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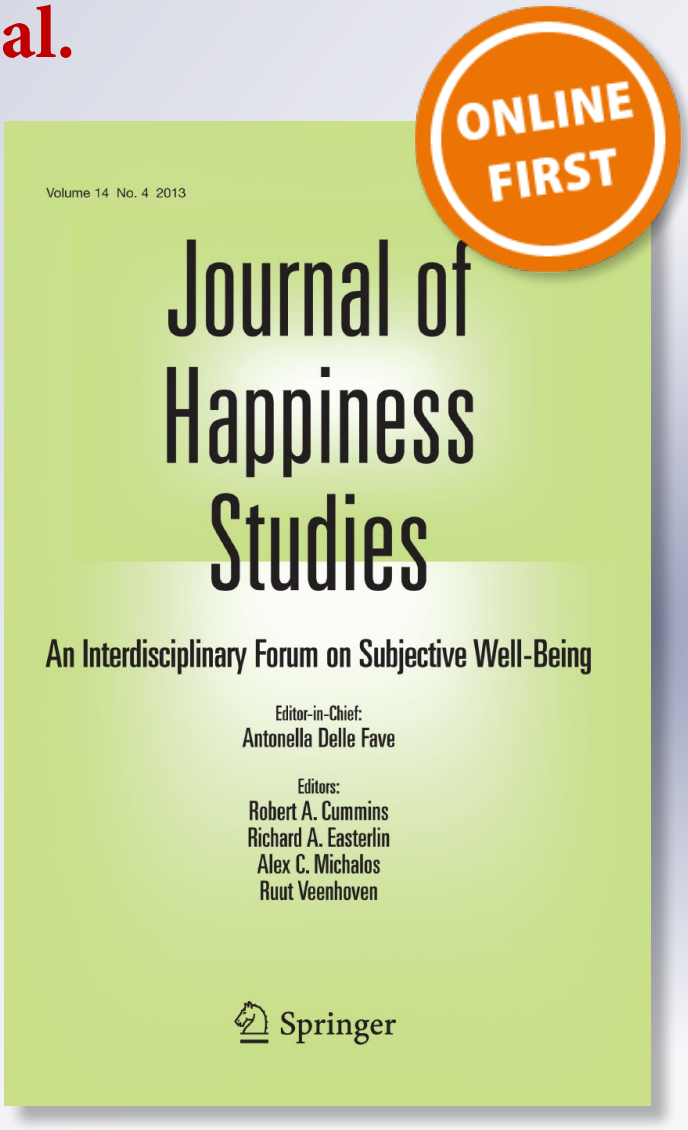

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RESEARCH PAPER

Can a Multilevel STI/HIV Prevention Strategy for High Risk African American Adolescents Improve Life Satisfaction?

Keith J. Zullig[1] · Robert F. Valois[2] · Gerald R. Hobbs[3] · Jelani C. Kerr[4] · Daniel Romer[5] · Michael P. Carey[6] · Larry K. Brown[6] · Ralph J. DiClemente[7] · Peter A. Vanable[8]

Abstract
Addressing adolescent sexual risk behaviors in the STI/HIV prevention literature is well documented; however, impacts from interventions on life satisfaction are relatively unexplored. This study examined data (n = 1658) from a randomized, multi-site, multi-level STI/HIV prevention intervention trial (Project iMPAACS) to determine whether increased protective and reduced sexual risk-taking behaviors associated with STI/HIV would also improve self-reported life satisfaction. Taking into account the nested study design and controlling for confounders, a mixed model ANOVA was performed where Total mean life satisfaction scores were analyzed at baseline and 3, 6, 12, and 18 months post-recruitment. Significance levels of 0.05 were used to determine significance and η^2 was used to assess effect size. We hypothesized that as intervention participants engaged in the intentional activity associated with increasing protective behaviors and reducing sexual risk-taking behaviors associated with STI/HIV, life satisfaction reports would also improve over the course of the intervention. A significant main effect for sex was detected ($F = 5.19$, $p = .02$, $\eta^2 = .03$), along with three interactions: between experimental condition and media intervention ($F = 7.96$, $p = .005$, $\eta^2 = .04$); experimental condition, sex, and media intervention ($F = 6.51$, $p = .01$, $\eta^2 = .04$); and experimental condition, sex, assessment point, and media intervention ($F = 3.23$, $p = .01$, $\eta^2 = .02$). With the exception of the control condition, female life satisfaction reports improved from baseline assessments to 18-months post-recruitment, whereas male reports decreased. Project iMPPACS was not designed with the intent on improving participants' life satisfaction. However, study results suggest incorporating strategies to address subjective well-being into future adolescent STI/HIV risk-reduction interventions is beneficial for females and additional research is necessary for males.

Keywords Adolescents · Subjective well-being · Life satisfaction · STI · HIV · Prevention · Intervention · Randomized trial

✉ Keith J. Zullig
kzullig@hsc.wvu.edu

Extended author information available on the last page of the article

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1 Introduction

Although there is a long history of attention to ameliorating adolescent sexual risk behaviors in the sexually transmitted infection (STI)/HIV prevention literature, attention to positive the impacts of interventions to effect subjective well-being, are relatively unexplored (Valois et al. 2002, 2014; Valois 2012). In contrast to HIV interventions where the focus may be on, for instance, effective condom use, a focus on subjective well-being attempts to differentiate the presence of more optimal levels of functioning (Valois et al. 2015).

Subjective well-being is a multidimensional construct in both adults (Andrews and Withey 1976; Diener 1984) and adolescents (Huebner and Dew 1996) composed of life satisfaction, positive affect, and negative affect. Life satisfaction generally refers to an individual's cognitive judgment of the positivity of their life as a whole (Diener 1984; Diener et al. 1999) or with specific life domains such as friendships or family life (Huebner et al. 2004, 2006). In contrast, positive and negative affect relate to emotional responses such as frequency of feelings of happiness, embarrassment, or sadness. Thus, an individual with high life satisfaction will experience greater frequency of positive emotions and lower frequency of negative emotions (Diener et al. 2002). Life satisfaction assessments are usually designed for individuals to report on a broad array of judgments ranging from very negative [e.g., "terrible"] through neutral and higher levels of satisfaction [e.g., "pleased" or "delighted"] (Andrews and Withey 1976).

In correlational research with diverse samples of adolescents, those who reported higher levels of life satisfaction also reported significantly less sexual risk behavior (Valois et al. 2002), suggesting that higher levels of life satisfaction may be a protective factor for the engagement in behaviors that may lead to increased risk for STI/HIV. Such research is important, given that sexual risk-taking is inter-correlated with other risk behaviors including substance use, truancy, and violent and aggressive behavior (Coleman et al. 2014; DuRant et al. 1999; Valois et al. 1999). Moreover, a history of sexual activity may be a shared risk behavior across different clusters of risk behaviors (Coleman et al. 2014; Valois et al. 1997, 1999).

Despite encouraging findings, the systematic study of life satisfaction among adolescents lags significantly behind that of adults (Huebner and Hills 2013). In addition, the study of life satisfaction among African-American adolescents, especially in regard to sexual risk-taking, lags even further behind the work conducted with White adolescents (Valois 2012; Valois et al. 2014). In 2016, African Americans accounted for 44% of HIV diagnoses despite only representing 12% of the US population (CDC 2017). Although adolescents with HIV/AIDS represent a relative minority of US cases (about 12%), of the estimated 17,528 persons under the age of 25 years who were diagnosed with HIV/AIDS during 2011 through 2016, 61.5% were African American (CDC 2017). Consequently, interventions targeted toward African American adolescents have been developed.

One successful multilevel intervention developed for African American adolescents was Project iMPPACS (an acronym representing project sites: in Macon, GA; Philadelphia, PA; Providence, RI; Atlanta, GA; Columbia, SC; and Syracuse, NY), a longitudinal intervention assessing the effect of a communitywide mass media campaign to increase condom use and reduce sexual risk taking associated with STI/HIV (Hennessy et al. 2013; Romer et al. 2009). Project iMPPACS was a 2 (sexual risk reduction or general health intervention) × 2 (media present or media absent) × 5 (time: at recruitment and 3, 6, 12, and 18 months post-recruitment) randomized controlled intervention implemented in two northern and two southern mid-sized cities (N = 1,658, 60% female) with 77% (n = 1277)

completing all 5 intervention questionnaires (Hennessy et al. 2013; Valois et al. 2015). All iMPPACS study participants also provided urine specimens to assess the presence of 3 prevalent sexually transmitted infections (STI) among adolescents: gonorrhea, chlamydia, and trichomoniasis at baseline, 6, 12 and 18 months with treatment provided for all participants testing positive for any STI.

