Obsessive-compulsive Disorder Symptoms and Correlates in Community Exercisers

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Abstract

Objectives: The purpose of this study was to examine the potential relationship between OCD symptoms and the constructs of depression, anxiety, self-esteem, and commitment to exercise in community-based exercisers. **Design and Method:** A mixed-methods approach was utilized. A sample of 64 female and 21 male participants (*M* age = 52.1 years) completed a series of online or written questionnaires related to the noted variables, while a subset of 10 participants participated in a qualitative interview to explain their OCD symptoms and exercise behavior. **Results:** Pearson correlations indicated all psychological constructs were significantly correlated with each other (absolute *r*'s ranged from .27 to .78, all *p*'s < .001), while a canonical correlation analysis revealed one significant function (Wilk's λ=.360, R_c=.80, *p*<.001). Set 1 (OCD symptoms) explained 36% of the variance in Set 2 (anxiety, depression, self-esteem and commitment to exercise), while Set 2 explained 64% of the variance in Set 1. Four primary themes were established from the qualitative data, including: 1) being involved in sport or physical activity from a young age, 2) high benefits versus low consequences of regular participation in exercise, 3) involvement in detail-oriented jobs, and 4) easy adjustments to unplanned deviations from an exercise schedule. **Conclusions:** Overall, this research suggests that community-based exercisers with elevated OCD symptoms simply display a healthy attention to the frequency and detail of their physical activity, which facilitates them staying active across a variety of conditions.

Key words: mental health, depression, anxiety, self-esteem, mixed-methods research

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Since the publication of *Healthy People 2010* (U.S. Department of Health and Human Services [USDHHS], 2000), it has been difficult to ignore the prevailing pattern of inactivity that characterizes the lives of most Americans. But in the 32% of American adults that meet the recommendation of 30 minutes of moderate physical activity five or more days per week (National Health Interview Survey [NHIS], 2010) notable psychological improvements have been increasingly documented, with the most robust effects including decreased anxiety, reduced depression, and enhanced self-esteem (USDHHS, 1996). With improvements in mental health also being a focus area of *Healthy People 2020* (USDHHS, n.d.), the role of physical activity and exercise in meeting these goals cannot be ignored.

One specific area of interest is the relationship between obsessive-compulsive disorder (OCD) and exercise participation. OCD is the psychological condition characterized by obsessions (constant, intrusive thoughts that cause anxiety and distress [APA, 2000]) and/or compulsions (recurring behaviors or mental acts that help reduce that anxiety or distress [APA, 2000]). While nearly all people will at one time experience such thoughts and behaviors, "…obsessions and/or compulsions must be found to be of sufficient severity to cause marked distress, be time-consuming, and interfere with daily functioning" to qualify for diagnosable OCD (Foa & Franklin, 2011). This disorder presents equally in females and males, and has been documented to have a lifetime prevalence of 2.5% (Eddy & Walbroehl, 1998; Bergin & Garfield, 1994). Moreover, OCD can often present simultaneously with other disorders (including mood disorders [e.g. depression] and general anxiety disorders [Lewin & Piacentini, 2010]). Studies in

non-exercising clinical populations (e.g. Ehntholt, Salkovskis, & Rimes, 1999) have demonstrated that people suffering from OCD are actually at risk for a psychological profile that includes increased depression, increased anxiety, and a lowered sense of self-esteem, a constellation of mental health concerns that can potentially produce very negative consequences and highlights the need for further research into the etiology, phenomenology, and treatment of the disease.

Brooks' (2010) autoethnography of her experiences with OCD illuminate just how debilitating the disease can be, straining work and personal relationships as well as mental health. She further notes that, "…OCD-related concerns might remain 'in the closet' because sufferers' doubts about the pressures they feel, about the ability of others around them to understand their disease, or about how they will be socially stigmatized once they have shared their concerns" (p. 259). As a result of such dynamics, OCD may remain under-diagnosed and even individuals who have subclinical symptoms might experience significant distress. Subclinical OCD is generally defined as obsessions and compulsions that are not within the individual's control but do not cause enough distress or interference in functioning to qualify for full OCD (Lenane et al, 1990), and the prevalence may be as high as 4.1% (Thomsen, 1993). Given the severity of the disease, it is both relevant and necessary to examine the dynamics of OCD symptoms, depression, anxiety, and self-esteem within non-clinical populations to see if impairments in these mental health indicators are replicated.

