

# Controlled Evaluation of an Optimization Approach to Mental Health and Sport Performance

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Athletes experience unique stressors that have been indicated to compromise their mental wellness and sport performance, yet they underutilize mental health services. Indeed, very few mental health interventions for athletes have been developed to fit sport culture, and well-controlled mental health outcome research in athlete populations is warranted. In this randomized controlled trial, a sport specific optimization approach to concurrent mental health and sport performance (The Optimum Performance Program in Sports; TOPPS) was examined. Seventy-four collegiate athletes (NCAA = 42; club = 11; intramural = 21) formally assessed for mental health diagnostic severity were randomly assigned to TOPPS or campus counseling/psychological services as usual (SAU) after baseline. Dependent measures assessed general mental health, mood, mental health factors affecting sport performance in training, competition and life outside of sports, days using substances, sexual risk behaviors, happiness in relationships, relationships affecting sport performance, and contributions of relationship to sport performance. Intent to treat repeated measures analyses indicated that participants in TOPPS consistently demonstrated better outcomes than SAU up to 8-months post-randomization and for mental health/substance use measures, particularly when diagnostic criteria were most severe. Recommendations are provided in light of the results to assist sport-specific mental health intervention development and implementation within athlete populations.

**Keywords:** family behavior therapy, mental health, RCT, sport culture, sport performance, wellness

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As summarized by Khan et al. (2012), the enormous global popularity of sport is reflected in more than 260 million registered participants in football (soccer), with approximately 30% to 50% of older youth and young adults in developed countries regularly participating in sport. In the United States there are approximately 2.5 million students participating in intercollegiate athletics annually (National Association of Intercollegiate Athletics, 2017; National Collegiate Athletic Association [NCAA], 2016; Pennington, 2008). Most collegiate athletes participate at the intramural or club sport level (Dugan, Torrez, & Turman, 2014; Marzell, Morrison, Mair, Moynihan, & Gruenewald, 2015).

There is substantial evidence to suggest athletes derive health benefits from sport and exercise participation (Eime, Young, Harvey, Charity, & Payne, 2013; Fraser-Thomas, & Côté, 2006; Warburton, Nicol, & Bredin, 2006). Specific to mental wellness, some investigations have indicated that athletes are at lower risk to evidence psychiatric symptoms as compared with their non-athlete peers (Armstrong, Burcin, Bjerke, & Early, 2015; Donohue, Covassin, et al., 2004). However, most studies indicate severity of psychiatric symptoms in athletes tend to be similar or sometimes higher than non-athletes (Gorczyński, Coyle, Gibson, 2017; Gulliver, Griffiths, Mackinnon, Batterham, & Stanimirovic, 2015; Martens, Dams-O'Connor, & Beck, 2006; Reardon & Factor, 2010; Rice et al., 2016; Sundgot-Borgen & Torstveit, 2004).

There is support to suggest specialized mental health interventions are warranted in athletes (Donohue et al., 2016). Indeed, athletes have been indicated to experience unique stressors (Gulliver, Griffiths, & Chrisenisen, 2012; Schwenk, 2003), they are disproportionately underserved in mental health centers compared with non-athletes (Gallagher, 2005), mental health interventions customarily offered in counseling and psychological centers appear to be a poor fit for athletes (see Sudano & Miles, 2016; Watson, 2006), and very few mental health centers include mental health outreach programming for athletes (Reetz, Bershada, LeViness, & Whitlock, 2016). Furthermore, although coaches, teammates and family have been indicated to be especially important to athletes' mental health (Biggin, Burns, & Uphill, 2017; Moreland, Coxe, & Yang, 2018; Shanmugam, Jowett, & Meyer, 2013; Turrisi, Mastroleo, Mallett, Larimer, & Kilmer, 2007) and sport performance (Donohue, Miller, Crammer, Cross, & Covassin, 2007), very few mental health centers are estimated to be family-oriented (Reetz et al., 2016).

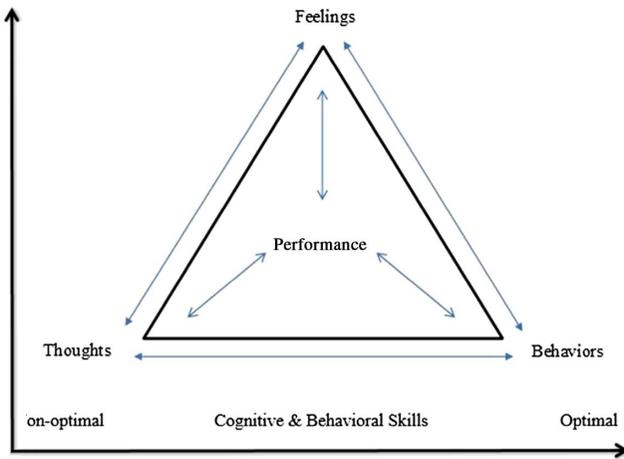
To assist athletes' access to mental health care, creative methods have been scientifically developed to increase athletes' awareness of the importance of mental health referrals (Breslin, Shannon, Haughey, Donnelly, & Leavey, 2017; Pierce, Liaw, Dobell, & Anderson, 2010; Sebbens, Hassment, Crisp, Wensley, 2016; Van Raalte, Cornelius, Andrews, Diehl, & Brewer, 2015), improve mental health knowledge and reduce social stigma experienced by athletes in their pursuit of mental health care (Bapat, Jorm, & Lawrence, 2009; Donohue, Dickens et al., 2004; Gulliver, Griffiths, Christensen, Mackinnon, et al., 2012), and successfully engage athletes into mental health intervention through normalization of problem behavior, discussion of sport culture, and goal orientation (e.g., Donohue et al., 2016). The results of these studies suggest mental health preparatory interventions increase athletes' interest in mental health care, and should be considered when developing sport-specific mental health interventions (Breslin et al., 2017). Along

these lines, there is a need to empirically adapt evidence-based mental health interventions to be tailored to athletes and inclusive of significant others (Donohue, Pitts, Gavrilova, Ayarza, & Cintron, 2013), and doing so is consistent with recommendations to adapt mental health interventions to fit unique sub-group populations (Goodheart, 2011).

Considerable effort has been made to draw attention to the importance of mental health intervention in athletes (Brown, Hainline, Kroshus, & Wilfert, 2014; NCAA Sport Science and the NCAA, 2016). However, sport-specific mental health interventions for athletes, although warranted, have been slow to develop (Donohue et al., 2013; Rice et al., 2016). More than a decade ago sport activities were innovatively integrated into cognitive behavioral treatments to reduce Attention Deficit Hyperactivity Disorder symptoms and improve sport performance outcomes in children who were not explicitly identified to be athletes (Hupp & Reitman, 1999; Reitman, Hupp, O'Callaghan, Gulley, & Northup, 2001). These efforts have continued (O'Connor et al., 2014). However, sport specific mental health interventions have only recently been evaluated in athletes with (Chow et al., 2015; Donohue et al., 2015; Gabana, 2017; Galante, Donohue, & Gavrilova, in press; Pitts et al., 2015) and without (Didymus & Fletcher, 2017; Gavrilova, Donohue, & Galante, 2017; Gross et al., 2016; Gustafsson, Lundqvist, & Tod, 2016) mental health conditions. Although these preliminary outcome studies assist in guiding intervention, only three involved controlled methodology (Chow et al., 2015; Didymus & Fletcher 2017; Gross et al., 2016). Collectively, the results of these studies support further development of Mindfulness Acceptance and Commitment (Gross et al., 2016), cognitive behavior therapy (Didymus & Fletcher, 2017; Gabana, 2017; Gustafsson, Lundqvist, & Tod, 2016), and The Optimum Performance Program in Sports (TOPPS; Chow et al., 2015; Donohue et al., 2015; Galante et al., in press; Gavrilova et al., 2017; Pitts et al., 2015).