All selected iMPPACS cities have sizable African American communities with above-average levels of poverty and high prevalence rates of adolescent STIs and emerging adult HIV. In addition, cities were selected because they did not have a history of recent HIV/AIDS media interventions or extensive school-based efforts to reduce risky sexual behavior. Syracuse and Macon were randomly assigned to receive the media campaign in the northeast and southeast, respectively, with Columbia and Providence serving as controls. The media production company Motivational Educational Entertainment served as the primary media partner for the intervention, owing to their expertise in the development and production of media materials for African American youth (MEE 2008). Based on estimates provided by the media channels, the average adolescent in the media markets was exposed to 3 television and 3 radio ads per month during the 15-month recruitment period in each media city (Romer et al. 2009). The media program began during the recruitment and small-group interventions study phases, however, baseline assessment occurred prior to the small-group intervention phase.

The iMPPACS mass media intervention (TV and radio) focused on three themes aligned with the outcome variables: (1) condom use hinders sexual pleasure/creates a sense of safety; (2) waiting to initiate sex shows respect for one's partner; and (3) condoms are needed with all types of sexual partners (Romer et al. 2009). The media messages created for the iMPPACS intervention were culturally sensitive and developed by African American experts. It should be noted here that culturally sensitive health communications are more effective than culturally neutral health information (Fishbein and Cappella 2006; Kreuter and Haughton 2006).

Findings from Project iMPPACS strongly support the use of media interventions directed at adolescents as a way to produce long-lasting effects on sexual risk behavior. The media program not only increased condom use among the highest risk youths within the first 8 months of its introduction (Romer et al. 2009), but it also reduced the trajectory of unsafe sex among the broader youth audience as the program continued (Sznitman et al. 2011). The iMPPACS intervention also maintained the effects of an STI screening intervention carried out face to face in the community (Sznitman et al. 2010). Thus, these researchers concluded that mass media provide an effective way to enhance durability of interventions carried out on the ground, and they independently change sexual norms and behaviors among adolescents on their own (Hennessy et al. 2013).

Project iMPPACS was not specifically designed to address life satisfaction among participants nor has there been any empirical investigation into the intervention's potential impact on life satisfaction. However, there is theoretical reasoning to suspect that improvements in self-efficacy, condom use and reductions in sexual behaviors associated with STIs/HIV among African American adolescents might also result in improvements in life satisfaction. For example, Lyubomirsky et al. (2005) determined that about 40% of the variance in well-being results from intentional activity in one's life, or a conscious decision to participate in an activity that demands effort to spur change. Such activity would include purposeful behaviors such as increasing condom use, reducing the number of sexual intercourse partners, volitional goal setting activity and working towards goals, and appropriate positive cognitive reflections and positive attitudes regarding the health promotion activity. Consequently, we hypothesized that as intervention participants engaged in the intentional

activity associated with increasing protective behaviors and reducing sexual risk-taking behaviors associated with STI/HIV, life satisfaction reports would also improve over the course of the intervention.

2 Methods

2.1 Participants

iMPPACS used a repeated measures, randomized-control research design to compare the effects of an experimental and a control condition in each city (Shadish et al. 2002; Romer et al. 2009). Cities were population and regionally balanced and matched on characteristics related to adolescent risk behaviors for urban African American adolescents in mid-sized cities. Of the 2145 adolescents ages 14–17 invited to participate, 1658 (77%) were consented/assented, assessed at baseline, and randomized to a treatment condition. The 23% who did not participate included adolescents who reported having scheduling conflicts, parent/guardian disapproval of the program, or lack of interest in the program and those adolescents who could not be reached to schedule their baseline appointment. Pretest and posttest data were collected at baseline, 3, 6, 12, and 18 month intervals. Youth were recruited through direct outreach of young people attending community-based organizations that provide recreational, social and education services for African American youth (21%), participant referrals (29%), respondent driven sampling (15%), and referrals from adult community members (14%), school-based social workers (12%), and street outreach by the study team (9%). A detailed report of these experiences can be found elsewhere (Vanable et al. 2007).

2.2 Study Design

Participants at each site were recruited in cohorts of approximately 25 adolescents per month for 15 months. There were 16 cohorts in Columbia, Macon and Syracuse, and 20 in Providence. Once recruited, participants were randomized into one of two conditions (a) a general health intervention ("Promoting Health Among Teens"; Jemmott et al. 1998), or (b) a sexual risk reduction intervention ("Focus on Youth"; Stanton et al. 1996) using a complete randomization scheme and computational random number tables. Identification numbers of possible participants were randomized into experimental or control conditions prior to workshop participation.

"Promoting Health Among Teens" (PHAT) (Jemmot et al. 1992, 1998, 1999, 2010; Kerr et al. 2013) is a culturally-tailored curricula to increase health knowledge and improve general health behavior. For African Americans specifically, PHAT is theorized to appeal to positive cultural characteristics that reflect the African American experience as well as address specific challenges to optimal health for this population (Jemmott et al. 1999; Kerr et al. 2013; Resnicow et al. 1999).

"Focus on Youth" (FOY; Galbraith et al. 1996; Li et al. 2002; Stanton et al. 1996, 1997) is a sexual risk reduction intervention developed and targeted specifically toward African American youth. Using Protection Motivation Theory (Rogers 1975), FOY focuses primarily on effective decision-making, communication, and negotiating skills and information regarding peer condom use in addition to an emphasis values clarification and goal setting.

The two interventions (PHAT, FOY) were structurally equivalent. That is, each intervention enrolled approximately 13 adolescents (approximately 26 per cohort). The two intervention conditions were equivalent in frequency (number of sessions; two consecutive Saturdays), length (duration of sessions – 16 h), and structure (level of active learning activities). The intervention sessions were co-facilitated by trained interventionists (at least 50% were African American to promote racial concordance) at each site. Fidelity to the intervention protocol was assessed on a regular schedule (implementation of the curriculum was evaluated for at least 65% of sessions). Evaluation of curriculum fidelity revealed that the curriculum was correctly implemented at 95% of sessions.

2.3 Data Collection

All study protocols were approved by the Institutional Review Boards (IRBs) at the respective universities in the four study sites. After receiving parental consent and youth assent, participants completed an Audio Computer Assisted Self-Interview (ACASI) on a laptop computer that gathered participant demographic characteristics and intervention-related knowledge, attitudes, life satisfaction, self-efficacy, perceptions and behavior. ACASI procedures are preferred for robust and accurate data of a sensitive and private nature (Murphy et al. 2000; Ghanem et al. 2005; Morrison-Beedy et al. 2006) and also demonstrate effectiveness in limiting social desirability of responses (Des et al. 1999; Turner et al. 1998). The auditory component of the ACASI that recites question and response options helps reduce literacy-related challenges (Ghanem et al. 2005). The ACASI took approximately 45 min to complete and study participants were compensated $30 for their time and effort.

2.4 Instrumentation

2.4.1 Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS)

Life satisfaction was measured using the BMSLSS and served as this study's dependent variable (Seligson et al. 2005). The BMSLSS assesses 5 domains (satisfaction with: family, friends, school, self, living environment) from the Multidimensional Students' Life Satisfaction Scale (Huebner 1991, 1994; Huebner et al. 1998). The BMSLSS also contains a sixth, global item (domain), overall life satisfaction item, which was not used in this study.

The BMSLSS has been validated for use with children/adolescents aged 8–18 (Seligson et al. 2005; Funk et al. 2006; Huebner et al. 2006) and is free to use by the public. The scale contains one item for each domain: "I would describe my satisfaction with my family life as;" "I would describe my satisfaction with my friendships as," and so forth. Seven response options from the Terrible-Delighted Scale (Andrews and Withey 1976) were used for each question: 1 (Terrible); 2 (Unhappy); 3 (Mostly Dissatisfied); 4 (Mixed: about equally Satisfied and Dissatisfied); 5 (Mostly Satisfied); 6 (Pleased); 7 (Delighted). The BMSLSS provided adequate estimates of internal consistency ($\alpha = .78$) reliability.