Empirically supported treatments for OCD include a blend of behavioral and cognitive components; that is, part of the therapy involves, "…prolonged confrontation with feared stimuli and encouragement to refrain from compulsions…" (Franklin & Foa,

2011, p. 232) while also, "…challenging the underlying belief system in order to affect symptom change" (Franklin & Foa, 2011, p. 232). Participation in exercise has been studied as a form of adjunct treatment with some success; for example, Abrantes et al. (2009) demonstrated that clinical OCD sufferers experienced a reduction in their symptoms, anxiety, and negative mood from the beginning of an exercise session to the end, while Lancer, Motta, and Lancer (2007) reported a significant decline in self-reported OCD symptoms following a 6-week exercise program and at 1-month follow up. Yet, complicating such a solution is that exercise can also fit the diagnostic definition of compulsive behavior, especially when used to reduce anxiety associated with obsessive thoughts related to body image, physical health, or other fitness concerns. Habitual, even excessive exercise has been noted in individuals with disorders related to OCD, including anorexia nervosa (Davis et al., 1995), body dysmorphic disorder (Biby, 1998), and people classified as excessive exercisers (Gulker, Laskis, & Kuba, 2001). Thus, exercise may not always be an appropriate means for treating OCD, and whether obsessions and compulsions about exercise exist in non-clinical physically active populations has yet to be studied.

Brooks' (2010) autoethnography further opens dimensions in the study of OCD by including a qualitative approach that, in very vivid form, gives voice to the experiences of people with OCD. Such forms of research have been advocated for and embraced in the health as well as exercise and sport psychology literature (e.g., Eklund, Jeffery, Doersek, & Cho, 2011; Tenenbaum, Gershgoren, & Schinke, 2011). While non-quantitative research has been criticized on both epistemological and methodological grounds, Tenenbaum, Gershgoren, and Schinke (2011) offer the reminder that all

approaches to answering a research question have their constraints and that using multiple methods in combination can improve the quality of work in the field. The present study purposefully creates the space for a qualitative understanding of the potential obsessions/compulsions exercisers face and discloses, in their own words, how such thoughts/behaviors might affect their normal functioning. This component compliments and adds further perspective to the numerical profile created through quantitative questionnaires in order to, "…reveal a greater complexity and multidimensionality of experience than expected…" through quantitative research alone (Eklund et al., 2011, p. 287) and to, "…examine the extent to which empirically derived models manifest themselves in individuals' experiences" (Brewer, Vose, Van Raalte, & Petipas, 2011).

Thus, the current investigation was designed to extend existing research by developing a better understanding of whether non-clinical, community-based exercisers experience the negative effects of the relationship between OCD symptoms and the triad of depression, anxiety, and self-esteem often seen in individuals with clinical OCD. The psychological construct of commitment to exercise was also examined, as it has shown a significant correlation to both obsessive-compulsiveness and physical activity (Davis, Brewer, & Ratusny, 1993). Moreover, this study expanded on previous research through the inclusion of a qualitative interview that let a subset of participants reflect on their quantitative results and explain how potential obsessions and compulsions were related to their exercise participation.

Methods

Participants

Of the 120 participants that completed questionnaires, 85 provided data for all the variables examined, with the relatively high dropout rate attributed primarily to the length of the questionnaire packet. The final sample consisted of 64 female and 21 male participants, with an average age of 52.1 years (*SD* = 13 years). The majority (*n*=57, 67%) were married or living with a partner, while 56 had children. Most individuals identified themselves as White (*n*=75). Thirty-seven people indicated they were currently retired (43.5%), while 34 worked full-time (40%) and another 11 worked part-time (12.9%). Finally, 62% of the participants became involved because they noticed a flyer at their gym announcing the study, while the remaining 38% responded to an advertisement in the local newspaper.

Procedures

Before beginning, approval for the study was obtained from the university's Institutional Review Board. Participants were recruited from four local fitness facilities and through a newspaper announcement in a medium-sized Northwestern city. To attract a representative adult sample, all people older than 18 years of age who were members of a facility for longer than three months and regularly exercising during that time (3 times per week, at least 20 minutes of moderate-to-vigorous activity per session) or were exercising regularly on their own (newspaper recruitment) were considered eligible to participate. Upon contact with the project director, a description of the study, an informed consent document, and a questionnaire packet were mailed to the participant or the participant was provided with a secure e-mail link to the documents; using multiple forms of data collection allowed for a more representative community sample, and 98 of the 120 respondents (82%) chose the latter option with no significant statistical differences

found between the two response formats. After providing informed consent, participants were asked to complete the Obsessive-Compulsive Inventory Revised (OCI-R; Foa et al., 2002), Beck Depression Inventory (BDI; Beck, Ward, Mendelson, & Erbaugh, 1961), Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1998), Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965), Commitment to Exercise Scale (CES; Davis et al., 1993), Leisure-Time Exercise Questionnaire (LTEQ; Godin & Shepard, 1985) and a demographics questionnaire. All instruments have been utilized in previous research related to OCD and exercise behavior with clinical populations (e.g. Ehntholt et al, 1999) and have demonstrated adequate psychometric properties. Each person that completed the questionnaires was entered into a drawing in which 1 out of every 40 individuals received a $200 cash prize.

