 1); problem solving (Day 2); developing assertiveness skills; and asking for help (Day 3). Table 1 provides additional details regarding these group components.

Measures

Basic demographic and background variables were collected to characterize the sample and establish group equivalence at baseline, including age, gender (0 = male, 1 = female, 2 = other), and ethnicity (1 = White, 2 = Black, 3 = Latino, 4 = Other); highest completed grade in school; number of days in past week slept on the streets; transience (number of intercity moves since leaving home for the first time); utilization of other services (e.g., case management, General Educational Development [GED] test preparation, job training; 0 = no, 1 = yes); and length of time homeless (calculated as the number of months between interview date and the date the youth last left home). Furthermore, at baseline interview, youth were administered a revised version of the Traumatic Life Events Questionnaire (TLEQ; Kubany et al., 2000) to assess victimization experiences since homeless. This measure assessed the frequency (0 = never, 1 = once, 2 = more than once) of experiencing different types of direct (e.g., robbery involving a weapon, physical assault by an acquaintance or stranger) and indirect (e.g., sudden death of a close friend or a loved one, witnessing a physical assault) victimization since leaving home. The TLEQ has demonstrated strong temporal stability and reliability with several other populations (Kubany et al., 2000). This instrument was revised to exclude items with less relevance for this study (e.g., natural disasters, warfare, or combat). Items were dichotomized to determine whether youth had experienced any direct victimization (0 = no, 1 = yes) or indirect victimization (0 = no, 1 = yes)

Table 1. Intervention Components.

Intervention Day	Executive Functioning Process	Intervention Target	Example Exercise
Day 1	Fail to notice external danger cues	Direct attention to cues in environment or other people	Quiz and discussion about dangerous situations
			Exercise practicing noticing facial cues of emotion
Day 1	Fail to notice internal danger cues	Improve emotion awareness and labeling	Exercise recognizing internal responses to music stimuli
Day 2	Notice danger, but have difficulty generating possible responses	Increase cognitive flexibility; increase knowledge of possible responses	Role-play exercise to practice problem solving in dangerous scenarios
Day 2	Have difficulty planning or initiating a response	Increase planning; practice generating ways to respond	Role-play exercise to practice problem solving in dangerous scenarios
Day 3	Notice danger and know what to do, but fail to change behaviors	Assertiveness training	Assertiveness role-plays
		Help-seeking skills	Exercise practicing identifying helpers and asking for help

since leaving home. The revised index had good internal reliability (Cronbach's $\alpha = .80$). Finally, as part of the baseline interview, interviewers administered the Mini-International Neuropsychiatric Interview (MINI; Sheehan & Lecrubier, 1998) to determine whether youth met *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM-IV-TR*; American Psychiatric Association, 2000) criteria for substance use disorders (alcohol/drug dependence/abuse) and for PTSD. MINI questions are asked in a decision-tree manner in which positive answers were explored with more in-depth questions to distinguish between specific criteria for disorders. The MINI has displayed good reliability (Lecrubier et al., 1997) and convergent validity with the Structured Clinical Interview for *DSM-IV-TR* Axis 1 Disorders (SCID), a widely accepted assessment of diagnostic criteria (Sheehan et al., 1997).

For the dependent (outcome) variable, baseline and posttest interviews assessed youths' risk detection abilities through a series of vignettes, read aloud to youth, describing characters in risky situations and asking youth to identify risk cues present. Vignettes were developed as part of the DePrince et al. (2015) trial (see also DePrince, Chu, Labus, Shirk, & Potter, 2013) and adapted here to address street risks facing homeless youth. Vignettes included scenarios in which a hypothetical homeless youth (depicted as the protagonist) was pressured to engage in risky behaviors (e.g., substance use, criminal activities) or placed in unknown or potentially dangerous environments (e.g., dark or isolated settings; parties with drugs, alcohol, and unknown strangers; sleeping at strangers' homes; encounters with controlling/abusive family members or acquaintances) in exchange for shelter, companionship, money, or other resources. Two vignettes were randomly selected, from a set of 12 vignettes, for each youth at each assessment point, to avoid repetition across time points and to account for potential variation in difficulty among vignettes. To ensure interviewers asked questions pertaining to the vignettes consistently across youth, and to prevent any "leading" questions, a rigid protocol for interviewers was established. After hearing each vignette, youth were systematically asked, "What are some of the cues you saw that might make it a dangerous or unsafe situation?" After youth provided a response, a follow-up prompt of "Anything else?" was asked only one time, providing youth with an opportunity to note or elaborate on any additional cues that they may have identified. Interviewers were instructed to only read these questions exactly as worded without any additional follow-up questions or comments regarding the youth's responses. Each vignette had predetermined internal (e.g., feeling uncomfortable or torn about what to do, using substances), interpersonal (e.g., in the presence of others acting overly forward, affectionate, hostile, or using substances), and environmental (e.g., unfamiliar, dark, or isolated setting) risk cues embedded in the story.