2.5 Data Analyses

All analyses were conducted with SAS Version 9.4. A Total mean life satisfaction score was calculated by summing all five items (excluding the overall item) then dividing by five. Inferential methods involved a mixed model analysis of variance (ANOVA) appropriate

to the repeated measures nature of the treatment design where Total mean life satisfaction scores were analyzed at baseline and 3, 6, 12, and 18 months post-recruitment. We used the method of linear contrasts to make comparisons at each time point. That analysis reflected the nesting of certain factors within levels of another factor or factors. For example, the project cities (i.e., Macon, Columbia, Providence, and Syracuse) are nested within the Intervention (yes/no) and adolescent participants are nested with city, gender, and whether they received FOY or PHAT. Significance levels of 0.05 were used to determine significance throughout the analysis and η^2 was used as the measure of effect size. Effect size values provide an indication of the magnitude of observed differences and in a practical sense, show the size of differences between means. For calculations using η^2, .01, .06, and .14 are common guidelines for determining small, medium, and large effect sizes (Cohen 1988). The analysis controlled for the likely confounding variables of sex, age, socioeconomic status (SES, as measured by eligibility for a free or reduced priced lunch at school), and family structure. Sensitivity analyses was performed to ensure the best fitting model was selected. The mixed model with the smallest BIC was selected and that model included sex.

3 Results

Baseline data are provided in Table 1 by city and intervention condition. There were a total of 1658 intervention participants across all sites, of which approximately 60% ($n=990$) were female (sample mean age 15.08, $SD=1.10$). Approximately 74% ($n=1215$) of respondents reported being eligible for free or reduced priced lunch at school and from 79 to 91% of participants identified mothers as the adults who live in their home. Across all cities, regardless of intervention condition, males reported greater Total mean satisfaction than females at baseline. Additional sample characteristics are presented in Table 1 by city and intervention condition.

3.1 Regression Findings

Mixed model repeated measures ANOVA findings for Total mean life satisfaction reports detected a significant main effect for sex ($F=5.19$, $p=.02$, $\eta^2=.03$) and three significant interactions. The significant interactions were between experimental condition (FOY or PHAT) and media intervention ($F=7.96$, $p=.005$, $\eta^2=.04$); experimental condition, sex, and media intervention ($F=6.51$, $p=.01$, $\eta^2=.04$); and experimental condition, sex, assessment point (3, 6, 12, and 18 month assessments), and media intervention ($F=3.23$, $p=.01$, $\eta^2=.02$). Given the significance of the interactions, our post hoc linear contrasts do not make an adjustment for the multiplicity of comparisons. All post hoc analysis results are reported in Table 2.

Based on these findings, FOY and PHAT male and female participants were separated and grouped into cities that received the media intervention (i.e., Syracuse and Macon) and cities that did not receive the media intervention (i.e., Providence and Columbia) in order to further describe the nature of the interactions among the four groups. Analyses were subsequently re-computed across each of the intervention assessment points with Total mean life satisfaction scores serving as the outcome variable of interest. Mean and standard error results of these analyses are located in Table 3 and graphically depicted in Fig. 1.

Table 1 Baseline sample characteristics by city and intervention condition

Characteristic	Providence (no media, n = 415)		Syracuse (media, n = 416)		Columbia (no media, n = 415)		Macon (media, n = 412)	
	FOY	PHAT	FOY	PHAT	FOY	PHAT	FOY	PHAT
Sex								
Male	82 (39.8)	85 (40.7)	85 (41.5)	89 (42.2)	91 (44.2)	93 (44.5)	68 (33.3)	74 (35.6)
Female	124 (60.2)	124 (59.3)	120 (58.5)	122 (57.8)	115 (55.8)	116 (55.5)	136 (66.7)	134 (64.4)
Age								
≤ 14 years	66 (32.2)	64 (30.6)	85 (41.5)	95 (45.0)	77 (37.4)	90 (43.1)	69 (33.8)	71 (34.1)
15 years	63 (30.7)	48 (23.0)	60 (29.3)	62 (29.4)	59 (28.6)	51 (24.4)	64 (31.4)	59 (28.4)
16 years	43 (21.0)	56 (26.8)	39 (19.0)	37 (17.5)	41 (19.9)	45 (21.5)	41 (20.1)	50 (24.0)
17 or 18 years	33 (16.1)	41 (19.6)	21 (10.2)	17 (8.1)	29 (14.1)	23 (11.0)	30 (14.7)	28 (13.5)
Year in school								
7th grade	5 (2.4)	4 (1.9)	6 (2.9)	6 (2.8)	7 (3.4)	11 (5.3)	8 (3.9)	7 (3.4)
8th grade	21 (10.2)	30 (14.4)	31 (15.1)	42 (19.9)	31 (15.1)	28 (13.4)	30 (14.7)	34 (16.4)
9th grade	68 (33.0)	51 (24.4)	93 (45.4)	80 (37.9)	69 (33.5)	73 (34.9)	74 (36.3)	64 (30.8)
10th grade	54 (26.2)	57 (27.3)	44 (21.5)	57 (27.0)	56 (17.2)	51 (24.4)	51 (25.0)	59 (28.4)
11th grade	34 (16.5)	37 (17.7)	21 (10.2)	18 (8.5)	27 (13.1)	34 (16.3)	28 (13.7)	34 (16.4)
12th grade	21 (10.2)	23 (11.0)	9 (4.4)	5 (2.4)	14 (6.8)	7 (3.4)	9 (4.4)	8 (3.9)
Ungraded or other	1 (0.5)	3 (1.4)	0 (0.0)	2 (1.0)	1 (0.5)	4 (1.9)	1 (0.5)	1 (0.5)
I'm not in school	1 (0.5)	1 (0.5)	1 (0.5)	1 (0.5)	1 (0.5)	1 (0.5)	3 (1.5)	1 (0.5)
Missing	1 (0.5)	3 (1.4)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
SES								
Yes	164 (79.6)	165 (79.0)	147(71.7)	155 (73.5)	141 (68.5)	154 (73.7)	145 (71.1)	145 (69.7)
No	19 (9.2)	20 (9.6)	37 (18.1)	34 (16.1)	40 (19.4)	30 (14.4)	41 (20.1)	39 (18.8)
Unsure	23 (11.2)	24 (11.4)	21 (10.2)	22 (10.4)	25 (12.1)	25 (11.9)	18 (8.8)	24 (11.5)
Family structure								
Mother (birth/adoptive)	178 (86.4)	171 (81.8)	171 (83.4)	179 (84.8)	163 (79.1)	168 (80.4)	183 (89.7)	189 (90.9)

Table 1 (continued)

Characteristic	Providence (no media, n = 415)		Syracuse (media, n = 416)		Columbia (no media, n = 415)		Macon (media, n = 412)	
	FOY	PHAT	FOY	PHAT	FOY	PHAT	FOY	PHAT
Father (birth/adoptive)	46 (22.3)	58 (27.8)	39 (19.0)	49 (23.2)	45 (21.8)	46 (22.0)	51 (25.0)	50 (24.0)
Stepfather	32 (15.5)	27 (12.9)	24 (11.7)	41 (19.4)	33 (16.0)	30 (14.4)	43 (21.1)	41 (19.7)
Stepmother	4 (1.9)	8 (3.8)	6 (2.9)	2 (1.0)	4 (1.9)	11 (5.3)	2 (1.0)	2 (1.0)
Other adults (non-relatives)	7 (3.4)	8 (3.8)	5 (2.4)	6 (2.8)	16 (7.8)	20 (9.6)	3 (1.5)	6 (2.9)
Other relatives	47 (22.8)	66 (31.6)	73 (35.6)	76 (36.0)	67 (32.5)	62 (29.7)	68 (33.3)	63 (30.3)

Table 2 Mixed Model Repeated Measures ANOVAs of Mean Life Satisfaction Scores at 3, 6, 12, and 18 month assessments between intervention conditions on each time point of measurement compared with baseline

Effect	Contrast value	Numerator (*df*)	Denominator (*df*)	*F* ratio	*P*
Contrasts: 3-months					
Males					
PHAT versus FOY	−0.15	1	2788	3.81	0.05
Media versus non-media cities	−0.07		2812	0.81	0.38
Females					
PHAT versus FOY	0.01	1	2795	0.02	0.89
Media versus non-media cities	−0.05		3304	0.46	0.50
Contrasts: 6-months					
Males					
PHAT versus FOY	−0.02	1	2788	0.07	0.79
Media versus non-media	0.06		2812	0.54	0.46
Females					
PHAT versus FOY	0.06	1	2795	0.78	0.38
Media versus non-media cities	−0.01		3304	0.01	0.93
Contrasts: 12-months					
Males					
PHAT versus FOY	0.01	1	2788	0.01	0.92
Media versus non-media cities	−0.04		2812	0.19	0.66
Females					
PHAT versus FOY	0.06	1	2795	0.72	0.40
Media versus non-media cities	−0.07		3304	1.14	0.29
Contrasts: 18-months					
Males					
PHAT versus FOY	−0.19	1	2788	4.37	0.03
Media versus non-media cities	0.17		2812	3.91	0.05
Females					
PHAT versus FOY	0.07	1	2795	0.93	0.36
Media versus non-media cities	−0.05		3304	0.48	0.49