Based on preliminary analyses of responses to the questionnaires, a sub-sample of the initial group was selected for potential participation in individual qualitative interviews. Twelve people were contacted, and ultimately 5 females and 5 males, ranging in age from their late 20's to early 80's (M=55 years, SD=12.2), agreed to participate. Each person demonstrated levels of OCD symptoms greater than three standard deviations above average for this sample (range = 32 to 61). Of those who participated in the interviews, 7 of the 10 indicated elevated levels of depression, increased anxiety, or decreased self-esteem (greater than 3 SD's above the mean for each scale). In consultation with the clinical psychologist assisting with the research, these criteria effectively distinguished these participants from the rest of the sample with respect to the noted psychological variables, and were thought to lend themselves to creating the greatest resonance (documenting the participants experiences in a way that, "…will

promote empathy, identification, and reverberation of the research by readers who have no experience with the topic discussed," [Tracy, 2010, p. 844]).

Each semi-structured interview lasted between 60-90 minutes. The participant was first asked about her or his historical and current participation in exercise as well as the potential benefits and/or drawbacks of that involvement. Interviewees were then asked about past and current physical and mental health conditions. From there, participants responded to 6 of the 11 questions that come from the Overvalued Ideas Scale (OVIS; Neziroglu, McKay, Yaryura-Tobias, Stevens, & Todaro, 1999): 1) how strong is the obsessive belief?, 2) how reasonable is the belief?, 3) how accurate is the belief?, 4) what is the extent to which other people share the same belief?, 5) how effective and important are the compulsions?, and 6) what was their degree of resistance toward the belief? Follow-up questions were also asked, including the extent to which the obsessions/compulsions disrupted each participant's normal functioning. This interview structure provided a deductive element to the qualitative analyses, in that it provided a framework through which participants' comments could initially be organized.

At the completion of each meeting, the project director and clinical psychologist debriefed for 10-15 minutes to discuss reactions to the dialogue, potential theoretical and clinical implications, necessary changes to future interview questions, and other information that might be relevant to the interpretation of previous interviews; this peer debriefing helped to control potential biases of the first author and improve the credibility and sincerity of the research (Tracy, 2010). While 10 people represented the time and resource limits for the qualitative portion, the clinical psychologist and project director agreed that theoretical saturation was reached. Each person who participated in the

interview was offered a $50 gift card to a local merchant. To further enhance the credibility of the work, all individuals were e-mailed a copy of their transcripts and asked to verify the content of the interview as well as provide any further explanations or clarification; each interviewee believed they explained themselves adequately.

Analyses

As noted previously, given the exploratory nature of the study, a mixed-methods approach was purposefully chosen. From a quantitative perspective, bivariate correlations were calculated after appropriate screening of the data. Second, canonical correlation analysis was performed with OCD symptoms (Set 1) and depression, anxiety, self-esteem, and commitment to exercise (Set 2). Actual physical activity was not included in these analyses, as it was not a psychological construct and was found in the preliminary analyses to be unrelated to the psychological variables of interest except commitment to exercise; please see the discussion for possible explanations regarding this result. Canonical correlation was deemed the most appropriate analytical tool because the goal was to explore what (if any) association existed between the two sets of variables, which individual variables contributed to any multivariate relationship, and the amount of variance in one set of variables explained by the other set of variables. According to Tabachnik and Fidell (2007), about 10 cases are needed for each variable included in a canonical correlation analysis; thus, the minimum sample size was satisfied in this study.

The qualitative philosophy and methodology for the present study were guided by a comprehensive set of suggestions described by Sparkes and Smith (2009), Tracy (2010), and Weed (2009) for producing qualitative research of merit. As advocated by Sparkes and Smith (2009), a relativist rather than criteriological approach was adopdted,

in which, "Various criteria, therefore, in list form may act as a *starting point* for judging a certain kind of inquiry, but these may not apply on all occasions…. Importantly, these lists are challenged, changed, and modified in their application to actual inquiries and writing practices by the very people involved in the research" (p. 495). Tracy (2010) offers that such a starting point can be eight specific qualities, six of which were prominent in the current research: worthy topic, rich rigor, sincerity, resonance, significant contribution, and meaningful coherence. Finally, an interpretivist ontology (multiple, constructed realities are created between the quantitative and qualitative results) and epistemology (the knower and known are inseparable in the qualitative component) were utilized. In other words, the qualitative component provided an alternate yet complimentary and deeper "reality" to the qualitative numbers; in addition, the qualitative phenomenology of how OCD symptoms impacted participants' lives was presented in the form of an analytical narrative, in that, "..narratives are important in the process of constructing selves and identities," (Smith, 2007, p. 391).