Youths' open-ended responses were recorded for coding by a trained research assistant and principal investigator, using with a standardized codebook. Interrater reliability was calculated using percent agreement among the two coders, who independently coded each cue type observed in youth's responses to vignettes from a list of possible cue types for each vignette as determined in the codebook. The coders each independently coded a subsample of the first 10 participants' responses, and then compared how they, respectively, coded responses, talking through any discrepancies or questions encountered in coding, and then calculated the percent agreement across each coded vignette, achieving 93.4% interrater reliability. After establishing this high level of interrater reliability, the two coders equally divided the coding responsibilities for the remaining uncoded cases.

For each vignette, the proportion of cues identified out of the total number of cues embedded in each vignette was calculated. This proportion was also calculated for subcategories of cues, including the proportion of internal, interpersonal, and environmental cues that were identified. The proportion of predetermined cues identified out of the number of cues embedded in the vignette was tallied for each youth. The use of a proportion score took into account the fact that vignettes did not have perfectly uniform numbers of overall cues or subcategories of cues (e.g., internal, interpersonal, and environmental) embedded; the total number of cues found in each vignette ranged from 7 to 16.

Data Analysis

Descriptive statistics (mean, standard deviation, frequency, percentage) were used to characterize the sample, and bivariate analyses (t tests, chi-square) were used to establish group equivalence at baseline.

Mixed 2 (intervention vs. control) × 2 (pretest vs. posttest) ANOVA was used to first test whether intervention youth improved in overall risk detection more so than youth in the control group, and then, subsequently, to compare the two groups on improvement in each specific type of risk detection (internal, interpersonal, and environmental) from pretest to posttest. Because a group difference in reports of indirect victimization at baseline was identified, this variable was included as a covariate in ANOVA models. In addition, post hoc subgroup analyses investigated whether the intervention was equally effective for youth who had and had not reported indirect victimization at baseline.

Only responses from youth who participated at baseline and at posttest were included in these analyses. Traditional intent-to-treat (ITT) analysis, which stipulates that researchers treat all cases as randomized regardless of treatment adherence, is often used in prevention and intervention research (Atkins, 2009; Gross & Fogg, 2004; Lachin, 2000; Olsson, 2010). Although we initially planned to use ITT analyses, approximately one third of youth (n = 18) assigned to the intervention group did not receive any intervention components, and because our goal for this pilot study was to determine whether any preliminary effects could be detected, youth who were originally assigned to the intervention but did not attend *any* intervention were excluded from ANOVAs. While ITT has often been regarded as the best method for representing a clinical population, the approach has also been critiqued, as ITT arguably contributes to Type II error (i.e., false negatives; Gross & Fogg, 2004), potentially leading to important ramifications in the interpretation of prevention research results.

Results

Sample Characteristics

A subsample of youth ($N = 74$; 76.3% of the total sample at baseline) participated in both baseline and posttest interviews. Of the 56 intervention-assigned youth, 38 (67.9% of intervention-assigned youth) participated in the intervention group, with 18 youth eliminated from analyses because they voluntarily declined participation or were hospitalized for illness. Among youth who participated in the intervention, 37 of 38 (97.4%) completed 1-week posttest. Regarding control-assigned youth, 37 of 41 (90.2% of control-assigned youth) completed both pretest and posttest, with four control youth eliminated from analyses because interviewers were unable to reach/find youth at time of posttest.