Although there is fluctuation in Total mean life satisfaction scores across the assessment points among the four intervention conditions, several trends can be discerned (see Fig. 1). First, all Total mean life satisfaction scores from baseline to 18 months post-intervention remain in the "mostly satisfied" range for all, regardless of sex or intervention condition. Second, the changes over time in females is different from that observed in males, suggesting females responded differently to the intervention than males. For example, at baseline, although male participants consistently reported higher life satisfaction than females, they also reported consistently lower Total mean life satisfaction after 18 months post intervention. The exception to this trend are male participants in non-media cities who were randomized into the PHAT intervention (Fig. 1d) where Total mean life satisfaction scores increased, albeit not statistically significantly, from baseline (Mean = 5.60) to 18 months post-intervention (Mean = 5.79). Finally, female participants nearly always reported increased Total mean life satisfaction after 18 months compared to baseline. The

Table 3 Total Mean Life Satisfaction across intervention conditions by sex

Condition	Baseline Mean (SE)	3 months Mean (SE)	6 months Mean (SE)	12 months Mean (SE)	18 months Mean (SE)
Syracuse and Macon (media cities)					
FOY					
Male	5.53 (0.08)	5.56 (0.08)	5.64 (0.08)	5.60 (0.08)	5.43 (0.09)
Female	5.36 (0.06)	5.38 (0.06)	5.34 (0.06)	5.46 (0.06)	5.50 (0.07)
PHAT					
Male	5.36 (0.08)	5.48 (0.08)	5.27 (0.08)	5.44 (0.08)	5.28 (0.09)
Female	5.32 (0.06)	5.35 (0.06)	5.31 (0.06)	5.34 (0.06)	5.50 (0.07)
Providence and Columbia (non-media cities)					
FOY					
Male	5.47 (0.08)	5.26 (0.08)	5.31 (0.08)	5.41 (0.08)	5.27 (0.09)
Female	5.34 (0.07)	5.32 (0.07)	5.37 (0.07)	5.32 (0.07)	5.52 (0.07)
PHAT					
Male	5.60 (0.08)	6.64 (0.08)	5.72 (0.08)	5.56 (0.08)	5.79 (0.09)
Female	5.45 (0.07)	5.33 (0.07)	5.28 (0.07)	5.33 (0.07)	5.38 (0.07)

exception here are female participants in non-media cities who received the PHAT intervention (Fig. 1d), however, these means are also not statistically significantly different (Mean = 5.45, baseline; Mean = 5.38, 18 months).

Further investigation by life satisfaction domain revealed that participants were least satisfied with their school experience and most satisfied with themselves. This pattern persisted across intervention assessment points regardless of media city (Fig. 2a), intervention condition (Fig. 2b), and gender (Fig. 2c), and is consistent with a substantial body of adolescent BMSLSS life satisfaction research (Seligson et al. 2005; Huebner et al. 2004; Funk et al. 2006; Abubakar et al. 2016; Valois et al. 2015).

4 Discussion

Interventions aimed at increasing subjective well-being are rare. Among adults, successful intervention strategies have involved asking participants to perform acts of kindness (Lyubomirsky et al. 2005), to increase grateful thinking (Emmons and McCullough 2003), to journal and use visualization to accomplish life goals (King 2001), and to identify and optimally use individual character strengths (Seligman et al. 2005). Among youth, interventions with the specific intent of increasing subjective well-being are somewhat nascent, however success has been demonstrated for increasing hope and global life satisfaction (Marques et al. 2011; Rashid and Anjum 2008; Proctor et al. 2011; Suldo et al. 2014) as well as gratitude and school satisfaction (Froh et al. 2008).

The current analyses examined Total mean life satisfaction reports from African American adolescents who participated in Project iMPPACS, a multi-site, multi-level, STI/HIV risk reduction intervention. Although iMPPACS was not designed with the specific intent of improving subjective well-being among participants, we hypothesized that as participants increased positive emotions, protective behaviors and reduced sexual risk-taking

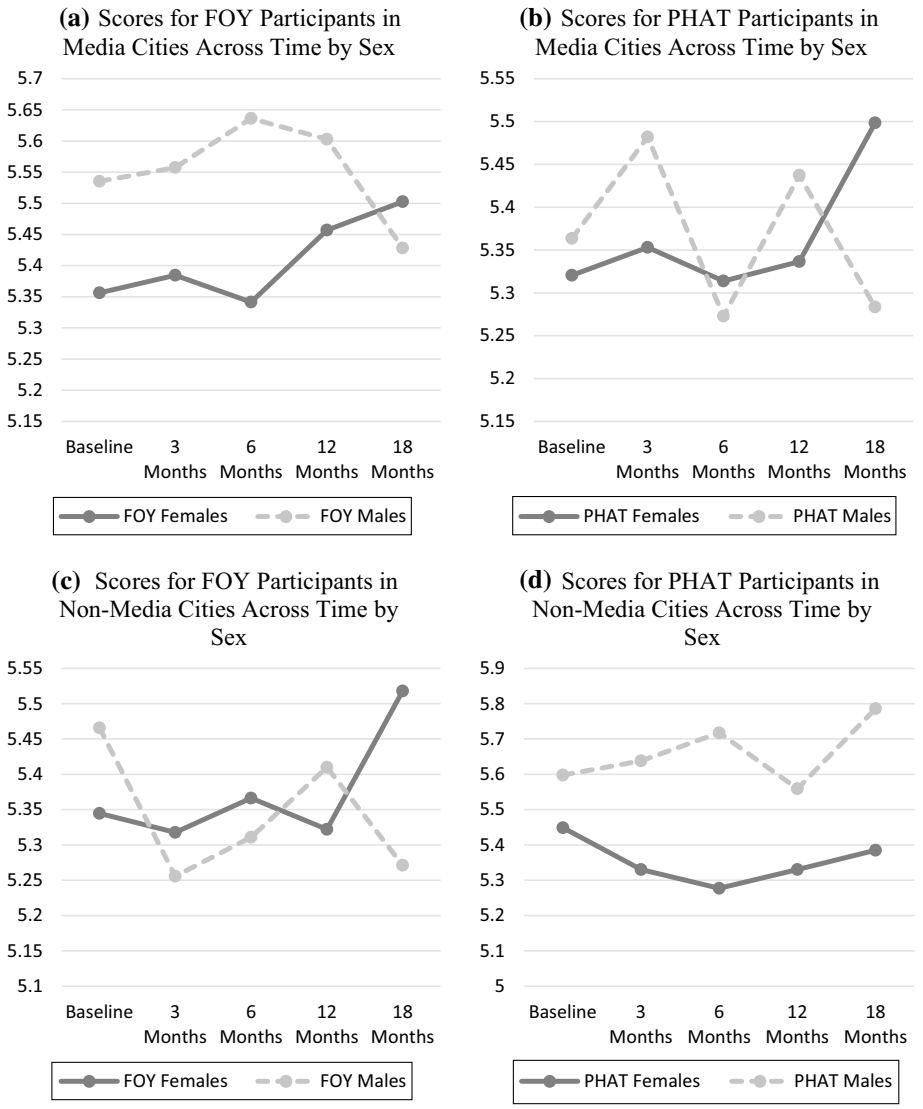

Fig. 1 Total Mean Life Satisfaction Scores across intervention conditions from the mixed model ANOVA

behaviors associated with STI/HIV, life satisfaction reports would improve over the course of the intervention. This hypothesis was partially supported.