All interviews were audio-recorded, and descriptions as well as quotes from the interviews were organized into relevant lower-order themes. Related lower-order themes were subsequently organized underneath a common higher-order theme, and potential relationships between higher-order themes were discussed, thus utilizing an inductive analytical process to compliment the deductive structure of the interview. Fit of the data and interpretations ("…how closely the concepts and theory generated fit the incidents and phenomena they represent," Weed, 2009, p. 506) was established through constant methods comparison (quantitative compared to qualitative results), analyst comparison (notes from the clinical psychologist who assisted in the interviews compared to notes

from the interviewer, independent coding of the transcripts by both individuals) and post-study validity checks with participants; all of these contributed to the credibility of the work, in particular crystallization and triangulation (Tracy, 2010). Reliability among major themes and sub-themes between the raters was high (greater than 90%; Berg, 2009), and all issues of non-agreement were discussed and resolved through consensus between the project director, clinical psychologist, and an independent reviewer. Collectively, these techniques lent themselves to the "meaningful coherence" of the research, which in part speaks to utilizing, "…methods and practices that partner well with espoused theories and paradigms," (Tracy, 2010, p. 848).

Results

Descriptive Statistics

Participants in the study reported an average of 3 days of mild (*SD*=2.8), 3.3 days of moderate (*SD*=2.4), and 2.9 days of vigorous physical activity (*SD*=2.4) per week. In addition, most people were low on the measure of obsessive-compulsive symptoms (*M*=8.0 out of 72 on the OCI-R; *SD*=7.8); these numbers are similar to previous research (e.g. Ehntholt et al., 1999) that suggests OCD symptoms occur at relatively low frequencies in non-clinical populations. In addition, individuals demonstrated low levels of depression (*M*=5.4 out of 63 on the BDI; *SD*=6.8;) and anxiety (*M*=7.7 out of 63 on the BAI; *SD*=7.5), similar to the values for a comparable group in Ehntholt et al. (1999; *M*=7.87 and *M*=8.27 respectively). Finally, the group reported high levels of self-esteem (*M*=4.85 out of 5 on the RSES; *SD*=.86) and a modest commitment to exercise (*M*=3.85 out of 7 on the CES; *SD*=.97).

Bivariate Correlations

Bivariate Pearson correlations indicated that the only psychological variable significantly correlated to reported exercise participation was commitment to exercise; however, all psychological variables were all significantly correlated to each other (see Table 1). Most notably, obsessive-compulsive symptoms were significantly related to anxiety (r=.724, p <.001), depression (r=.709, p <.001), commitment to exercise (r=.393, p < .001) and self-esteem (r=-.387, p <.001). This pattern of relatedness between the variables supports previous research that has established meaningful correlations among these various conditions.

Canonical Correlation Analysis

The canonical correlation analysis revealed one significant function (Wilk's λ = .360, χ^2 = 69.411, df = 4, p < .001). The canonical correlation of R_c = .80 suggested a strong relationship between the two sets of variables. Set 2 (depression, anxiety, self-esteem, and commitment to exercise) explained 64% of the variance in OCD symptoms. Moreover, depression was the only variable to make a substantive contribution to the multivariate relationship (canonical coefficient = .744), suggesting that a higher level of depression was associated with the reporting of more OCD symptoms. According to Pedhazur (1982), variables loading greater than or equal to .30 are considered to be significant and meaningful contributors; thus, the canonical coefficients for commitment to exercise (.247), anxiety (.170), and self-esteem (.018) suggest they did not have a consequential role in explaining the variance in OCD symptoms. Interestingly, OCD symptoms (canonical coefficient = 1.00) explained 36% of the variance in depression, anxiety, self-esteem, and commitment to exercise, implying this direction of influence is

potentially meaningful as well; this suggests that may be a bi-directional relationship in that these constructs can be *both* vulnerability factors and consequences of OCD.

Qualitative Analyses

Through extensive review of the interview transcripts and the notes provided by the consulting clinical psychologist and project director, four main themes pertaining to exercise patterns were identified among the participants: the extent of actual engagement with exercise, beliefs regarding the advantages and disadvantages of exercise, exercise as a reprieve from work, and adjustments made to compensate for missed workouts. In the following descriptions, considerable effort was given to utilizing rich rigor, in which the themes are both generously described and have high face validity (Tracy, 2010).