To assess group equivalence, baseline characteristics for this overall sample as well as for the intervention ($n = 37$) and control groups ($n = 37$) separately are displayed in Table 2. The sample consisted of youth ranging in age from 18 to 20 years ($M = 18.98$, $SD = 0.80$). Approximately 60.8% of youth identified as male, 36.5% as female, and 2.7% as other; and 41.9% of youth identified as White, 32.4% as Biracial/Other, 20.3% as Black, and 5.4% as Latino. Participants reported living away from their home of origin for an average of 15.2 months ($SD = 20.0$) and having moved between cities an average of 1.4 times ($SD = 2.2$). As their primary residence, 68.9% reported living mostly on the streets or in temporary shelter, whereas 31.1% reported living with a friend, relative, or in a facility. The two groups were comparable at baseline, except that control youth reported significantly greater past experiences of indirect victimization when compared with intervention youth, $\chi^2(4) = 9.54$, $p = .01$, and, although not at a statistically significant level, rates of substance use disorder were higher among control youth (62%) than intervention youth (40%) group.

Risk Detection Abilities and Effects

On average, youth at baseline identified 25.8% ($M = 0.26$, $SE = 0.01$) of risk cues, which included a greater proportion of interpersonal cues ($M = 0.39$, $SE = 0.03$) compared with environmental cues ($M = 0.24$, $SE = 0.03$) and internal cues ($M = 0.13$, $SE = 0.02$). Separate 2 (intervention vs. control) × 2 (pretest vs. posttest) mixed ANOVAs found a significant Group × Time interaction effect, as the intervention group improved in overall risk detection significantly more than control youth, $F(1) = 5.84$, $p = .018$, from pre to post. The intervention group improved from identifying 25.0% of total cues to 33.3%, whereas the control group showed no improvement from 26.6% to 26.3%.

Table 2. Sample Characteristics at Baseline Interview.

	Total Sample (N = 74)		Intervention Group (n =37)		Control Group (n = 37)		
	Frequency	%	Frequency	%	Frequency	%	χ^2
Gender							4.02
Male	45	60.8	19	51.3	26	70.3	
Female	27	36.5	16	43.2	11	29.7	
Other	2	2.7	2	5.4	0	0.0	
Ethnicity							9.63
White	31	41.9	13	35.1	18	48.6	
Black	15	20.3	9	24.3	6	16.2	
Latino	4	5.4	0	0.0	4	10.8	
Other	24	32.4	15	40.5	9	24.3	
Sexual orientation							4.09
Straight	57	77.0	30	81.1	27	73.0	
Gay/lesbian	2	2.7	0	0.0	2	5.4	
Bisexual	11	14.9	4	10.8	7	18.9	
Other	4	5.4	3	8.1	1	2.7	
Current living situation							0.63
Homeless	51	68.9	25	67.6	26	70.3	
Housed	23	31.1	12	32.4	11	29.7	
Street victimization							
Direct victimization	38	51.3	17	45.9	21	56.8	3.33
Indirect victimization	51	68.9	20	54.1	31	83.8	9.54*
PTSD	8	10.8	4	10.8	4	10.8	.00
Substance use disorder	38	51.4	15	40.5	23	62.2	3.46
	M	*SD*	*M*	*SD*	*M*	*SD*	*F*
Age	19.0	0.8	19.0	0.9	19.1	0.8	0.99
Months homeless	15.2	20.0	16.6	22.1	13.7	17.9	0.38
Transience	1.4	2.2	1.5	2.3	1.2	1.8	0.39
Last grade finished	11.1	1.1	11.0	1.1	11.3	1.0	1.73
Nights on streets/ week	0.3	1.0	0.4	1.3	0.1	0.5	1.25

Note. Intervention group characteristics include only those youth who participated in intervention. PTSD = posttraumatic stress disorder.
*$p < .05$.

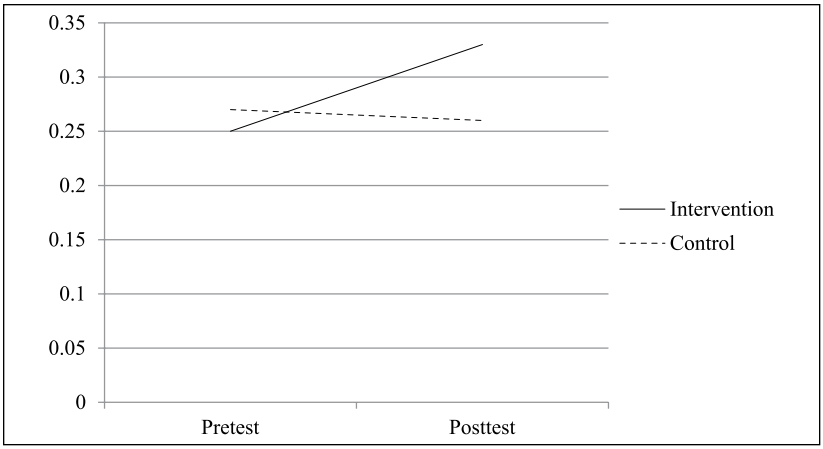

Figure 1. Overall risk detection (all cue types).
Note. The Y axes on both figures represent % of Risk Cues Identified by Youth.