Results suggest females benefitted from FOY regardless of media condition (i.e., city) more than males in terms of their mean Total life satisfaction reports from baseline to 18 months post-intervention (Fig. 1a, c). Similar to the results observed for FOY, females who received the PHAT intervention in media cities improved their Total life satisfaction scores more than males from baseline to 18 months post-intervention (Fig. 1b). Collectively, these findings are consistent with iMPPACS results where researchers concluded that the media intervention had a stronger effect on sexual risk reduction regardless of

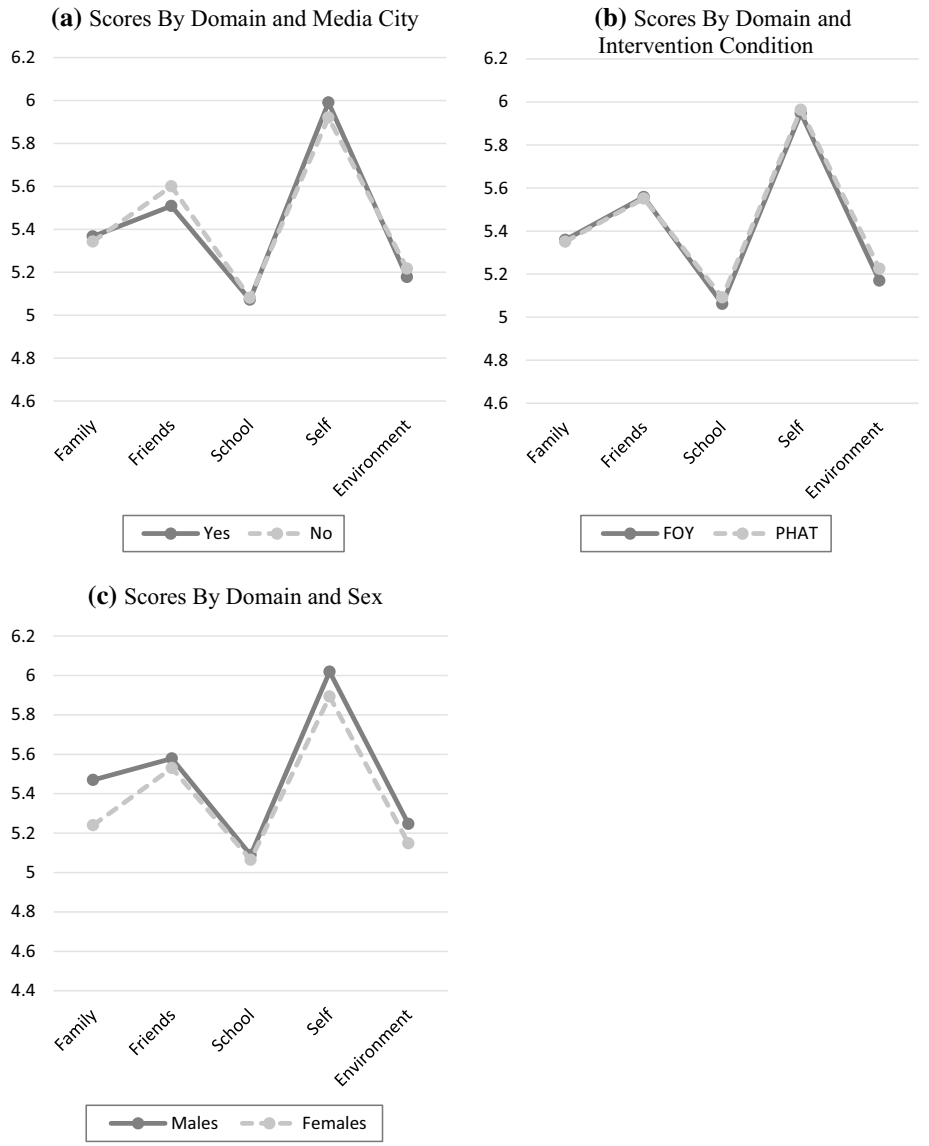

Fig. 2 Total Mean Life Satisfaction Scores by domain and media city (**a**), domain and intervention condition (**b**), and domain and sex (**c**) from the mixed model ANOVA

whether participants received the FOY or PHAT intervention (Romer et al. 2009; Hennessy et al. 2013).

Conversely, the PHAT intervention in non-media cities benefitted male participants' Total life satisfaction reports more from baseline to 18 months post-intervention; in contrast, females' life satisfaction reports during the same period remained relatively unchanged (Fig. 1d). Given that participants assigned to this condition in iMPPACS were considered a control condition, and males reported higher Total life satisfaction at baseline

in all treatment conditions, this is not an unexpected finding. PHAT targets general health behavior by increasing knowledge, reexamination of beliefs regarding risk and consequences, developing skills to reduce health risks, and increasing self-efficacy and motivation to eat healthier foods, perform more physical activity, and reduce substance use (Jemmot et al. 1992, 1998, 1999, 2010; Kerr et al. 2013). Adolescent substance use is recognized as an antecedent to sexual risk behaviors that could result in STIs/HIV, especially for females (Jackson et al. 2012). However, discussions of sexual behavior among youth can be sensitive (Merzel et al. 2004) where fear of being embarrassed has been shown to be a deterrent to adolescents' seeking reproductive health care, including testing for STIs (Ford et al. 1999; Huppert and Adams-Hillard 2003). PHAT does not address these areas, and the relatively stable Total life satisfaction reports of adolescents in this intervention may reflect the perceived "safer" or potentially "less embarrassing" subject matter offered in PHAT compared to that of FOY.

Among African American adolescents assigned to the other three intervention conditions (i.e., media cities with PHAT, media cities with FOY, and non-media cities with FOY), a distinct pattern emerged for both female and male participants. In these three conditions, female participants' life satisfaction reports improved from baseline assessments to 18-month post-recruitment assessments, whereas the opposite was observed for males. This finding only partially supports the hypothesis. We can offer several possible explanations for these preliminary findings. This study compared a general health promotion with a sexual risk reduction intervention combined with culturally relevant radio and TV messages. Perhaps females responded more positively to the intervention and had greater gains in life satisfaction because they have more at stake in sexual encounters compared to males (Valois et al. 2015); specifically, teen mothers are less likely to complete high school, and are more likely to live in poverty, to seek public assistance, and to be in poor health compared to adult mothers. Moreover, children of teen mothers are more likely to experience increased health, social, and cognitive challenges; and to live in poverty, drop out of school, and become teen parents (NCSL 2017). As a result, skills females learned through iMPPACS may have secondary benefits related to breaking potential intergenerational impacts of unplanned pregnancies resulting in greater improvements in life satisfaction. However, future research and practice needs to address mechanisms that might elucidate gender differences in relationships between life satisfaction, positive and negative emotions, and sexual risk behavior in African American adolescents. For example, sexual risk behavior may address different psychosocial needs in adolescent females versus males and for African American adolescents versus White adolescents and others (Cooper et al. 2003; Folkman et al. 1992; Silk et al. 2003). Females tend to show greater needs for intimate relationships (Furman et al. 1999; Simon and Barnett 2010) that are related to adolescent mental health, life satisfaction, and positive emotions. Overall, the improvements in life satisfaction for females in this study's intervention conditions are meaningful given that previous research has generally demonstrated that females report lower life satisfaction than males across cultures (Goldbeck et al. 2007; Kwan 2010; Moksnes et al. 2014; Neto and Barros 2007; Piko and Hamvai 2010).

Given the relationships among life satisfaction, and positive and negative affect, the importance of regarding one's competence in controlling negative emotions as it relates to sexual risk-taking among adolescents has been noted (Collazo 2004; Hessler and Fainsibler-Katz 2010; Valois et al. 2013). Life satisfaction seems to predict a person's ability to function in major life tasks or social roles (Frisch 2013). Collazo (2004) found that negative emotion reaction regarding sexual intercourse was more strongly associated with females' intent to abstain from sexual intercourse with a main partner (vs. a casual partner)

among 10th and 12th grade students. Hessler and Fainsilber-Katz (2010) found that difficulty managing emotions was associated with having more sexual partners in a longitudinal study of early adolescents. African American males consistently report higher rates of risky sexual behavior than African American females (CDC 2012, 2014) and these differences could be the result of varying styles of regulating emotions and emotionally driven behaviors during adolescence according to previous studies that included Black and White adolescents (Cooper et al. 2003; Folkman et al. 1992).

4.1 Limitations

These results should be interpreted in light of limitations. Recruitment from four midsized cities in two geographical regions is not totally representative of African American adolescents or other races/ethnicities. Future studies should examine whether results generalize to other sociodemographic groups. Second, our assessment of SES (i.e., eligibility for the free/reduced-price school lunch program) was brief; use of additional indicators of SES can provide a more precise estimation of participants' SES. However, eligibility for the free/reduced-price school lunch program has been moderately correlated with other indicators of SES. For example, eligibility for free/reduced-price school lunch was significantly negatively correlated with both median income ($r=-0.50$) and mean education level ($r=-0.40$) by zip code in a predominantly African American adolescent sample (Scarinci et al. 2002). Third, we did not collect data on adolescents who were recruited and chose not to participate in our study and therefore cannot determine differences from those who did and did not participate. Finally, these data are from a single source, which could lead to shared method and source variance bias. Nonetheless, data were collected using ACASI, which is known to be reliable and demonstrate decreased socially desirable responding for sensitive topics among adolescents (Romer et al. 1997).