Theme #1: *Initiating and Maintaining Physical Activity*

This theme evolved primarily from interviewees' responses to their history of participation in exercise and/or physical activity, as well as historical and current health conditions. Eight of the 10 participants indicated becoming involved in sport or physical activity at a very early age. Most participation occurred either through youth sport leagues and organizations (e.g., swimming, soccer, tennis) or as part of daily activities (e.g., bicycle riding). Moreover, those participants that are parents emphasized that they communicated the importance of physical activity and sport to their children, thereby socializing them into an active lifestyle. Only two participants reported picking up physical activity later in their lives, which was generally in response to potential health concerns (e.g. weight gain, cardiac symptoms) or increased free time due to retirement. Cycling, swimming, and resistance training were the three most popular physical activities reported.

Although each was currently healthy, most spoke of various physical ailments that they had been treated for; these ranged from acute injuries (e.g. broken bones) to chronic issues (e.g. back pain, cardiovascular health). Universally, however, these injuries did not cause the participants to stop their exercise regimen. Rather, their mode of activity was often changed to reduce the potential for further injury (e.g., switching from running to cycling) or to improve conditioning in the affected areas (e.g. starting a muscle resistance program to improve strength in the lower back). The lifetime mental health status of the interviewees was also generally positive. Only four of the 10 people reported treatment for depression during their lifetime, and all of those maintained a regular exercise regimen during their care; the clinical psychologist noted that seeking treatment was a positive sign, and their experiences with exercise weren't different than those of people who were not treated. Noticeably absent from the interviews was the presence of anxiety symptoms, as none of the participants reported being treated for the condition.

Through the questions regarding current physical activity and exercise participation, it became immediately evident that all of the people interviewed were highly committed to a regular program, which became the salient factor that was explored as a potential obsession and compulsion throughout each dialogue. While there were a few notable instances of characteristic obsessive behavior (e.g. counting laps swam in a particular fashion repeatedly [counting; APA 2000], or maintaining a repetitive schedule of aerobic activity [repeating, APA 2000]), these were not determined to be serious enough to be a clinical concern. None of the interviewees reported keeping a journal of their weight, calories consumed, etc. As such, the only prospective compulsion for this

sample of people was participation in the exercise itself, spurred by their perceived need to be active on a very regular basis.

Theme #2: *Pros vs. Cons of activity*

Much of the exploration of the strength, reasonableness, and accuracy of the need to be regularly physically active (the first three questions from the Overvalued Ideas Schedule (OVIS); Neziroglu et al., 1999) produced the subthemes that contributed to this higher-order theme. For example, when asked to describe the potential benefits versus potential drawbacks related to regular participation in exercise (as a proxy for the strength and accuracy of the belief), it was extremely easy for participants to describe the former and very difficult to express the latter. Common physical benefits included risk reduction for common chronic diseases (i.e. cardiovascular disease, diabetes, and osteoporosis), weight management, and injury rehabilitation. Another three spoke to the fact that cycling allowed them to spend significant time with their spouses or simply be social with other adults with whom they would not normally come into contact.

In addition to these physical and social benefits, 7 of the 10 participants readily spoke to the psychological benefits of the activity, most notably stress relief, relaxation, and improved self-esteem. In the words of one interviewee, "If I've got something I'm trying to work on, I'll just kind of use it [exercise] to open my mind up and it kind of just lets me think about broad issues. So I consider it a mental relaxation." Another pair of participants echoed this idea in specifically comparing their swimming routines to meditation; as one put it quite simply, "Beating the water is always good therapy." It became apparent that the stress being relieved through exercise for the people in this

study came from their work obligations, not from actually completing the exercise routine itself (see Theme 3 also).

Given the age of the individuals that participated in the interview, much of the self-esteem improvements related to being able to perform tasks that weren't expected for their chronological maturity. For example, one woman spoke to feeling great after she could easily change the 5-gallon water bottle at the office; another spoke to the ability to pull herself out of the swimming pool on a hanging vertical rope. Not looking one's age was also salient for a pair of the participants, which also seemed to engender an increase in self-esteem. Yet, the one positive feeling that permeated all interviews was that maintaining a regular fitness regimen wasn't easy; thus, being able to do so created a sense of personal value. According to one person, "It's difficult, you know, physically demanding, and it's a lot easier to not do. But there's a payoff at the end, because I always feel good afterwards." The only drawbacks to being so physically active that were identified included the potential for it to take away from important social time with others (especially children), and the possibility of exacerbating existing physical injuries or acquiring new ones.