Development of TOPPS was inspired by the tenets of Positive Psychology (Seligman & Csikszentmihalyi, 2000) and based in Family Behavior Therapy (FBT), a comprehensive intervention developed with support from the National Institute on Drug Abuse and National Institute of Mental Health to reduce substance use and other mental health concerns in adolescents and adults (e.g., Azrin et al., 1994, 2001; Donohue et al., 2014). The strength-based therapeutic style of providers is similar in TOPPS and FBT, but the theoretical underpinnings of FBT were shifted from a focus on symptom reduction to performance optimization in TOPPS. Similarly, FBT protocols were modified to fit sport culture in TOPPS. In the optimization approach, feelings, thoughts and behaviors are conceptualized to reciprocally influence performance. Therefore, intervention is focused on the optimization of cognitive and behavioral skills that facilitate performance in both sport and life outside of sport, encouraging mental health service utilization of athletes by reducing social stigma (see Figure 1). The optimization process also facilitates a state of well-being beyond the absence of psychopathology (Gavrilova & Donohue, in press). There is no assumption or need to acknowledge pathology or impairment, unlike traditional treatment models, including Family Behavior Therapy as it was originally developed.

The purpose of the current study was to conduct the first randomized clinical trial involving athletes formally assessed for mental health/substance use conditions; comparing TOPPS with campus counseling/psychological services as usual



**Figure 1** — Theoretical Model Underlying The Optimization Approach to Performance.

(SAU). This controlled study represents a significant methodological advancement in the evaluation of mental health and sport performance intervention, including (a) utilization of psychometrically validated interviews to assist formal diagnostic assessment of participants' mental health/substance use, (b) inclusion of urinalysis and hair follicle testing to complement self-reports of substance use, (c) pre-intervention assessment of participants' therapeutic expectations, (d) examination of intervention integrity in both experimental interventions, (e) assessment of treatment outcomes by trained technicians blind to experimental assignment of participants, (f) intent to treat management of missing data, (g) assessment of post-intervention consumer satisfaction/social validity, (h) and extension of follow-up assessment to 8-months post-randomization. It was predicted that TOPPS would demonstrate better outcomes than SAU from baseline to 4-months post-randomization and from baseline to 8-months post-randomization, and for mental health/substance use measures, particularly when participants were determined to evidence greater diagnostic severity.

## Method

### Participants

Participants were 74 collegiate athletes (i.e., NCAA = 42, intramural = 21, club = 11) at a Division I southwestern university. At the time of referral, participants were required to (a) be at least 18 years old, (b) participate in NCAA, intramural, or club sports at the time of referral, (c) report alcohol or non-prescribed drug use during the past 4 months, (d) be willing to have a significant other (family member, coach, teammate or peer) attend intervention meetings, (e) not be actively receiving psychotherapeutic services, and (f) have intentions of residing locally for the duration of the study (8 mos.). As can be seen in Table 1, students were

**Table 1 Participant Demographics**

Demographic	Total Sample (N = 74)		TOPPS (n = 38)		SAU (n = 36)		Statistic (t-test or chi-square)	df	Probability TOPPS & SAU groups are different
	M	SD	M	SD	M	SD			
Age in Years	20.64	2.26	20.55	1.77	20.72	2.71	$t = -.32$	72	.75
	$\lambda$	%	$\lambda$	%	$\lambda$	%			
Gender							$X^2 = .051$	1	.82
Male	38	51.4	20	52.6	18	50.0			
Female	36	48.6	18	47.4	18	50.0			
Ethnicity							$X^2 = 3.30$	5	.65
White/Caucasian	30	40.5	15	39.5	15	41.7			
Black/African-American	15	20.3	9	23.7	6	16.7			
Asian/Asian American	8	10.8	3	7.9	5	13.9			
Hispanic/Latino	16	21.6	7	18.4	9	25.0			
Pacific Islander	1	1.4	1	2.6	0	0			
Other	4	5.4	3	7.9	1	2.8			
Type of Athlete							$X^2 = 3.79$	2	.15
NCAA	42	56.8	25	65.8	17	47.2			
Club	11	14.9	3	7.9	8	22.2			
Intramural	21	28.4	10	26.3	11	30.6			
Referral Type							$X^2 = 1.67$	3	.64
Athletic Department	8	10.8	4	10.5	4	11.1			
Presentation	34	45.9	15	39.5	19	52.8			
Coach/Teammate	16	21.6	10	26.3	6	16.7			
Class Credit	16	21.6	9	23.7	7	19.4			
Class Status							$X^2 = 3.93$	3	.27
Freshman	17	23.0	7	18.4	10	27.8			
Sophomore	22	29.7	10	26.3	12	33.3			
Junior	20	27.0	10	26.3	10	27.8			
Senior	15	20.3	11	28.9	4	11.1			
Intimate Partner Status							$X^2 = 2.31$	2	.32
Single	69	93.2	37	97.4	32	88.9			
Married / Cohabiting	5	6.8	1	2.6	4	11.1			

Note. TOPPS = The Optimum Performance Program in Sports; SAU = Services as Usual;  $\lambda$  = frequency;  $X^2$  = chi-square.

approximately 21 years old, about half were female, most were Caucasian (41%), a little more than half were NCAA athletes (55%), the most common referrals were self-initiated after study presentations at team practices and campus orientation events (46%), and almost all were single (93%).

## Experimental Design

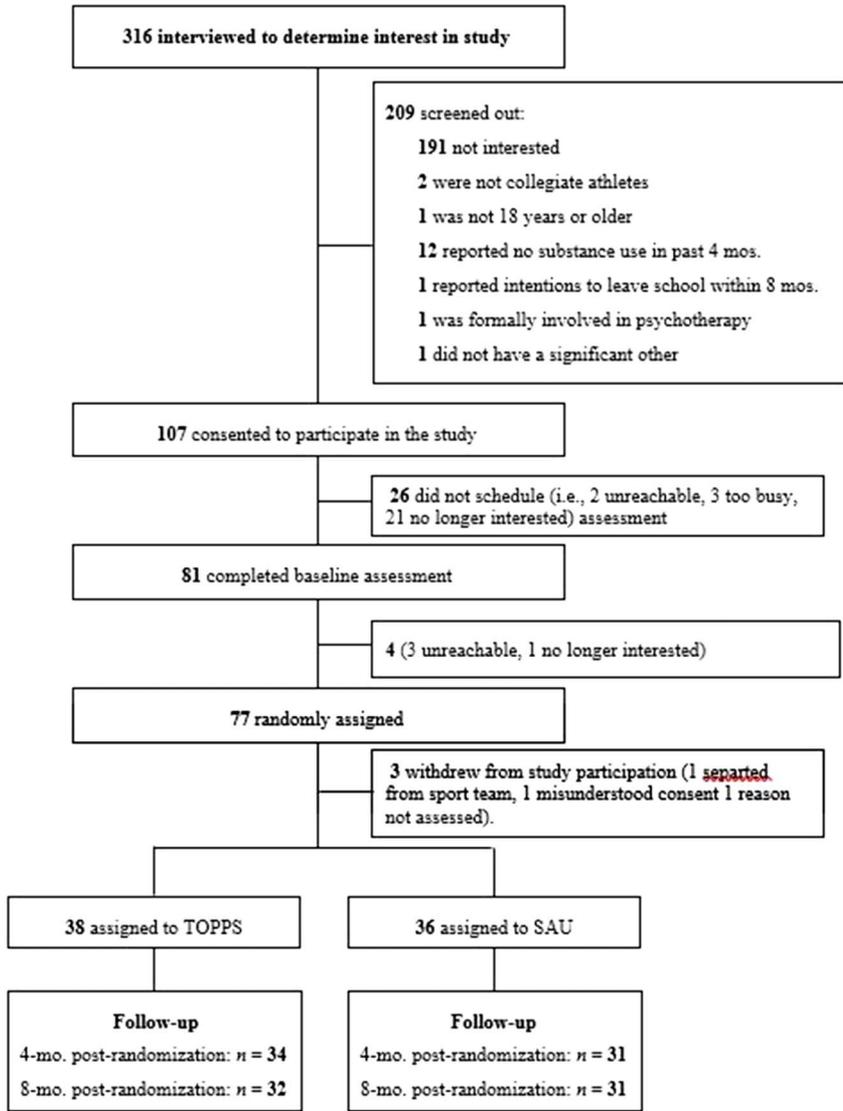
The study was conducted utilizing controlled clinical trial methodology with 2 intervention arms occurring across four months (TOPPS, SAU), three assessments occurring at baseline, 4-month post randomization, and 8-month post-randomization, urn randomization of participants to experimental conditions (urns included substance use/mental health diagnosis, type of substance, gender, ethnicity, athlete type), and intent to treat management of missing data to assist internal and external validity. Diagnostic severity for mental health (multiple diagnoses, single diagnosis, no diagnosis) or substance use (substance use diagnosis, no diagnosis) was utilized in repeated measures analyses as an additional independent variable when dependent measures were specific to mental health or substance use, respectively.