The η_p^2 of .075 indicated a moderate effect size (Cohen, 1988). To account for the significant difference in past experiences of indirect victimization between groups at baseline, indirect victimization was added as a covariate in ANOVAs. Indirect victimization did not have a significant direct effect on risk detection ($F = .331$, $p = .567$). With indirect victimization at baseline included as an additional variable in the model, the η_p^2 intervention effect was .058, indicating a medium effect size.

In regard to specific types of risk detection (interpersonal, internal, and environmental), a significant interaction was found for interpersonal cue identification, $F(1) = 4.07$, $p = .047$, as intervention youth improved (pre = 38.9%, post = 46.7%), relative to control youth (pre = 38.6%, post = 31.1%); the η_p^2 of .054 indicated a moderate effect size (Cohen, 1988). With indirect victimization at baseline added as a covariate in this model, the η_p^2 was reduced to .031, $p = .135$, a small effect. Figure 1 displays intervention effects for overall and specific types of risk detection over time. Although no significant Group × Time interactions were found for identification of environmental cues, intervention youth improved in their overall correct identification of environmental cues present in vignettes (pre = 23.0%, post = 32.9%) at a greater rate than control youth (pre = 24.2%, post = 26.1%). No interaction was observed for identification of internal cues (intervention, pre = 12.3%, post = 19.0%; control, pre = 14.6%, post = 18.6%). See Figure 2 for these results presented visually, and additional information regarding intervention effects may also be found in Table 3.

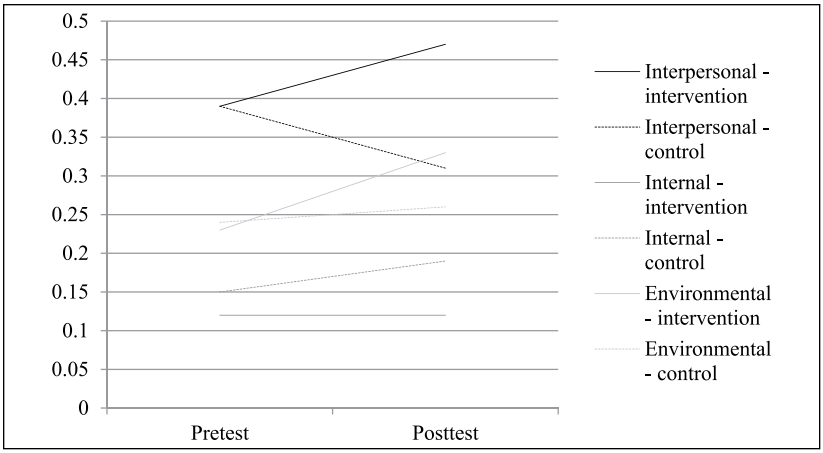

Figure 2. Risk detection by cue type (internal, interpersonal, and environmental).
Note. The Y axes on both figures represent % of Risk Cues Identified by Youth.

Subgroup analyses revealed the intervention effect was significant for participants who did not report experiences of indirect victimization at baseline (η_p^2 =.170, F = 4.29, p = .051), but not for youth who did report experiences of indirect victimization at baseline (η_p^2 = .021, F = 1.058, p = .309).

Discussion

This study documented the promise of an intensive, 3-day mindfulness, skills-based intervention (SAFE) that targeted risk detection among homeless youth. Youth in the intervention group showed significant improvements in risk detection abilities as measured by vignettes designed to reflect real risks on the streets, relative to their peers in the control group. Risk detection skills appear malleable utilizing a mindfulness-based, cognitive intervention. While this study focused on risk detection skills, which are believed to be important to victimization risk (e.g., Marx et al., 2001), the clinical significance of the change for later experiences of direct victimization remains unknown. Like other studies that have considered risk detection and victimization (e.g., Chu, DePrince, & Mauss, 2014; Marx et al., 2001), the current study points to the importance of future research that examines the degree to which behavioral risk detection tasks predict later experiences of victimization. Future research should also focus on strategies for self-protection, both in terms of an intervention focus area and measurement of outcomes.