Theme #3: *Transitioning from Work to Workout*

In trying to assess whether the people in the study believed other people shared the same beliefs about the need to be physically active (Question 4 of the OVIS), an unexpected higher-order theme developed. In the discussion of whether their OCD symptoms were specifically related to physical activity, it became apparent that six of the ten participants either currently have or had very detail-oriented jobs that could lead to mildly obsessive thinking. For example, one person was in charge of the payroll for over

200 people in a very large organization; thus, she regularly worked with money and had to have everything in a specific order so that employees could get paid. If she didn't perform her duties correctly, "They wouldn't get paid. And that's a lot of stress to deal with." Another person classified very small fishes for a living; as such, he had to follow a very specific routine to perform his job correctly. As he shared, "…it's about as detail-oriented as it can get and it's very tedious." Thus, attention to detail and repetitive behaviors (two symptoms of OCD) were structurally included in their employment.

When asked whether such thinking also occurred in relation to their physical activity, all said no. Instead, they viewed their activity as a break from their work. In fact, one person went far enough to inform his colleagues at work that he would be unavailable for work meetings from 5-6pm; this was the time the pool was open for lap swim, and the break was seen as necessary for continued productivity at the job. Another individual who made home visits as part of his job generally made an "appointment" in his day that would allow him an hour at the local gym. The people in this study ultimately did not view these thoughts (work-related or exercise-related) as having a negative impact on their lives; rather, the abilities to maintain a routine and pay attention to detail were advantageous. The clinical psychologist who assisted in the interviews agreed that there were no apparent detrimental characteristics to the thinking or behavioral patterns shared by the participants, but they were most likely the reason for their elevated scores on the quantitative measure of OCD symptoms.

Theme #4: *Easy adjustments for Missed Workouts*

This final higher-order theme coalesced out of interviewees' responses to the relative importance and effectiveness of their potential compulsion (exercise) and their

resistance to their possible obsessions (Question 5 and 6 of the OVIS). The importance of developing a physical activity routine was clearly valued among all participants. Perhaps the most interesting question of the interviews was related to how individuals handled an unanticipated deviation from a planned exercise session. Six of the ten indicated, quite simply, that they would just adjust by finding a different activity or a different time of day (or different day altogether) to do their activity of choice. When asked if an unpredicted meeting interfered with a planned exercise session, one person said quite explicitly, "I'd probably go do it later anyway, even if I did it on my own. Sometimes when I get something in my head, I gotta go do it." In response to potential future injury, another person shared, "I'm going to keep doing things, so I don't recognize that as a barrier to me. Heaven forbid, if something happened to some part of my body, the other part of the body is going to be working out." Thus, there was no "true" missed workout, only modifications to be made. The clinical psychologist interpreted this thinking and behavior to be facilitative in that any missed activity did not cause significant distress.

However, three of the ten interview participants did speak to feeling some anxiety, disappointment or even resentment about missed workout days. However, such symptoms were not coupled with compulsive behaviors that needed to be done immediately in order to reduce the negative feelings they experienced. Instead, these people noted that the anxiety, disappointment, or resentment was generally mild and tended to dissipate after they had the chance to exercise again. Moreover, these feelings didn't have an impact on their ability to perform other significant behaviors in their lives, once again suggesting that this pattern does not match accepted definitions of clinical OCD. Overall, participants evaluated their cognitions, feelings, and behaviors as highly

facilitative and allowed them to be physically active across a variety of environments, time constraints, and physical limitations.

Discussion

Despite various limitations, the current study helped to further explore the phenomenology of OCD symptoms in non-clinical exercising populations, thus extending its potential as a "worthy topic" for future study and providing a "significant contribution" through the mixed-methods approach (Tracy, 2010). It should be noted that, collectively, the individuals in this study did not experience levels of OCD symptoms, anxiety, or depression higher than expected in the normal population; as such, the results should be interpreted with relative caution. Furthermore, it is worth entertaining the possibility that other constructs, such as perfectionism or harm-avoidance, are more related to exercise behavior that those that were explored. Finally, OCD symptoms that were experienced at the subclinical level by the 10 interview participants did not seem to be detrimental to participants' psychological wellbeing, a finding that doesn't mirror the experiences of people with clinical OCD and would not have been discovered without the qualitative component of the study. Thus, the information gleaned may begin to reduce concern about potential negative experiences of people with subclinical OCD symptoms participating in exercise.