## Procedure

**Method of recruitment and flow of participants through study.** Figure 2 depicts how participants entered and were retained or exited from the study. Three hundred and sixteen collegiate athletes were interviewed from the fall of 2013 to the fall of 2016 to determine their interest in participating in one of two goal oriented programs aimed at assisting performance in sport and life. Referrals occurred through the athletics department (i.e., administrators, office of student conduct, athletic trainers, medical staff;  $n = 18$ ), coaches/teammates ( $n = 33$ ), study presentations at campus events and team workshops ( $n = 75$ ), class credit ( $n = 155$ ), and other sources ( $n = 35$ ). Most referrals ( $n = 289$ ) were randomly assigned to prescribed engagement interviews ( $n = 172$ ) or an engagement as usual interview ( $n = 117$ ), while a minority of referrals ( $n = 27$ ) were non-randomly assigned to the engagement as usual interview in a series of controlled trials that were conducted to assess efficacy of intervention engagement methods (see [Donohue et al., 2016](#) for detailed description of first controlled trial). One-hundred and seven participants met inclusionary criteria, consented to participate in the study, and were scheduled to complete baseline. Thirty-three participants withdrew from the study, with 74 participants agreeing to be randomly assigned to intervention and complete assessments. Eighty-eight percent ( $n = 65$ ) of the sample completed 4-month post-randomization assessment, and 85% ( $n = 63$ ) completed 8-month post-randomization assessment. The study was approved by the local institutional review board, and a federal certificate of confidentiality was obtained prior to initiating the trial to refute potential mandates in judicial proceedings. All participants provided written informed consent prior to participating in the study. The participants' significant others completed verbal consents. No adverse events were determined to be due to the study.

## Treatment Conditions

**The Optimum Performance Program in Sports (TOPPS).** *Format:* Twelve performance meetings of 60 to 90 minutes duration were scheduled to occur within 4 months, with meeting frequency and duration generally fading with the passage of time. Each intervention component included a protocol checklist. These



**Figure 2** — Flow chart of participant entry and exit.

checklists included a rationale for the intervention component, guidelines to assist intervention implementation, and handouts and worksheets to assist instruction. The interventions were focused on performance optimization in both sport and life outside of sport, with athletes determining personal goals and practice scenarios to review during skills training. Role-playing was extensively utilized to assist cognitive and behavioral skill acquisition. Assignments were prescribed to occur

between performance meetings. Providers encouraged participation through non-specific supportive text messages (e.g., “stay strong”) and brief telephone calls between performance meetings.

**Inclusion of significant others:** Optimal combinations of significant others (e.g., family, coaches, teammates, partners, close friends) were determined from the athlete’s social ecology during the first meeting (i.e., Orientation; see below). Significant others assisted participants in attending meetings, sharing insights, goal development, modeling skills, and performing assignments. The number of minutes significant others participated in meetings varied based on the significant other’s availability and participant’s intervention plan, and occurred in-person or through telephone or video conferencing.

**Setting:** Meetings almost always occurred in an outpatient center, although some meetings occurred in sport facilities upon the participants’ request. The outpatient center was designed to be a prototype for mental health centers serving athletes, and was decorated in motivational posters, university paraphernalia, game schedules, and pictures of athletes. A gender neutral athlete emblem was integrated into university paraphernalia and educationally-relevant and inexpensive products valued by student athletes (e.g., back packs, t-shirts, pens, water and sport drinks, energy bars). These products were distributed at university events to promote and brand TOPPS.

**Therapeutic style:** Providers were trained to emphasize positive feedback and encouragement, ignore undesired behaviors, empathize with expressed concerns, and passionately and descriptively praise thoughts, behaviors, and character attributes. Humor was utilized, and modeling, behavioral rehearsal, and imagery were extensively used. Providers used non-stigmatizing, achievement-oriented nomenclature (e.g., performance programming for treatment, goal-worthy for problem behavior).

**Optimal performance preparation:** Consistent with evidence-supported mental preparation strategies (Donohue, Barnhart, Covassin, Carpin, & Corb, 2001; Donohue, Miller, et al., 2006; Miller & Donohue, 2003), providers initiated meetings with an exercise to assist optimum mindset in an upcoming sport or life outside of sport scenario (e.g., relaxation prior to test, optimum arousal prior to game). Brainstorming was used to generate optimum thoughts and emotional intensity for the respective scenario (e.g., athlete’s positive qualities, motivation-, focus-, and relaxation-oriented self-statements), and providers modeled and instructed role-playing to practice statements aloud in the simulated scenario with appropriate timing and intensity.

**Structured meeting agendas:** To assist meeting efficiency, providers indicated which intervention components were planned at the start of each meeting, including the estimated times to implement each component. Opportunities were provided for participants to change agendas and determine how significant others would be able to assist performance planning in the meeting.

**Cultural enlightenment:** To assure sport and/or ethnic culture were sufficiently addressed throughout intervention, the psychometrically validated Semi-Structured Interview for Consideration of Ethnic Culture Scale and a similar scale for Sport Culture (see Donohue et al., 2006) were administered to assess positive and negative experiences of participants with ethnic and sport cultures (e.g., extent to which these cultures are perceived to be important, time spent doing activities

consistent with these cultures, extent to which rude or offensive remarks have been experienced due to these cultures, methods of addressing these cultures during intervention). Participants were prompted to choose if it would be helpful to discuss ethnic and/or sport culture, and if so, semi-structured interviews were utilized to prompt questions about the participants' experiences with these cultures, disclose cultural commonalities, and empathize with difficult experiences.

**Orientation:** Limits of confidentiality, format of meetings, conceptualization of optimization approach (see Figure 1), potential advantages of participation, and goal expectations were reviewed. Feelings about the referral and the participants' sports backgrounds (e.g., how participants want to be remembered, past accomplishments) were honored. Preliminary methods were generated to assist optimum performance in sport and mental performance, relationships, safe sexual activity, abstinence or controlled substance use, and betterment of others. Potential significant others (i.e., coaches, family, teammates, peers) were generated, and their role in helping the participants accomplish performance goals throughout programming were reviewed.

**Dynamic goals and rewards:** To encourage motivation for skills training, assessment findings were presented to participants to assist in the generation of personal goals. These goals were transferred to a daily monitoring form. Personal goals were both specific (e.g., attending a morning class) and non-specific (e.g., thinking positively). Participants were taught that specific goals facilitate reliability and definitive outcomes, whereas non-specific goals could be rapidly developed and flexible to accommodate dynamic discussion of achievement in multiple skill sets (i.e., facilitating generalizability of skill acquisition). The monitoring form included prescribed program goals that may or may not have been indicated in the development of personal goals (e.g., avoiding non-prescribed drug or alcohol use, optimum effort in sport activities, optimum mental strength and stability, say and do positive things to others). In meetings, participants were queried to indicate how they achieved their goals since last contact (e.g., Tell me how you were able to maintain optimum relationships with others on Monday.). Discussion was focused on determining strategies, thoughts and actions that were consistent with goal achievement. Descriptive praise and role-playing was used to demonstrate and practice skills. Contingent rewards and/or support for goal accomplishment from significant others were provided. Plans for goal accomplishment for the upcoming week were reported by participants, and significant others were prompted to indicate how goal accomplishment would be rewarded and/or supported.

**Performance planning:** To assist participants in prioritizing the extent to which intervention components were emphasized throughout the program, and to increase motivation for participation, participants and their significant others each ranked the 14 intervention components in order of preference from a menu. Interventions were implemented in subsequent meetings sequentially and cumulatively based on the arithmetic average of their rankings.