5 Conclusion

Results have implications for the design of interventions to improve the life satisfaction and positive emotions for adolescents, in particular, the use of a theoretical framework to guide development and implementation. For example, Proctor et al. (2011) used a positive youth development approach with a focus on Values-In-Action—Inventory of Character Strengths (Peterson 2006; Peterson and Seligman 2004), Froh et al. (2008) used a positive affect/gratitude framework and Marques et al. (2011) utilized Snyder's (2002) and Snyder et al.'s 2003) Hope Theory to improve life satisfaction and well-being of adolescents. Suldo et al. (2014) used Seligman's (2002) and Seligman et al.'s (2005) framework for happiness and a combination of intervention components improvement from previous subjective well-being/live satisfaction intervention studies (Marques et al. 2011; Rashid and Anjum 2008; Proctor et al. 2011; Suldo et al. 2014; Froh et al. 2008). For school-based interventions for improving life satisfaction (positive emotions) and an ecological model (Huebner et al. 2004), a coordinated school health model (Valois and Hoyle 2000), a social-emotional learning model (Payton et al. 2000) or a healthy school community framework could be utilized (Valois et al. 2015). In sum, current study results suggest future STI/HIV risk-reduction interventions that specifically incorporate one or more of these approaches may achieve even greater success in "traditional" outcomes such as those demonstrated by

iMPPACS, but also potential improvements in subjective well-being for females. However, additional research is necessary for males.

In regard to increasing positive affect (and thus life satisfaction) for reductions in adolescent sexual risk-taking behaviors, experts suggest skills necessary for navigating the challenges of the immediate social environment (Buckley et al. 2003; Halberstadt et al. 2001; Saarni 1999; Saarni et al. 1998). A basic set of skills for adolescents could include: developing an awareness of one's emotional state; skills for discerning emotions in others; skills in using the language and vernacular of emotion and expression in a culturally competent manner; developing the capacity for empathy and sympathy involving the emotions of others; skills in recognizing that inner emotional state does not need to translate to outer emotional expression; developing a capacity for managing stress; and developing the ability to recognize that the formation of relationships, to some degree, is determined by the level of emotional genuineness of expression and the degree of balance within a relationship (Buckley et al. 2003; Halberstadt et al. 2001; Saarni 1999; Saarni et al. 1998).

These skills and strategies are adaptive and assist the adolescent to reach goals, cope with life challenges, manage emotional arousal for effective problem solving, discern what others feel and to respond sympathetically as the situation is presented, and recognize how emotion communication and self-presentation affect relationships (Buckley et al. 2003). More importantly, in regard to effective learning for improved emotional self-efficacy for increasing life satisfaction and positive emotions is skill development to the degree where an adolescent can begin to trust their ability to reach their goals when faced with emotion-laden social and sexual interactions with others (Buckley et al. 2003; Halberstadt et al. 2001; Saarni 1999; Saarni et al. 1998). Because African American adolescents tend to begin sexual intercourse at earlier ages, and involve more partners with males reporting higher prevalence rates for both behaviors (CDC 2011), interventions should began early in the teen years, focus on emotion regulation and be culturally sensitive and competent. Adolescent sexual risk reduction intervention research should consider enhancing the perceived ability in performing safer, responsible and preventive behaviors, and include life satisfaction, emotional self-efficacy and emotion regulation as program components for male and female adolescents of all racial/ethnic backgrounds.

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Compliance with Ethical Standards

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References

Abubakar, A., van de Vijver, F., Alonso-Arbiol, I., He, J., Adams, B., Aldhafri, S., et al. (2016). Measurement invariance of the Brief Multidimensional Student's Life Satisfaction Scale among

adolescents and emerging adults across 23 cultural contests. *Journal of Psychoeducational Assessment, 34*(1), 28–36.
Andrews, F. M., & Withey, S. B. (1976). *Social indicators of well-being: American's perceptions of life quality*. New York: Plenum.
Buckley, M., Storino, M., & Saarni, C. (2003). Promoting emotional competence in children and adolescents: Implications for school psychologists. *School Psychology Quarterly, 18*(2), 177–191.
CDC-Centers for Disease Control and Prevention. (2011). Disparities in diagnoses of HIV infection between blacks/African Americans and other racial/ethnic populations—37 States, 2005—2008. *MMWR Morbidity and Mortality Weekly Report, 60*(4), 93–98.
CDC-Center for Disease Control and Prevention. (2012). MMWR Youth Risk Behavior Surveillance—United States, 2011. *Morbidity and Mortality Weekly Report, 61*(4), 4–44.
CDC-Center for Disease Control and Prevention. (2014). MMWR Youth Risk Behavior Surveillance United States, 2013. *Morbidity and Mortality Weekly Report, 63*(4), 5–45.
CDC-Centers for Disease Control and Prevention. (2017). HIV Surveillance Report, 2016, *28*. http://www.cdc.gov/hiv/library/reports/hiv-surveillance.html. Published November 2017. Accessed December 19, 2017.
Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). New York: Academic Press.
Coleman, C., Wileyto, E. P., Lenhart, C. M., & Patterson, F. (2014). Multiple health risk behaviors in adolescents: An examination of Youth Risk Behavior Survey data. *American Journal of Health Education, 45*(5), 271–277.
Collazo, A. A. (2004). Theory-based predictors of intention to engage in precautionary sexual behavior among Puerto Rican high school adolescents. *Journal of HIV/AIDS Prevention in Children and Youth, 6*(1), 91–120.
Cooper, M. L., Wood, P. K., Orcutt, H. K., & Albino, A. (2003). Personality and the predisposition to engage in risky or problem behaviors during adolescence. *Journal of Personality and Social Psychology, 84*(2), 390–410.
Des, J., Paone, D., & Milliken, J. (1999). Audio-computer interviewing to measure risk behavior for HIV among injecting drug users: A quasi-randomized trial. *Lancet, 353,* 1657–1661.
Diener, E. (1984). Subjective well-being. *Psychological Bulletin, 95,* 542–575. https://doi.org/10.1037//0033-2909.95.3.542.
Diener, E., Lucas, R. E., & Oishi, S. (2002). Subjective well-being: The science of happiness and life satisfaction. In C. R. Snyder & S. Lopez (Eds.), *Handbook of positive psychology* (pp. 463–473). London: Oxford University Press.
Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin, 125,* 276–302.
DuRant, R. H., Smith, J. A., Kreiter, S. R., & Krowchuk, D. P. (1999). The relationship between early age of onset of initial substance use and engaging in multiple health risk behaviors among young adolescents. *Archives of Pediatric and Adolescent Medicine, 153*(3), 286–291. https://doi.org/10.1001/archpedi.153.3.286.
Emmons, R. A., & McCullough, M. E. (2003). Counting blessings versus burdens: An experimental investigation of gratitude and subjective well-being in daily life. *Journal of Personality and Social Psychology, 84*(2), 377–389.
Fishbein, M., & Cappella, J. N. (2006). The role of theory in developing effective health communications. *Journal of Communication, 56,* S1–S17.
Folkman, S., Chesney, M. A., Pollack, L., & Phillips, C. (1992). Coping and high risk sexual behavior. *Health Psychology, 11,* 218–222.
Ford, C. A., Bearman, P. S., & Moody, J. (1999). Foregone health care among adolescents. *Journal of the American Medical Association, 282,* 2227–2234.
Frisch, M. B. (2013). Evidence-based well-being/positive psychology assessment and intervention with quality of life therapy and coaching and the Quality of Life Inventory (QOLI). *Social Indicators Research, 114*(2), 193–227. https://doi.org/10.1007/s11205-012-0140-7.
Froh, J. J., Sefick, W. J., & Emmons, R. A. (2008). Counting blessings in early adolescents: An experimental study of gratitude and subjective well-being. *Journal of School Psychology, 46,* 213–233.
Funk, B. A., Huebner, E. S., & Valois, R. F. (2006). Reliability and validity of a brief life satisfaction scale with a high school sample. *Journal of Happiness Studies, 7,* 41–54.
Furman, W., Brown, B. B., & Feiring, C. (1999). *The development of romantic relationships in adolescence*. New York, NY: Cambridge University Press.