The quantitative portion of this study provided insight into the strength of the relationship between OCD symptoms and depression, anxiety, self-esteem, and commitment to exercise. Similar to previous research with clinical (Ehntholt, Salkovskis, & Rimes, 1999) and non-clinical samples (Biby, 1998), the bivariate correlations between the psychological constructs were robust. For example, the correlation between OCD

symptoms and depression was higher (r= .709) in this study than in Biby (1998, r = .60), while the correlation with self-esteem was similar (r=.387 vs. r=.40 respectively). The findings related to depression are congruent with those from Steketee, Grayson, & Foa (1987), which indicated that people with OCD experience greater depressive symptoms that people with other anxiety-related disorders; they also choose descriptors (e.g., useless, unconfident, etc.) that signal depression and low self-esteem more frequently (Steketee, Grayson, & Foa, 1987). Similarly, the correlation between OCD symptoms and commitment to exercise was greater in the current research (r=.393) than in Davis et al. (1993; r=.10 for females, r=.25 for males). Thus, while community exercisers may not experience OCD symptoms or the noted psychological correlates at the same quantitative magnitude, the strength of the relationship between these variables is still present and suggests that research with sub-clinical groups holds merit as a worthy topic in helping to further understand the association among these various conditions.

Absent in the aforementioned studies were participants' explanations of how OCD symptoms affect their lives. A comprehensive exploration of these dynamics, as well as their relationship to exercise behavior, was provided in the current study. An advantage of utilizing this methodology is that it incorporated participants' insights into their symptoms in their own words, as well as the extent to which they created distress in their lives. Given that these are two of the criteria used to diagnose OCD, it seemed pertinent to explore these characteristics in a non-clinical population that may experience negative consequences but not seek treatment. Based on what was shared by participants in this study, such a concern wasn't substantiated, a result that would not have arose through the use of a singular methodology and further underscores the need for more

mixed-method approaches in sport and exercise psychology that seeks to demonstrate resonance in the presentation of participants' experiences.

Overall, it could be discerned that none of the participants' OCD symptoms were explicitly related to their participation in exercise. The main *possible* obsession surrounding the elevated importance of maintaining a physically active lifestyle presented itself as strong (it was a high priority for participants), reasonable, and accurate (the positive consequences far outweighed the negative ones). The historical similarity between most participants highlights the importance of early socialization into sport, exercise, and physical activity as a positive influence on lifetime participation and the many mental and physical benefits it can produce; perhaps repeated exposure to such ideas during the formative years of physical and cognitive development can manifest as healthy "obsessive" thinking about being physically active in adolescence and adulthood.

Similarly, while some traditional aspects of compulsions may have been present (e.g. counting laps a specific way, performing an activity at the same time of day, etc.), being unable to complete these behaviors was not linked to increased anxiety as would be seen in people with clinical OCD. Instead, participants seemed readily able to alleviate any potential anxiety related to a missed workout by immediately rescheduling their exercise session, changing the mode of exercise, etc. Interestingly, this can be interpreted as a lack of resistance to their "obsession" regarding physically activity, as well as a marker of the importance of participating in their "compulsive" behavior. The effectiveness of the exercise, then, becomes the telling attribute; the overwhelming positive outcomes of participation (reduced stress, improved self-esteem, etc.) were justification enough and ultimately reward for participation in the behavior. In that light,

the positive immediate and long-term effects of exercise may have a protective effect against multiple physical and mental health conditions, including OCD.

Finally, a rather interesting finding from this study is the prevalence of participants in highly detail- and schedule-oriented occupations that had the potential to create significant distress if the job wasn't done correctly. Timeliness, scheduling, repetitive tasks, and counting were part of the occupation for over half of the participants. These characteristics seemed to carry over to their exercise, with one notable exception: the job caused stress, while the exercise relieved it. While having such an occupation (or being involved in regular exercise) clearly isn't a prerequisite to cognitive and behavioral patterns that mimic OCD symptoms, it draws into question whether such patterns might be encouraged if more worksites explicitly scheduled time for sport, exercise, or physical activity within the workday and provided appropriate resources for it. This is another outcome that was only made evident through the mixed-methods approach.

Conclusions

Overall, despite the shortcomings regarding the size of the sample and the low scores on measures of OCD in sub-clinical population, it appears that most community-based exercisers display a healthy attention to the frequency and detail of their physical activity that facilitates them staying active across a variety of conditions. While most mental health professionals will most likely stay attuned to the diagnosis, etiology, and treatment of clinical OCD cases, it behooves those that work in the multiplicity of sport, exercise, physical activity, and health promotion settings to understand the relationship between OCD symptoms, depression, anxiety, and self-esteem described in this study as well as to develop effective means to encourage all people to develop the exercise

tendencies described. As one participant stated, "One thing that causes stress is not getting things done and so when I finally get things done I feel a lot better." If only everybody thought that way about exercise, we would certainly have a physically and mentally healthier society.