**Goal inspiration:** To inspire motivation for goal achievement, participants were prompted to review negative consequences of their undesired thoughts and behaviors while providers listened, empathized, and subsequently solicited positive consequences for future goal achievement. Motivation was also inspired by soliciting positive consequences for goal oriented behavior from participants. The

responses of participants were recorded and utilized during meetings to enhance motivation.

**Communication skills training:** To encourage optimal communication, participants and their significant others were prompted to exchange statements of appreciation, usually towards the beginning of each performance meeting. When participants experienced disagreements with their significant others, they were taught to assertively and respectfully initiate positive requests (e.g., requesting a coach to change practice routines, requesting a partner to use a condom). Written prompts were used to teach skills impromptu or during role-plays (i.e., request a specific action, indicate why request is important, indicate action would be appreciated, offer to do something to make it easier for person to do action, offer to do something for the other person if action performed, offer and solicit acceptable alternative actions).

**Career development:** Athletes were encouraged to brainstorm career options to assist generation of a “dream job.” Supportive others assisted participants in generating positive consequences for the dream job, facilitated the development of actions and potential resources to assist accomplishment of the dream job, and assisted in the review and visualization of potential job experiences to build excitement.

**Job-getting skills training:** Participants were taught job interviewing skills and methods of soliciting job interviews through networking and professional solicitation of direct contacts with potential employers. Significant others were recruited to assist networking and interviewing skill development.

**Financial management:** Participants were taught to determine their current and anticipated income and desired lifestyle. Participants utilized standardized prompts from the worksheets and incorporated advice from significant others to learn methods of increasing income and decreasing expenses for both the present and future.

**Environmental control:** People, places, activities and emotions compatible and incompatible with goal attainment were brainstormed and recorded on a list. In future meetings, optimum actions and thoughts that occurred, or could have occurred, when spending time with these stimuli since last contact were reviewed. Performance coaches and significant others assisted participants in generating methods of effectively managing these stimuli to assist goal accomplishment through optimal skills. Participants were assigned to practice the developed skills and these efforts were reviewed during future meetings to assist optimization.

**Self control:** Mental skills were taught sequentially using a series of prompts in a worksheet. First, problem behaviors and thoughts that were experienced since the last meeting or that were likely to occur in the future were generated (e.g., swearing at teammate during practice, desire to use drugs or alcohol). For each problem behavior or thought, participants were taught to determine the initial thought that led to the undesired action, and to sequentially practice cognitive and behavioral skills that would likely optimize performance in the adverse situation, including focus statements (e.g., “focus”), motivational statements (e.g., it’s important to keep our relationship positive), cue-controlled relaxation and diaphragmatic breathing, brainstorming potential solutions (e.g. I can ask him what he thinks will solve the problem, I can ask to meet after practice to work it out

one-on-one), imagining successful performance of one or more of the selected options, and imagining positive consequences due to having successfully performed one or more of the selected solutions. Performance coaches provided prompts and constructive feedback during practice trials, and significant others assisted in modeling skills and providing descriptive praise and support. Participants were assigned to practice these Self Control skills, and practice attempts were reviewed during subsequent meetings to assist optimization.

**Meeting conclusion:** At the end of each meeting, performance coaches and athletes reviewed beneficial aspects of skills practiced during the meeting, methods of assuring practice assignments were completed, and significant other involvement for next meeting.

### **Campus Counseling/Psychological Services as Usual (SAU)**

Services as usual occurred at a counseling and psychological services center. The services offered to participants were consistent with mental health services customarily offered to university students throughout the United States, and varied according to provider orientation and qualifications, and duration and intensity of intervention (Galloway et al., 2000). No attempt was made to standardize SAU in this study to assist its external validity (Henggeler, Scott, Clingempeel, Brondino & Pickrel, 2002), although sessions were monitored through session digital audio recordings to permit a valid comparison of TOPPS to “real world” arrangements (Rawson et al., 2004). Participants were permitted to receive up to 12 office-based outpatient sessions. Sessions were scheduled to occur on a weekly or bi-weekly basis. Each session was approximately 50 minutes in duration. All participants were required to receive an intake session prior to being assigned to clinical treatment. The intake session included the completion of consent for treatment for the clinic, collection of contact and demographic information, assessment of presenting concerns, development of preliminary goals for treatment, and review of services. All participants completed individual sessions, although group and couples counseling were available, including mindfulness, yoga and international, academic, and social confidence student support groups. Other cost-free available services included referrals to other providers, and for a small fee, medication evaluations and psychological testing,

### **Method of Training and Assessing Intervention Fidelity in TOPPS Providers**

Six providers of TOPPS initiated this study as first or second year students in a Ph.D. clinical psychology program (three with a Masters, three with a Bachelors). A post-doctoral fellow additionally provided services for the first participant. Prior to this study none of the providers had experience implementing prescribed interventions. Each provider received training in TOPPS from a licensed clinical psychologist through behavioral role-playing prior to intervention implementation, and was required to demonstrate at least 80% protocol adherence in each of the TOPPS intervention components in a pilot case prior to the trial. Providers attended approximately 24 hours of workshop training and 90 to 120 minutes of weekly training/group supervision throughout their involvement in the study. These

meetings were focused on intervention planning and maintenance of intervention adherence.

Performance meetings were assessed using digital audio recordings. For each intervention component, validity estimates of intervention integrity were determined by having the provider compute the number of protocol instructions that were reported to have been implemented, and dividing this number by the total number of prescribed protocol instructions. Inter-rater reliability was determined by comparing the scores of providers with the scores of independent raters. Reliability and validity for this method are well-established (Sheidow, Donohue, Hill, Henggeler, & Ford, 2008).

## Method of Assessing Intervention Fidelity in Services as Usual Providers

Services as Usual sessions were implemented by one licensed psychologist, one post-doctoral fellow of clinical psychology, and one non-licensed Masters-level marriage and family therapist. Sessions were assessed using digital audio recordings. The Yale Adherence and Competence Scale (YACS) was used to determine adherence to intervention and competency of providers (Carroll et al., 2000), including general (Assessment, General Support, Supplemental Information) and critical (Cognitive Behavioral Therapy, Interpersonal Therapy, Motivational Interviewing Clinical Management, Twelve Step) aspects of therapy. For each domain, scores are derived for intervention integrity (1 = not at all, 7 = extensively) and skill level (1 = very poor, 7 = excellent). A licensed clinical psychologist from the community and research assistant performed independent ratings using the YACS.

## Measures

Structured clinical interviews were administered at baseline to assess demographic, background and mental health/substance use diagnostic information. A credibility measure was administered after randomization and prior to treatment to assess participant expectancy effects with their assigned intervention. Standardized outcome measures were administered at baseline, and 4- and 8-months post randomization, and program satisfaction questions were administered 4- and 8-months post-randomization to assess social validity. Assessments were administered by trained technicians in a neuropsychology clinic that operated independently from the intervention programs. The assessment measures were selected due to their psychometric support and study relevance. Assessors were not informed of the participants' intervention assignment, and no blinks were assessed to be broken. Participants were reimbursed for their time completing assessments (\$25 for baseline assessment and \$70 for the post-randomization assessments).

A structured interview was used to assess demographic and background information.

The Structured Clinical Interview for DSM-IV (SCID-IV; First, Spitzer, Gibbon, & Williams, 2002) was used to assess Axis I diagnoses consistent with the Diagnostic and Statistical Manual of Mental Disorders (4th ed., text

rev.; DSM-IV-TR; American Psychiatric Association, 2000), with substance abuse and dependence scales modified to be consistent with DSM-V criteria. The SCID has demonstrated reliability and validity in non-collegiate adult populations (Kranzler, Kadden, Babor, Tennen, & Rounsavill, 1996; Spitzer, Williams, Gibbon, & First, 1992), and has demonstrated clinical utility in studies involving collegiate athletes (e.g., Donohue et al., 2015).