Galbraith, J., Ricardo, I., Stanton, B., Black, M., & Feigelman, S. (1996). Challenges and rewards of involving community in research: An overview of the "Focus on Kids" HIV risk reduction program. *Health Education Quarterly, 23,* 383–394.

Ghanem, K. G., Hutton, H. E., Zenilman, J. M., Zimba, R., & Erbelding, E. J. (2005). Audio computer assisted self-interview and face to face interview modes in assessing response bias among STD clinic patients. *Sexually Transmitted Infections, 81,* 421–425.

Goldbeck, L., Schmitz, T. G., Besier, T., Herschbach, P., & Henrich, G. (2007). Life satisfaction decreases during adolescences. *Quality of Life Research, 16,* 969–979.

Halberstadt, A., Denham, S., & Dunsmore, J. (2001). Affective social competence. *Social Development, 10,* 79–119.

Hennessy, M. K., Romer, D. R., Valois, R. F., Vanable, P. A., Carey, M. P., Stanton, B. A., et al. (2013). Safer sex media messages and adolescent sexual behavior: 3-year follow-up results from Project iMPPACS. *American Journal of Public Health, 103*(1), 134–140.

Hessler, D., & Fainsibler-Katz, L. (2010). Association between emotional competence and adolescent risky behaviour. *Journal of Adolescence, 33*(1), 1–10.

Huebner, E. S. (1991). Correlates of life satisfaction in children. *School Psychology Quarterly, 6,* 103–111.

Huebner, E. S. (1994). Preliminary development and validation of a multidimensional life satisfaction scale for children. *Psychological Assessment, 6,* 149–158.

Huebner, E. S., & Dew, T. (1996). The interrelationships of positive affect, negative affect, and life satisfaction in an adolescent sample. *Social Indicators Research, 38*(2), 129–137.

Huebner, E. S., & Hills, K. J. (2013). Assessment of subjective well-being in children and adolescents. In D. H. Saklofske, C. R. Reynolds, & V. Schwean (Eds.), *The Oxford handbook of child psychological assessment*. Toronto: Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199796304.013.0034.

Huebner, E. S., Laughlin, J. E., Ash, C., & Gilman, R. (1998). Further validation of the Multidimensional Students' Life Satisfaction Scale. *Journal of Psychoeducational Assessment, 16,* 118–134.

Huebner, E. S., Seligson, J. L., Valois, R. F., & Suldo, S. M. (2006). A review of the Brief Multidimensional Students' Life Satisfaction Scale. *Social Indicators Research, 79,* 477–484.

Huebner, E. S., Valois, R. F., Suldo, S. M., Smith, L. C., McKnight, C. G., Seligson, J. L., et al. (2004). Perceived quality of life: A neglected component of adolescent health assessment and intervention. *Journal of Adolescent Health, 34*(4), 270–278.

Huppert, J. S., & Adams-Hillard, P. J. (2003). Sexually transmitted disease screening in teens. *Current Women's Health Reports, 3,* 451–458.

Jackson, C., Sweeting, H., & Haw, S. (2012). Clustering of substance use and sexual risk behavior in adolescence: Analysis of two cohort studies. *British Medical Journal Open, 2,* e000661. https://doi.org/10.1136/bmjopen-2011-000661.

Jemmott, J., Jemmott, L., & Fong, G. T. (1992). Reductions in HIV risk-associated sexual behaviors among Black male adolescents: Effects of an AIDS prevention intervention. *American Journal of Public Health, 82*(3), 372–377.

Jemmott, J., Jemmott, L., & Fong, G. (1998). Abstinence and HIV-risk reduction interventions for African American adolescents: A randomized control trial. *Journal of the American Medical Association, 279,* 1529–1536.

Jemmott, J., Jemmott, L., & Fong, G. T. (1999). Reducing HIV risk-associated sexual behavior among African American adolescents: Testing the generality of intervention effects. *Journal of Community Psychology, 27*(2), 161–187.

Jemmott, J. B., Jemmott, L. S., & Fong, G. T. (2010). Efficacy of a theory-based abstinence-only intervention over 24 months: A randomized controlled trial with young adolescents. *Archives of Pediatric and Adolescent Medicine, 164*(2), 154–159.

Kerr, J. C., Valois, R. F., Farber, N. B., Vanable, P. A., DiClemente, R. J., Salazar, L. F., et al. (2013). Effects of promoting health among teens on general health knowledge, dietary, physical activity, and substance use behaviors for African American adolescents. *American Journal of Health Education, 44,* 1–13.

King, L. A. (2001). The health benefits of writing about life goals. *Personality and Social Psychology Bulletin, 27,* 798–807.

Kreuter, M. W., & Haughton, L. T. (2006). Integrating culture into health information for African American women. *American Behavioral Scientist, 49*(6), 794–811.

Kwan, Y. K. (2010). Life satisfaction and self-assessed health among adolescents in Hong Kong. *Journal of Happiness Studies, 11,* 383–393.

Li, X., Stanton, B., Feigelman, S., & Galbraith, J. (2002). Unprotected sex among African-American adolescents: A three-year study. *Journal of the National Medical Association, 94,* 789–796.

Lyubomirsky, S., Sheldon, K. M., & Schkade, D. (2005). Pursuing happiness: The architecture of sustainable change. *Review of General Psychology, 9,* 111–131.
Marques, S. C., Lopez, S. J., & Pais-Ribero, J. L. (2011). Building hope for the future: A program to foster strengths in middle-school students. *Journal of Happiness Studies, 12,* 139–152.
Merzel, C. R., Vandevanter, N. L., Middlestadt, S., Bleakley, A., & Ledsky, R. (2004). Attitudinal and contextual factors associated with discussion of sexual health issues during adolescent health visits. *Journal of Adolescent Health, 35,* 108–115.
Moksnes, U. K., Løhre, A., Byrn, D. G., & Haugan, G. (2014). Satisfaction With Life Scale in adolescents: Evaluation of factor structure and gender invariance in Norwegian sample. *Social Indicators Research, 118,* 657–671.
Morrison-Beedy, D., Carey, M., & Xin, T. (2006). Accuracy of audio computer-assisted self-interviewing (ACASI) and self-administered questionnaires for the assessment of sexual behavior. *AIDS and Behavior, 10,* 541–552.
Motivational Educational Entertainment, (MEE). (2008). http://www.meeproductions.com. Accessed November 25, 2017.
Murphy, D. A., Durako, S., & Muenz, L. R. (2000). Marijuana use among HIV-positive and high-risk adolescents: A comparison of self-report through audio computer-assisted self-administered interviewing and urinalysis. *American Journal of Epidemiology, 152,* 805–813.
NCSL - National Conference of State Legislatures. (2017). Teen pregnancy prevention. http://www.ncsl.org/research/health/teen-pregnancy-prevention.aspx. Accessed November 22, 2017.
Neto, F., & Barros, J. (2007). Satisfaction with life among adolescents from Portuguese immigrant families in Switzerland. *Swiss Journal of Psychology, 66,* 215–223.
Payton, J. W., Wardlaw, D. M., Graczyk, P. A., Bloodworth, M. R., Tompsett, C. J., & Weissberg, R. P. (2000). Social and emotional learning: A framework for promoting mental health and reducing risk behavior in children and youth. *Journal of School Health*, *70*(5), 179–185.
Peterson, C. (2006). *A primer in positive psychology*. New York, NY: Oxford University Press.
Peterson, C., & Seligman, M. E. P. (2004). *Character strengths and virtues: A classification and handbook*. Washington, DC: American Psychological Association.
Piko, B. F., & Hamvai, C. (2010). Parent, school and peer-related correlates of adolescents' life satisfaction. *Children and Youth Services Review, 32,* 1479–1482.
Proctor, C., Tsukayama, E., Wood, A. M., Maltby, J., Eades, J. F., & Linley, P. A. (2011). Strengths gym: The impact of a character strengths-based intervention on the life satisfaction and well-being of adolescents. *Journal of Positive Psychology, 6,* 377–388.
Rashid, T., & Anjum, A. (2008). Positive psychotherapy for young adults and children. In J. R. Z. Abela & B. L. Hankin (Eds.), *Handbook of depression in children and adolescents* (pp. 250–287). New York: Guilford Press.
Resnicow, K., Braithwaite, R., & Ahluwalia, J. (1999). Cultural sensitivity in public health: Defined and demystified. *Ethnicity and Disease, 9,* 10–21.
Rogers, R. W. (1975). A protection motivation theory of fear appeals and attitude change. *Journal of Psychology, 91,* 93–114. https://doi.org/10.1080/00223980.1975.9915803.
Romer, D. R., Hennessy, M. F., DiClemente, R. J., Vanable, P. A., Carey, M. P., Brown, L. K., et al. (2009). Mass media as an HIV-prevention strategy: Using culturally sensitive messages to reduce HIV associated sexual behavior of at-risk African–American youth. *American Journal of Public Health, 99*(12), 2150–2159.
Romer, D. R., Hornik, R. C., Stanton, B., Black, M., Li, X. M., & Ricardo, I. (1997). "Talking" computers: A reliable and private method to conduct interviews on sensitive topics with children. *Journal of Sex Research, 34,* 3–9.
Saarni, C. (1999). *The development of emotional competence*. New York: Guilford.
Saarni, C., Mumme, D., & Campos, J. (1998). Emotional development: Action, communication, and understanding. In N. Eisenberg (Ed.), *Handbook of child psychology, 3; social, emotional, and personality development* (pp. 237–309). New York: Wiley.
Scarinci, I. C., Robinson, L. A., Alfano, C. M., Zbikowski, S. M., & Klesges, R. C. (2002). The relationship between socioeconomic status, ethnicity, and cigarette smoking in urban adolescents. *Preventive Medicine, 2*(34), 171–178.
Seligman, M. E. P. (2002). *Authentic happiness: Using the new positive psychology to realize your potential for lasting fulfillment*. New York: Free Press.
Seligman, M. E. P., Steen, T. A., Park, N., & Peterson, C. (2005). Positive psychology progress: Empirical validation of interventions. *American Psychologist, 60,* 410–421.
Seligson, J., Huebner, E. S., & Valois, R. F. (2005). An investigation of a brief life satisfaction scale with elementary school students. *Social Indicators Research, 73,* 355–374.