Table 3. Intervention Effects.

	Conditions							
	Intervention (n = 37)		Control (n = 37)				Including Indirect Victimization at Baseline as Covariate	
	Pretest	Posttest	Pretest	Posttest				
Dependent Variable	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F*	η_p^2	*F*	η_p^2
Total risk detection	0.25 (0.09)	0.33 (0.14)	0.27 (0.10)	0.26 (0.12)	5.84*	.075	4.38*	.058
Interpersonal cues	0.39 (0.21)	0.47 (0.24)	0.39 (0.27)	0.31 (0.26)	4.07*	.054	2.29	.031
Internal cues	0.12 (0.13)	0.19 (0.19)	0.15 (0.14)	0.19 (0.18)	0.27	.004	0.22	.003
Environmental cues	0.23 (0.28)	0.33 (0.29)	0.24 (0.26)	0.26 (0.24)	0.80	.011	0.80	.011

*p < .05. **p < .01. ***p < .001.

SAFE's largest effect was on identifying interpersonal risk cues, which suggests that youth in the intervention group improved their abilities to recognize when others were acting suspicious or dangerous. This finding may suggest that interpersonal cue recognition is more pliable compared with skill building in regard to environmental and internal cue recognition, which may require awareness of more subtle cues as well as physiological reactions. It is important to note that SAFE was administered in a homeless youth shelter setting, which may have made environmental cues seem less urgent or relevant as basic housing needs were being met, whereas interpersonal safety risks may have remained salient in the shelter environment. Also important is the origin of the SAFE intervention; SAFE was adapted from a prior intervention aimed at preventing intimate partner (interpersonal) violence among girls in foster care (DePrince et al., 2015); thus, it may be that interpersonal cue identification was unintentionally emphasized more so than internal and environmental risk identification in the intervention manual. Although the effect on interpersonal risk detection was the largest comparable with other effects in this study, it represents a small to moderate effect size and may, in reality, represent a rather small improvement in risk detection abilities. However, given the seriousness of the range of victimization experiences of which youth are at risk (e.g., physical attacks and sexual assault) in a complex, real-world cognitive environment, detecting even one additional risk cue may offer youth essential information to organize responses that allow them to better protect themselves.

While this study documented less change in environmental risk detection, this may be due, in part, to the nature of the vignettes used in the risk detection task. Fewer possible environmental cues were embedded in each vignette compared with interpersonal and internal cues; thus, possible variance may have been reduced. In future tests of this intervention, additional environmental cues should be embedded into vignettes to assure adequate possible variance. Internal risk detection also appeared more difficult to change relative to interpersonal cue identification. This, too, might involve a basis in the measurement approach. Specifically, it may be difficult for youth to identify internal cues that are relevant to characters in vignettes; they may show improvement in these abilities if tasks required attention to their own internal cues. Alternatively, victimization history as well as trauma-related symptoms, such as dissociation, may make it especially difficult for youth to notice and respond to internal cues. Indeed, vast research suggests that victimization history and trauma-related responses such as dissociation are linked with disruptions in processing affective information (DePrince & Freyd, 2004; Reichmann-Decker, DePrince, & McIntosh, 2009), such as those tapped by the internal cues in the current risk detection task.

Because of a difference between randomized groups on exposure to indirect victimization since living on the streets, post hoc, subgroup analyses examined the impact of the SAFE intervention for youth with and without previous experiences of indirect victimization. A different pattern was found depending on indirect victimization exposure, such that youth without those experiences showed significant intervention effects whereas youth with those experiences did not. This post hoc analysis points to the importance of considering different types of trauma exposure in future research. Future iterations may consider testing booster sessions to address the needs of youth with victimization histories who may not benefit to the same degree in the condensed intervention format.