A Credibility Questionnaire was administered due to the importance of assessing intervention expectancies (Deville & Borkovec, 2000). Participants were queried to indicate how helpful (1 = extremely unhelpful, 7 = extremely helpful) they expected their assigned intervention would be in: (a) "sport performance," (b) "relationships," (c) "avoiding substance use," (d) "avoiding sexually transmitted infections," (e) "mental health," and (f) "other areas of life." Item responses were summed to obtain a total scale score (higher scores indicate greater expectancies).

The Global Severity Index of Symptom Checklist 90 – Revised (GSI; Derogatis, Rickels, & Rock, 1976) was used to assess overall mental health symptom severity. The GSI includes 90 items (e.g., "Feeling afraid in open spaces or on the streets") that assess the extent to which participants are bothered by mental health symptoms using a five-point Likert-rating scale (0 = Not at all, 4 = Extremely). Item responses were summed to obtain a total score (higher scores indicate greater mental health severity). Reliability and validity of the GSI is well-established in community samples (e.g., Derogatis, 1994; Horowitz, Rosenberg, Baer, Ureño, & Villaseñor, 1988), and college students (Martinez, Stillerman, & Waldo, 2005; Todd, Deane & McKenna, 1997). The GSI has demonstrated clinical utility in collegiate athletes (Donohue et al., 2004, 2015).

The Beck Depression Inventory II (BDI-II; Beck, Steer, & Brown, 1996) was used to assess severity of depressive symptoms. The BDI-II includes twenty-one items that are rated on a 0 to 3 scale of increasing symptom severity (e.g., "I am not sad," "I feel sad," "I am sad all the time and I can't snap out of it," "I am so sad and unhappy that I can't stand it"). Items responses were summed to obtain a total score (higher scores indicate greater depressive symptoms). The BDI has been found to be reliable and valid in both general outpatient and college student populations (Beck et al., 1996), and scores on the BDI-II are consistent with DSM-TR semi-structured interview data obtained from collegiate student athletes (Hammond, Gialloredo, Kubas, & Davis, 2013).

The Sport Interference Checklist (SIC; Donohue, Silver, Dickens, Covassin, & Lancer, 2007) was used to assess mental health associated factors negatively affecting training (Problems in Sport Training Scale; PSTS), competition (Problems in Sport Competition Scale; PSCS), and life outside of sports (Problems with Life Outside of Sports; PLOS). Each inventory includes the same 26 item stems (e.g., "How often does feeling stressed out interfere with your performance in" . . . *training, competition, life outside of sports*). Items are scored using a 7-point Likert-scale (1 = never, 7 = always) and summed to obtain total scores for each inventory (higher scores indicate greater interference). The PSTS and PSCS have been found to be reliable and valid in collegiate athletes (Donohue et al., 2007), whereas the PLOS was developed in the current study to assist in determining how athletes are affected by these factors outside of sport participation.

The Timeline Follow-Back assessment procedure (TLFB; Sobell, Sobell, Klajner, Paven, & Basian, 1986) involves a calendar with pre-recorded memory anchors (e.g., parties) to assist retrospective estimates of days using alcohol and non-prescribed drugs, and days having unprotected sexual intercourse during the 30 days prior to assessment. A five-panel urinalysis test (anabolic steroids, barbiturates, benzodiazepines, oxycodone, amphetamines; Redwood Toxicology, Inc.) and five-panel hair-follicle toxicology test (cocaine, opiates, methamphetamines, phencyclidine, tetrahydrocannabinol/THC; Omega Labs) were utilized to corroborate TLFB self-reports. The TLFB format has been found to be reliable and valid in assessing substance use and other problem behaviors in collegiate populations (Panza, Weinstock, Ash, & Pescatello, 2012; Sobell et al., 1986), and has demonstrated clinical utility in collegiate athletes (Donohue et al., 2015).

The Student Athlete Relationship Instrument (SARI; Donohue, Miller et al., 2007) was used to assess sport specific problems in relationships with Family, Coaches, Teammates, and Peers. The SARI includes 63 items (e.g., “At least one of my teammates has a negative attitude towards me.”). Items are rated using a 7-point Likert scale (1 = extremely disagree, 7 = extremely agree), and summed to obtain a total score (higher scores indicate greater problems). The SARI has demonstrated reliability and validity in collegiate athletes (Donohue, Miller, et al., 2007).

Overall Happiness with Family, Coaches, Teammates and Peers (Donohue, Miller, et al., 2007) were each assessed using a single 0 to 100 scale of happiness (0 = completely unhappy, 100 = completely happy). Responses were averaged to obtain a total score (higher scores indicate greater happiness). The overall happiness ratings have demonstrated concurrent validity in high school and collegiate athletes (Donohue, Miller, et al., 2007).

Overall Contributions to Sport by Family, Coaches, Teammates and Peers (Donohue, Miller, et al., 2007) were each assessed using a single 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). Responses were averaged to obtain a total score (higher scores indicate greater contribution to sport). The clinical utility of these scales have been demonstrated in high school and collegiate athletes (Donohue, Miller, et al., 2007).

The Sexual Risk Scale of the Risk Assessment Battery (RAB; Metzger, Woody, & Navaline, 1993) is an 18-item scale used to assess sexual activity that may lead to risk of sexually transmitted infections. Each item is rated on a zero to three scale of severity. Responses were summed to obtain a total score (higher scores indicate greater risk). In community samples, the RAB has demonstrated test-retest reliability and validity, although its internal consistency is poor (Metzger et al., 1993). The RAB has demonstrated clinical utility in collegiate athletes (Chow et al., 2015).

The Client Satisfaction Questionnaire-8 (CSQ-8; Attkisson & Zwick, 1982) was used to assess participants' satisfaction with services received. Eight items (e.g., How would you rate the quality of the service you received?) are rated on 4-point Likert scales of increasing satisfaction (1 = poor, 4 = excellent). Responses are averaged to obtain a total score (higher scores indicate greater program satisfaction). In various community and clinical samples the CSQ-8 has demonstrated acceptable reliability and validity (Attkisson & Zwick, 1982; Kelly et al., 2017), and clinical utility in college students (McIndoo, File, Preddy, Clark, & Hopko, 2016).

## Results

### Preliminary Analyses

**Diagnostic severity.** Twenty-three (31%) of the participants were formally diagnosed with a current substance use disorder (i.e., according to SCID), 46 (62%) were diagnosed with a current or past substance use disorder (the most frequently diagnosed condition), 59 (80%) evidenced a current or past mental health disorder (including substance use disorder). Eight of the participants (11%) evidenced current multiple diagnoses, 26 (35%) evidenced one current diagnosis, and 40 (54%) did not evidence a current diagnosis.

**Treatment expectancies.** There were no significant differences between TOPPS and SAU groups in credibility scores,  $t(72) = -.42$ ,  $p = .68$ , indicating no differences in expectancy outcomes upon notification of experimental condition assignment (and before intervention participation).

**Intervention attendance.** TOPPS participants attended an average of 9.79 meetings ( $SD = 3.74$ ), and of those sessions 4.92 ( $SD = 3.46$ ) meetings were attended by significant others. SAU participants attended an average of 0.83 meetings ( $SD = 2.27$ ), and no significant others attended SAU meetings. Participants in TOPPS attended significantly more intervention meetings than SAU participants,  $t(61.78) = 12.50$ ,  $p < .001$ .

**Baseline comparisons of experimental conditions.** Chi-square and one-way ANOVAs were used to compare intervention groups in categorical and continuous demographic and outcome variables, respectively. Results indicated no differences between intervention groups in these measures ( $ps > .05$ ).

**Intervention fidelity of providers of TOPPS.** According to TOPPS providers, 87% of the prescribed protocol instructions were implemented, ranging from 69% (Job Getting Skills) to 99% (Cultural Enlightenment), suggesting a high level of adherence. Digital audio recordings of approximately 24% of the performance meetings were randomly selected for review by independent reviewers. The providers' scores were compared with the independent raters' scores to assess intervention fidelity. Average inter-rater reliability for all protocols was 93%, suggesting the providers' estimates were reliable.