Shadish, W., Cook, T., & Cambell, T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston: Houghton Mifflin.

Silk, J. S., Steinberg, L., & Morris, A. S. (2003). Adolescents' emotion regulation in daily life: Links to depressive symptoms and problem behavior. *Child Development, 74,* 1869–1880.

Simon, R. W., & Barnett, A. E. (2010). Non-marital romantic relationships and mental health in early adulthood: Does the association differ for women and men? *Journal of Health and Social Behavior, 15*(2), 168–182.

Snyder, C. R. (2002). Hope theory: Rainbows in the mind. *Psychological Inquiry, 13,* 249–275.

Snyder, C. R., Lopez, S. J., Shorey, H. S., Rand, K. L., & Feldman, D. B. (2003). Hope theory, measurements, and applications to school psychology. *School Psychology Quarterly, 18,* 122–139.

Stanton, B., Fang, X., Li, X., Feigelman, S., Galbraith, J., & Ricardo, I. (1997). Evolution of risk behaviors over 2 years among a cohort of urban African American adolescents. *Archives of Pediatrics and Adolescent Medicine, 151,* 398–406.

Stanton, B. F., Li, X., Ricardo, I., Galbraith, J., Feigelman, S., & Kaljee, L. (1996). A randomized, controlled effectiveness trial of an AIDS prevention program for low-income African–American youths. *Archives of Pediatrics and Adolescent Medicine, 150,* 363–372.

Suldo, S. M., Savage, J. A., & Mercer, S. H. (2014). Increasing middle school students' life satisfaction: Efficacy of a positive psychology group intervention. *Journal of Happiness Studies, 15,* 19. https://doi.org/10.1007/s10902-013-9414-2.

Sznitman, S. R., Carey, M. P., Vanable, P. A., DiClemente, R. J., Brown, L. K., Valois, R. F., et al. (2010). The impact of community-based STI screening results on sexual risk behavior in African American adolescents. *Journal of Adolescent Health, 47*(1), 12–19.

Sznitman, S. R., Vanable, P. A., Carey, M. P., Hennessy, M., Brown, L. K., Valois, R. F., et al. (2011). Using culturally sensitive media messages to reduce HIV-associated sexual behavior in high-risk African American adolescents: Results form a randomized trial. *Journal of Adolescent Health, 49*(3), 244–251.

Turner, C. F., Ku, L., & Rogers, S. M. (1998). Adolescent sexual behavior, drug use, and violence: Increased reporting with computer survey technology. *Science, 280,* 867–873.

Valois, R. F. (2012). Adolescent problem behaviour and life satisfaction. In A. C. Michalos (Ed.), *Encyclopedia of quality of life and well-being research*. Dordrecht: Springer.

Valois, R. F., Hoyle, T. B. (2000). Formative evaluation results from the mariner project: A coordinated school health pilot program. *Journal of School Health*, *70*(3), 95–103.

Valois, R. F., Kammermann, S. K., & Drane, J. W. (1997). Number of sexual intercourse partners and associated risk behaviors among public high school adolescents. *Journal of Sex Education and Therapy, 22*(2), 13–22.

Valois, R. F., Kerr, J. C., Hennessey, M., DiClemente, R. J., Brown, L. K., Carey, M. P., et al. (2015). Perceived difficulty of performing selected HIV/AIDS preventive behaviors and life satisfaction: Is there a relationship for African American adolescents? *AIDS and Behavior, 19*(7), 1288–1297.

Valois, R. F., Kerr, J. C., & Kammermann, S. K. (2014). Life satisfaction and adolescent health risk behaviors. In F. Sarracino & M. Mikucka (Eds.), *Life satisfaction: Perceptions, social influences and implications for long-term health*. Nova Science Publishers: Hauppauge, New York.

Valois, R. F., Oeltmann, J. E., Hussey, J. R., & Waller, J. (1999). Relationship between number of sexual intercourse partners and selected health risk behaviors among public high school adolescents. *Journal of Adolescent Health, 25*(5), 328–335.

Valois, R. F., Zullig, K. J., Huebner, E. S., Kammermann, S. K., & Drane, J. W. (2002). Association between life satisfaction and sexual risk-taking behaviors among adolescents. *Journal of Child and Family Studies, 11*(4), 427–440.

Valois, R. F., Zullig, K. J., Kammermann, S. K., & Kershner, S. H. (2013). Relationships between adolescent sexual risk behaviors and emotional self-efficacy. *American Journal of Sexuality Education, 8,* 1–20.

Vanable, P. A., Carey, M. P., Bostwick, R. L., Brown, L. K., Valois, R. F., DiClemente, R. J., et al. (2007). Community partnerships in adolescent HIV prevention research: The experience of project iMPPACS. In B. Stanton, J. Galbraith, & L. Kalgee (Eds.), *The uncharted path from clinic-based to community-based research* (pp. 155–174). New York: Nova Science Publishers Inc.

Affiliations

Keith J. Zullig[1] · Robert F. Valois[2] · Gerald R. Hobbs[3] · Jelani C. Kerr[4] · Daniel Romer[5] · Michael P. Carey[6] · Larry K. Brown[6] · Ralph J. DiClemente[7] · Peter A. Vanable[8]

Robert F. Valois
rfvalois@mailbox.sc.edu

Gerald R. Hobbs
ghobbs@mail.wvu.edu

Jelani C. Kerr
j.kerr@louisville.edu

Daniel Romer
dromer@asc.upenn.edu

Michael P. Carey
michael_carey@brown.edu

Larry K. Brown
larry_brown@brown.edu

Ralph J. DiClemente
rjd438@nyu.edu

Peter A. Vanable
pvanable@syr.edu

[1] Department of Social and Behavioral Sciences, School of Public Health, West Virginia University, Morgantown, WV 9190-26506, USA

[2] Department of Health Promotion, Education and Behavior, Department of Family and Preventive Medicine, Schools of Public Health and Medicine, University of South Carolina, Columbia, SC 29208, USA

[3] Department of Statistics, West Virginia University, Morgantown, WV 26506, USA

[4] Department of Health Promotion and Behavioral Sciences, School of Public Health and Information Sciences, University of Louisville, Louisville, KY 40202, USA

[5] Public Policy Center, Annenberg School for Communication, Adolescent Communication Institute, University of Pennsylvania, Philadelphia, PA, USA

[6] The Centers for Behavioral and Preventive Medicine, The Miriam Hospital and Brown University, Providence, RI, USA

[7] Department of Social and Behavioral Sciences, College of Global Public Health, New YorkUniversity, New York, NY 10012, USA

[8] Department of Psychology, Center for Health and Behavior, Syracuse University, Syracuse, NY, USA