Limitations

While this intervention served as a pilot study aiming to identify the effectiveness of an intervention to improve risk detection among homeless youth, a few limitations are worth noting. First, youths' responses to interview questions may have been modified so as to appear more socially desirable; while this phenomenon is common among most studies involving human subjects, interviewers tried to make youth feel comfortable about providing answers without judgment as well as offering the option to refrain from answering any questions as they so choose without being eliminated from study participation. Also, while this study demonstrated above-average retention, particularly for a population that is often transient and difficult to reach, generalizability is always a concern when sample sizes are limited by attrition. Our sample included English-speaking, service-seeking youth, which prevents the generalizability of our findings to nonservice using youth and youth who do not speak English, populations that could be at heightened risk due to disconnection from formal services. Given that ITT analyses were not utilized out of caution against committing Type II violations (considering that one third of the experiment-assigned youth did not participate in the intervention), abilities to draw absolute conclusions regarding causality and intervention effectiveness are limited. It is also possible that the intervention would have proven less effective for the youth who did not attend the group, as this group may have been less motivated to learn about risk detection techniques. Furthermore, the control group reported significantly higher past experiences of indirect victimization at baseline as well as higher rates of substance use disoders (SUDs) when compared with intervention youth. Because youth were not tested if they appeared under the influence of substances, real-time substance use should not have affected performance on the risk detection tasks; however, we cannot rule out that overall substance use and associated

cognitive problems influenced performance differently across control and intervention groups. While the current study did not make predictions about SUD or PTSD (rates of which were very low in this sample), the presence of these diagnoses may moderate intervention effects and should be considered in future research. Finally, as the long-term benefits of this intervention remain unknown in terms of victimization, future research should prioritize longitudinal methods that can assess risk detection and victimization over time.

Implications

Despite these limitations, our findings suggest several important implications. Considering the extremely high rates of street victimization experienced by homeless youth (Ensign & Santelli, 1998; Kipke et al., 1997), it is quite promising that our intervention was able to increase risk detection skills, a theoretically important construct to victimization risk. Although additional research is necessary to determine whether increases in risk detection skills translate to better safety outcomes for homeless youth, that homeless youth are interested in, and able to, improve their risk detection skills implies they may be better able to protect themselves in a dangerous street environment.

Recent research has found that a substantial subgroup (35%) of homeless youth has experienced little to no victimization on the streets (Bender et al., 2015). This suggests that prevention efforts to enhance risk detection may be wise to target youth who have not yet experienced extreme victimization as means of interrupting a host of negative outcomes associated with such victimization, including posttraumatic stress symptoms (Stewart et al., 2004), depressive symptoms (Whitbeck et al., 1999), alcohol abuse and dependence (Bender et al., 2010; Rytwinski et al., 2013), criminal activity and arrests (Ferguson et al., 2012), and elevated HIV risk behaviors (Melander & Tyler, 2010). Indeed, the post hoc subgroup analyses suggested that the intervention may be most effective when provided to youth who have not yet been exposed to indirect victimization on the streets. Such findings suggest future iterations of this intervention may have the most value when viewed as preventive and offered early in youths' introduction to homelessness.

Service agencies should, however, concurrently consider the value of enhancing risk detection for youth who *already* have significant street victimization histories, as preventing *revictimization* may be equally important in protecting this vulnerable population and helping them to make positive changes in their lives. Previous research indicates youth with victimization histories distrust formal and informal support systems (Auerswald & Eyre,

2002), and exhibit that inhibited social-emotional skills can impede upon their ability to transition to more stable living situations (McManus & Thompson, 2008). Helping this group of youth to accurately detect risks may enable them to avoid dangerous individuals and situations and possibly differentiate safe individuals who may offer support.

Results also have implications for researchers in regard to intervention study with this highly transient population. That approximately one third of the youth recruited dropped out after they were randomly assigned to the intervention group and before groups began suggests that randomization may need to occur a few days after initial baseline interviews, perhaps, instead, on the first day of the intervention group. As such, this may allow for natural attrition of highly transient youth, who would otherwise be most likely to leave the shelter overnight. In doing so, randomization may be protected by only randomizing youth who demonstrate enough stability to report for a second research contact.

Promising results were found in this mindfulness-based, cognitive, skill-building intervention to improve homeless youths' risk detection skills. These preliminary findings offer potentially valuable information for both service providers and intervention researchers. As such, there is arguably great utility in further refining and improving aspects of this intervention through future iterations. Such refinements should include efforts to enhance program effects on detection of internal and environmental risk cues, where effect sizes were smallest. Future iterations of this intervention may spend more time helping youth build knowledge of internal/environmental risk cues and better emphasize practicing identifying these cues and addressing them through problem solving in group role-plays or through homeless assignments between group sessions. The more "real life" such practice exercises can be, the better able youth may be to relate and build skills that can be applied in their current context. In making such refinements, further testing of the intervention should be conducted for the purpose of helping homeless youth experience healthier and safer lives through important skill acquisition.

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