**Intervention fidelity of providers of SAU.** Seventy-eight percent of SAU sessions were randomly coded by an expert (i.e., licensed clinical psychologist from the community trained in YACS). The expert's frequency ratings ranged from 1.64 (CBT) to 4.3 (Motivational Interviewing) and the expert's skill ratings ranged from 3.9 (Assessment) to 4.0 (General Support, CBT, Interpersonal Therapy, Motivational Interviewing). The expert indicated that Supplemental Information, 12-Step, and Clinical Management were not performed. One single overall skill rating was also provided for each session. The expert's overall session skill level rating average was 3.6. Forty-three percent of the intervention sessions that were rated by the expert were independently rated for integrity (frequency) and competence (skill level) by a graduate research assistant trained in YACS. Percentage agreement for implementation frequency ranged from 46% (General Support) to 95% (CBT)

and percentage agreement for skill level ranged from 87% (Interpersonal Therapy) to 100% (Assessment, Supplemental Information). Both raters agreed that 12-Step and Clinical Management were not reviewed. The raters' agreement with an independent rater for the overall skill ratings for each of the sessions was 83%, suggesting the experts' estimates were reliable.

**Comparison of experimental conditions on assessment completion.** A Chi-square analysis was utilized to examine potential differences in proportions of participants in each experimental condition that completed 4- and 8-month post-randomization assessments. There were no differences in assessment completion between intervention groups at 4-months post randomization ( $\chi^2 = .01, p = .93$ ) or 8-months post-randomization assessment ( $\chi^2 = .05, p = .81$ ).

## Primary Analyses

**Examination of mental health and mental health factors interfering with sport performance.** Means, standard deviations and Cohen's *d* effect sizes for mental health and mental health factors interfering with sport performance for participants in TOPPS and SAU by diagnostic severity across time are presented in Table 2. Two (TOPPS, SAU) X 3 (multiple, single, no diagnosis) X 3 (baseline, 4-month post randomization, 8-month post-randomization) repeated measures ANOVAs were conducted for mental health (Global Scale for SCL90R, BDI) and mental health factors interfering with sport performance in training, competition and life outside of sports (PSTS, PSCS, PLOS). Results indicated significant time by intervention interactions from baseline to 4-months post-randomization for GSI ( $F(1,68) = 12.50, p = .001$ ), BDI ( $F(1, 68) = 10.22, p = .002$ ), SIC Training ( $F(1, 68) = 11.44, p = .001$ ), SIC Competition ( $F(1, 68) = 6.92, p = .01$ ), and SIC Life Outside of Sports ( $F(1, 68) = 8.20, p = .01$ ), showing TOPPS led to better outcomes than SAU. There was a significant time by intervention by diagnostic severity interaction from baseline to 4-month post-randomization for SIC training ( $F(2,68) = 3.36, p = .04$ ); participants in TOPPS demonstrated significantly better outcomes in Training than SAU, particularly when participants evidenced greater diagnostic severity. There were significant baseline to 8-months post-randomization interactions for time by intervention in GSI ( $F(1,68) = 16.45, p < .001$ ), BDI ( $F(1,68) = 8.97, p = .004$ ), SIC Training ( $F(1,68) = 5.80, p = .02$ ), SIC Competition ( $F(1,68) = 4.57, p = .04$ ), and SIC Life Outside of Sports ( $F(1,68) = 7.69, p = .01$ ). Significant baseline to 8-months post-randomization interactions were found for time by intervention by diagnostic severity in GSI ( $F(2,68) = 3.50, p = .04$ ), BDI ( $F(2,68) = 3.52, p = .04$ ), and SIC Training ( $F(2,68) = 3.12, p = .05$ ), suggesting TOPPS demonstrated better outcomes than SAU on these latter measures from baseline to 8-months post-randomization, particularly when participants evidenced greater diagnostic severity. To determine the magnitude of these effects, Cohen's *d* effect sizes were calculated for participants in both intervention groups for these measures from pre- to 4-month randomization and pre- to 8-month randomization. For participants in TOPPS, the magnitude of effect sizes consistently increased from medium to very large as severity increased, and for participants in SAU the effect sizes were generally very small to small. Thus, the effect sizes were consistent with inferential statistics and suggest improvement in TOPPS was meaningful.

**Table 2 Means, Standard Deviations, and Effect Sizes of Mental Health & Sport Performance at Baseline, 4-Month Post-randomization, 8-Month Post-randomization by Mental Health Diagnostic Severity (Multiple Diagnosis, Single Diagnosis, No Diagnosis) (N = 74)**

	TOPPS (n = 38)												SAU (n = 36)														
	Baseline				4-month post-randomization				8-month post-randomization				Baseline				4-month post-randomization				8-month post-randomization						
	M	SD	d		M	SD	d		M	SD	d		M	SD	d		M	SD	d		M	SD	d				
<b>SCL-90-R</b>																											
Multiple Dx.	1.21	0.61	0.09	1.74	0.45	0.09	1.74	0.35	0.09	1.97	0.81	0.67	0.73	0.64	0.12	0.80	0.71	0.01									
Single Dx.	0.90	0.73	0.41	0.50	0.78	0.39	0.42	0.86	0.43	0.44	0.43	0.40	0.38	0.10	0.44	0.50	0.00										
No Dx.	0.40	0.44	0.27	0.33	0.33	0.23	0.22	0.49	0.36	0.26	0.32	0.30	0.14	0.31	0.29	0.18											
Total	0.63	0.62	0.33	0.39	0.58	0.30	0.30	0.68	0.45	0.41	0.41	0.40	0.10	0.43	0.46	0.05											
<b>BDI</b>																											
Multiple Dx.	20.67	5.86	7.33	3.06	2.85	5.67	2.08	3.41	17.00	10.42	18.20	11.63	-0.11	17.20	12.68	-0.02											
Single Dx.	15.85	9.73	5.92	5.82	1.24	7.15	6.80	1.04	10.15	9.37	5.92	7.03	0.51	7.38	9.20	0.30											
No Dx.	6.95	7.25	4.95	5.23	0.32	4.36	4.35	0.43	8.22	6.03	7.83	7.76	0.06	5.39	4.09	0.55											
Total	11.08	9.38	5.47	5.25	0.74	5.42	5.26	0.74	10.14	8.29	8.58	8.82	0.18	7.75	8.44	0.29											
<b>SIC – Training</b>																											
Multiple Dx.	101.00	19.52	53.00	12.00	2.96	55.33	5.86	3.17	86.00	31.04	84.60	23.56	0.05	81.60	26.42	0.15											
Single Dx.	75.85	28.29	60.23	20.17	0.64	64.62	23.26	0.43	73.62	27.65	65.38	23.13	0.32	61.23	20.91	0.51											
No Dx.	59.00	19.52	49.30	18.09	0.52	50.23	17.41	0.47	65.50	22.57	61.94	25.89	0.15	61.06	25.53	0.18											
Total	68.08	25.58	53.33	18.76	0.66	55.55	19.87	0.55	71.28	25.88	66.33	25.10	0.19	63.97	24.45	0.29											

(continued)

**Table 2 (continued)**

	TOPPS (n = 38)						SAU (n = 36)									
	Baseline		4-month post-randomization		8-month post-randomization		Baseline		4-month post-randomization		8-month post-randomization					
	M	SD	M	SD	d	M	SD	M	SD	d	M	SD	d			
<b>SIC – Competition</b>																
Multiple Dx.	93.67	21.22	58.00	8.72	2.20	55.00	6.56	2.46	81.20	22.49	76.60	24.38	0.20	77.60	21.15	0.16
Single Dx.	71.31	27.28	54.85	18.28	0.71	61.31	21.43	0.41	75.00	25.18	65.38	21.50	0.41	65.31	22.03	0.41
No Dx.	58.09	20.39	47.80	20.70	0.50	48.64	16.50	0.51	65.44	18.97	61.17	21.56	0.21	59.56	23.20	0.28
Total	65.42	24.71	51.01	19.26	0.65	53.47	18.48	0.55	71.08	22.06	64.83	21.89	0.28	64.14	22.72	0.31
<b>SIC - Life Outside of Sport</b>																
Multiple Dx.	105.00	14.73	66.67	12.34	2.82	68.67	8.14	3.05	96.60	29.13	85.40	21.27	0.44	97.20	23.27	-0.02
Single Dx.	85.00	23.54	66.38	25.29	0.76	69.31	24.78	0.65	73.69	20.46	69.92	20.42	0.18	64.31	13.94	0.54
No Dx.	62.50	23.41	51.52	22.10	0.48	53.05	21.46	0.42	60.11	20.40	59.56	23.77	0.02	57.33	26.20	0.12
Total	73.55	26.49	57.80	23.42	0.63	59.84	23.01	0.55	70.08	24.48	66.89	23.43	0.13	65.39	25.30	0.19

*Note.* TOPPS = The Optimum Performance Program in Sports, SAU = Services as Usual, SCL-90-R = Symptom Checklist-90-Revised, BDI = Beck Depression Inventory, SIC = Sport Interference Checklist; *d* = Cohen's *d* effect size (comparing pre to post, pre to follow-up; .2 = small effect, .5 = medium effect, .8 = large effect).

**Overall and sport-specific relationships.** Means, standard deviations and Cohen's  $d$  effect sizes for relationship variables are presented in Table 3 for participants in TOPPS and SAU. Independent samples  $t$ -tests were conducted using intervention type (TOPPS, SAU) as an independent variable and mean differences from pre-intervention assessment to 4-months post-randomization, and pre-intervention assessment to 8-months post-randomization, in the following scales: SARI, contribution of family, teammates, coaches, and peers to sport performance, overall happiness with family, teammates, coaches, and peers, as dependent variables. The SARI scores were significantly more improved for TOPPS participants, as compared with participants in SAU, from baseline to 4-months post-randomization ( $t(68.98) = 2.06, p = .02$ ), but not baseline to 8-months randomization ( $p = .08$ ). The intervention by time interaction for contributions to sport performance was not significant from baseline to 4-months randomization ( $p = .06$ ), but was from baseline to 8-months randomization ( $t(72) = -1.68, p = .05$ ). The intervention by time interaction was not significant for Overall Happiness from baseline to 4-months randomization ( $p = .11$ ), but was from baseline to 8-months randomization ( $t(72) = -1.73, p = .04$ ). Cohen's  $d$  effect sizes indicated that for participants in TOPPS the magnitude of effects for these measures was consistently larger than SAU, particularly for SARI and contributions of significant others to sport performance.

**Sexual risk behaviors.** Means, standard deviations, and Cohen's  $d$  effect sizes for Sexual Risk Scale of RAB and TLFB number of days of unprotected sex are presented in Table 3 for participants in TOPPS and SAU. Independent samples  $t$ -tests were conducted using intervention type (TOPPS, SAU) as the independent variable and mean differences from baseline to 4-months post-randomization and baseline to 8-months post-randomization for sexual risk behavior and days of unprotected sex as dependent variables. The aforementioned results were consistent with effect sizes.

**Substance use.** As indicated in Table 4, two repeated measures ANOVAs were employed across time (baseline to 4-month post-randomization, baseline to 8-months post-randomization) utilizing treatment type (TOPPS, SAU) and current substance use disorder diagnosis (yes, no) as independent variables and substance use days as the dependent variable. The baseline to 4-month repeated measure analysis indicated significant intervention by time ( $F(1,70) = 4.55, p = .04$ ) and intervention by time by diagnosis ( $F(1,70) = 5.31, p = .02$ ) interactions. No significant interactions were found from baseline to 8-months post-randomization ( $ps > .05$ ). These results show TOPPS demonstrated significantly better outcomes in substance use from baseline to 4-months post-intervention only, particularly when participants evidenced greater diagnostic severity. Effect sizes indicated that for participants in TOPPS the magnitude of effect was small (non-diagnosed participants) to medium (diagnosed participants) from baseline to 4-months post-randomization, whereas for participants in SAU there was a medium effect size during this time period for non-diagnosed participants and when diagnosed with a substance use disorder negative medium effect sizes (noticeably higher use from baseline to 4-months post-randomization). From baseline to 8-months, participants in both intervention groups demonstrated negative effect sizes.

**Consumer satisfaction.** Means and standard deviations for CSQ-8 at 4- and 8-months post-randomization are presented in Table 5 for experimental groups,

**Table 3 Means, Standard Deviations, and Effect Sizes for Measures of Significant Other-Based Sport Problems (SARI), Contribution of Significant Others to Sport Performance, Overall Happiness With Significant Others, Days of Unprotected Sex (TLFB), & Sexual Risk Behaviors (RAB) at Baseline, 4-Month Post-Randomization, 8-Month Post-Randomization (N = 74)**

	TOPPS (n = 38)						SAU (n = 36)									
	Baseline		4-month post-randomization		8-month post-randomization		Baseline		4-month post-randomization		8-month post-randomization					
	M	SD	M	SD	d	M	SD	d	M	SD	d	M	SD	d		
SARI Total	2.62	0.99	2.14	0.88	.51	2.33	1.16	0.27	2.36	0.73	2.25	0.83	0.14	2.31	0.89	0.06
Significant Other Contributions to Sport	5.59	0.73	5.95	0.68	.51	5.85	0.67	0.37	5.78	0.77	5.86	0.89	0.10	5.73	0.82	-0.06
Overall Happiness w/Significant Others	77.83	14.59	83.32	17.34	.34	85.39	10.74	0.59	81.74	11.72	84.93	12.71	0.26	86.04	8.67	0.42
TLFB – days of unprotected sex	2.24	4.14	1.95	4.39	.07	2.40	4.25	-.04	2.61	5.74	3.69	10.14	-.13	2.99	4.10	-.08
Sexual Risk (RAB)	3.68	2.13	3.24	1.85	.22	3.76	2.05	-.04	3.75	2.10	3.86	1.82	-.06	3.92	1.83	-.09

*Note.* TOPPS = The Optimum Performance Program in Sports, SAU = Treatment as Usual, SARI = Student Athlete Relationship Instrument, TLFB = Timeline Follow Back, RAB = Risk Assessment Battery; *d* = Cohen's *d* effect size (comparing pre to post, pre to follow-up, .2 = small effect, .5 = medium effect, .8 = large effect).

**Table 4 Means, Standard Deviations, and Effect Sizes for Days Using Substances at Baseline, 4-Month Post-randomization, 8-Month post-randomization by Substance Use Diagnostic Severity (Substance Use Diagnosis, No Diagnosis) (N = 74)**

	TOPPS (n = 38)						SAU (n = 36)									
	Baseline		4-month post-randomization		8-month post-randomization		Baseline		4-month post-randomization		8-month post-randomization					
	M	SD	M	SD	d	M	SD	d	M	SD	d	M	SD	d		
TLFB																
Substance Use Dx	8.18	10.48	4.00	4.54	0.52	12.20	10.76	-0.38	6.75	6.22	12.08	10.95	-0.60	13.75	11.38	-0.76
No Substance Use Dx	5.19	5.50	3.76	4.98	0.27	5.82	6.56	-0.10	5.21	6.55	3.42	3.24	0.35	4.63	5.52	0.10
Total	6.05	7.27	3.83	4.80	0.36	7.67	8.37	-0.21	5.72	6.40	6.31	7.86	-0.08	7.67	8.93	-0.25

Note. TOPPS = The Optimum Performance Program in Sports; SAU = Services as Usual; TLFB = Timeline Follow Back; d = Cohen's d effect size (comparing pre to post, pre to follow-up, .2 = small effect, .5 = medium effect, .8 = large effect).







including verbatim comments. These groups were compared on the CSQ-8 utilizing independent samples *t*-tests. Results indicated that participants in TOPPS were significantly more satisfied with their intervention than participants in SAU at 4-months post-randomization ( $t(32.85) = 4.70, p < .001$ ) and 8-months post-randomization ( $t(30.18) = 4.36, p < .001$ ).

In TOPPS, 14 participants provided comments at 4-months post-randomization, and 9 provided comments at 8-months post-randomization; all were positive. Five themes were identified in the narrative responses of participants receiving TOPPS: (a) strengths of providers and interventions (e.g., enthusiastic and supportive counselors, variety of interventions offered to address situations, focus on the individual), (b) improved personal growth (e.g., rejuvenated in how self and others are viewed, better person, growth in a positive way, insight into personal problems, confidence in resisting temptation/marijuana in future), (c) decreased stress and greater relaxation, (d) improved mental skills assisting sport performance (e.g., overcoming mental barriers to sport, obtaining tools to stay focused in sport, school, and life), and (e) improved relationships (e.g., enjoying friends and family, helpful communication strategies).

In SAU, 8 participants provided comments at 4- and 8-months post-randomization. At 4-months post-randomization SAU comments were generally negative or neutral, whereas at 8-months post-randomization the comments were mostly positive or neutral. Five themes were identified in the narrative responses of participants receiving SAU: (a) strengths of providers (e.g., great people, very helpful/understanding, learning how things affected life on and off the field), (b) desire to have easier access to services (e.g., desire for more sessions/not having enough sessions, need to better inform others of available services, difficulties scheduling sessions), (c) emphasis on pathology (e.g., focus on extreme problems and not smaller issues), (d) preferring TOPPS over SAU, and (e) unable to address sport (i.e., providers not knowing how to help in sports psychology).

## Discussion

The purpose of the current study was to conduct the first randomized clinical trial involving athletes formally assessed for mental health/substance use conditions; comparing TOPPS with SAU. As hypothesized, the study results indicated that participants in TOPPS, as compared with participants in SAU, reported greater improvements in overall mental health, mood, and mental health factors interfering with performance in sport competition, sport training, and life outside of sports up to 8-months post-randomization. For mental health measures and factors interfering with sport performance training, these improvements were especially pronounced in participants who evidenced greater mental health severity. Participants in TOPPS also demonstrated greater improvements in overall happiness with significant others and contributions of significant others to sport performance from baseline to 8-months randomization, as well as sport specific problems due to relationships with significant others from baseline to 4-months post-randomization. TOPPS was more efficacious than SAU in decreasing substance use while in the program, and TOPPS and SAU were not efficacious in reducing sexual risk behaviors.

Participants in both intervention groups were generally satisfied with services, although compared with participants in SAU, participants in TOPPS attended more intervention meetings and reported significantly greater satisfaction. Qualitative responses were consistent with previous research suggesting SAU's typically do not address sport-related factors (Sudano & Miles, 2016; Watson, 2006) and evidence scheduling difficulties (Misner, 2014). We believe there were replicable factors that led TOPPS to be particularly engaging, including: (a) branding clinic aesthetics to be sport relevant, (b) focusing on performance and optimization rather than the elimination of pathology, (c) implementation of semi-structured engagement interviews prior to intervention, (d) not requiring athletes to evidence a psychiatric disorder in order to receive services, (e) brief engagement/progress calls between intervention meetings, (f) permitting athletes to determine the order and extent to which intervention components were implemented, (g) permitting performance meetings in sport settings, (h) omitting nomenclature that has been found to increase stigma, (i) substituting providers when scheduling difficulties arose, and (j) involving significant others through video- or telephone-conferencing or in person. The willingness of collegiate athletes to include persons from their social ecology suggests TOPPS was successful in reducing stigma specific to mental health concerns to some extent, and is relatively novel to campus mental health services.

The findings support a flexible, sport-specific optimization approach capable of addressing a broad spectrum of concerns experienced by athletes. This is important because participants were not required to evidence psychiatric symptoms, permitting a full range of mental health severity to be assessed and targeted for intervention. Forty-six percent of the participants formally evidenced at least one current mental health diagnosis, and 80% were found to evidence a current or past mental health diagnosis. These rates are strikingly consistent with Blanco, Okuda, and Wright (2008), who found nearly half of collegiate students assessed in their study evidenced a psychiatric diagnosis during the past year. Therefore, a large percentage of collegiate athletes who pursue performance programs are likely to evidence mental health concerns (Gabana, 2017) and potentially benefit in their sport performance and mental wellness from TOPPS regardless of symptom severity.

The current study was accomplished through an effective collaboration involving administrators at TOPPS, campus SAU and the Athletics Department. From this backdrop, systemic recommendations can be made to guide professionals in formally addressing mental health in athletes. Indeed, the process of intervention implementation used in the current study provides an efficient model for mental health optimization in athletes, including wide scale administration of validated screening methods to identify mental health conditions (administered or supervised by licensed psychologists), incorporation of evidence-supported engagement interviews to motivate athletes to pursue evidence supported optimization interventions that are sport-specific, and implementation of such programs by appropriately trained professionals (Silva, Metzler, & Lerner, 2011).

In the current study relatively inexperienced student providers were able to implement TOPPS with fidelity. Therefore, both licensed psychologists familiar with sport culture and sport performance professionals are very likely capable of learning to implement TOPPS within their specialized competencies. As job

opportunities inevitably improve due to growing awareness of mental health concerns in athletes (Hayden et al., 2013), it will be economically important and attractive to consumers for sport psychologists and other sport performance professionals to be hired to work together within integrated systems (Connole et al., 2014). These recommendations are consistent with NCAA Mental Health Best Practices (NCAA, 2017) and various codes of ethics (American Psychological Association, 2017; British Psychological Society, 2009).

The results of this study support the development of resources to assist collegiate athletes in gaining access to sport specific optimization programs that are evidence supported, regardless of diagnostic severity. This health care strategy, although initially more costly than traditional triage models that limit mental health services to those meeting clinical thresholds, is likely to have long term systemic benefits in the wellness of all athletes while reducing stigma that is often present when pursuing deficit-based mental health services. The need for optimization programs is substantiated in the results of studies that have found collegiate athletes evidence lower scores on measures of wellness as compared with non-athlete collegiate students (Watson & Kissinger, 2007). The focus of TOPPS on optimization of strengths through skill development, creativity through brainstorming and future mindedness through goal orientation (Seligman & Csikszentmihalyi, 2000) is consistent with the wellness movement to mental health intervention (Tedeschi & Kilmer, 2005) that is becoming increasingly popular in athletes (e.g., Breslin et al., 2017; Gavrilova & Donohue, in press).

It is important to emphasize, the providers of TOPPS in this study were trained to facilitate wellness. However, most of the outcome measures that were used in this study do not assess wellness beyond the absence of pathology or to some extent lack psychometric support in collegiate athletes. Therefore, emphasis on pathological assessment in this study was a limitation, and warrants psychometric development and evaluation of assessment tools in collegiate athlete populations that are capable of assessing the full spectrum of wellness, including optimization.

Although sexual risk behaviors were relatively low at baseline, it should be emphasized that the participants in TOPPS did not evidence improvements in sexual risk behavior compared to SAU. This is disappointing because there is a great need to develop mental health interventions that are capable of reducing sexual risk behaviors in collegiate athletes. Therefore, it may be necessary to complement TOPPS with pre-existing evidence supported sexual risk prevention programs or to refine TOPPS to better reduce sexual risk behavior. Participants consistently reported greater interest in mental health and sport performance than safe sexual activity, so although safe sexual activity was included as a program goal, it was not chosen by participants to be reviewed intensively during meetings. Thus it may have been helpful to implement motivational enhancement specific to sexual risk behavior prior to goal development.

Overall, this study represents a significant advancement in sport-specific mental health interventions development. Specific to methodology, this was the first controlled outcome study to incorporate validated clinical interviews, self-report measures, and biological testing to assist formal examination of mental health disorders in athletes while adhering to rigorous experimental methods.

Specific to practice implications, the results of this study suggest TOPPS offers promise in athlete populations within the context of campus-based counseling and psychological services. The optimization approach provides a framework through which similar programs can be developed in clinical trials and expanded into different contexts, including youth athletics, professional sports, music, theatre, and other populations with unique cultures that require specialized skill sets, and incorporating methods in TOPPS that are absent in traditional evidence-based approaches. Along this vein, the findings in this study provide good effect size and mean variance estimates for future outcome studies involving collegiate athletes. Finally, as sport-specific mental health interventions inevitably develop in outcome studies, it will be important for practitioners and administrators in universities and other amateur and professional organizations to prioritize them over mental health practices and programs that are not sport specific and supported by evidence.

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