In addition, the unique contribution made through utilizing a mixed-methods approach should further encourage researchers to explore the multiplicity of research paradigms, philosophies, and methods that are available. While resisting essentialist thoughts on what qualifies as good research, the concept of meaningful coherence, in which studies "…a) achieve their stated purpose, b) accomplish what they espouse to be about, c) use methods and practices that partner well with espoused theories and paradigms, and d) attentively interconnect literature reviewed with research foci, methods, and findings," (Tracy, 2010, p. 848) is certainly a worthy one to pursue. It is the sincere hope of the researchers that this study significantly fulfilled those elements in a rich, meaningful way that represents the experiences of the participants in an eloquent, compelling manner and sparks further interest into such a worthy topic.

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References

Abrantes, A.M., Strong, D.R., Cohn, A., Cameron, A.Y., Greenberg, B.D., et al. (2009). Acute changes in obsessions and compulsions following moderate-intensity exercise among patients with obsessive-compulsive disorder. *Journal of Anxiety Disorders, 23,* 923-927.

American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC.

Beck, A.T., Epstein, N., Brown, G., & Steer, R.A. (1988). An inventory for measuring clinical anxiety: psychometric properties. *Journal of Consulting and Clinical Psychology, 56,* 893-897.

Beck, A.T., Ward, C.H., Mendelson, M., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry, 4,* 561-571.

Berg, B. L. (2009). *Qualitative research methods: For the social sciences.* (7th ed). San Francisco: Allyn & Bacon.

Bergin, A.E., & Garfield, S.L. (1994). *Anxiety disorders and phobias.* New York: Guilford Press.

Biby, E. (1998). The relationship between body dysmorphic disorder and depression, self-esteem, somatization, and obsessive-compulsive disorder. *Journal of Clinical Psychology, 54,* 489-499.

Brewer, B., Vose, J., Van Raalte, J., & Petipas, A. (2011). Metaqualitative reflections in sport and exercise psychology. *Qualitative Research in Sport, Exercise, and Health, 3,* 329-334.

565 Brooks, C.F. (2010). Social performance and secret ritual: Battling against obsessive-
566 compulsive disorder. *Qualitative Health Research, 21,* 249-261.
567 Davis, C., Brewer, H., & Ratsny, D. (1993). Behavioral frequency and psychological
568 commitment: Necessary concepts in the study of excessive exercising. *Journal of*
569 *Behavioral Medicine, 16,* 611-628.
570 Davis, C., Kennedy, S.H. Ralevski, E., Dionne, M., Brewer, H., Neitzert, C., & Ratusny,
571 D. (2005). Obsessive compulsiveness and physical activity in anorexia nervosa and
572 high-level exercising. *Journal of Psychosomatic Research, 39,* 967-976.
573 Eddy, M.F., & Walbroehl, G.S. (1998). Recognition and treatment of obsessive-
574 compulsive disorder. *American Family Physician, 57,* 1623-1630.
575 Eklund, R.C., Jeffery, K.A., Doersek, U., & Cho, S. (2011). Reflections on qualitative
576 research in sport psychology. *Qualitative Research in Sport, Exercise, and Health, 3,*
577 285-290.
578 Enhtholt, K.A., Salkovskis, P.M., & Rimes, K.A. (1999). Obsessive-compulsive disorder,
579 anxiety disorders, and self-esteem: An exploratory study. *Behavioral Research and*
580 *Therapy, 37,* 771-781.
581 Franklin, M.E., & Foa, E.B. (2011). Treatment of obsessive-compulsive disorder. *Annual*
582 *Review of Clinical Psychology, 7,* 299-243.
583 Foa, E.B., Huppert, J.D., Lelberg, S., Langner, R., Kichic, R., Hajcak, G., & Salkovskis,
584 P.M. (2002) The Obsessive-Compulsive Inventory: Development and validation of a
585 short version. *Psychological Assessment, 14,* 485-496.
586 Godin, G., & Shepard, R.J. (1985). A simple method to assess exercise behavior in the
587 community. *Canadian Journal of Applied Sport Science, 10,* 141-146.

588 Gulker, M.G., Laskis, T.A., & Kuba, S.A. (2001). Do excessive exercisers have a higher
589 rate of obsessive-compulsive symptomology? *Psychology, Health, & Medicine, 6,*
590 387-398.
591 Jacobs, D., Ainsworth, B., Hartman, T., & Leon, A. (1993). A simultaneous evaluation of
592 10 commonly used physical activity questionnaires. *Medicine and Science in Sports*
593 *and Exercise, 25,* 81-91.
594 Lancer, R., Motta, R., & Laner, D. (2007). The effect of aeropic exercise on obsessive-
595 compulsive disorder, anxiety, and depression: a preliminary investigation. *Behavior*
596 *Therapist, 30,* 53-62.
597 Lenane, M.C., Swedo, S.E., Leonard, H., Pauls, D.L., Sceery, W., & Rapoport, J.L.
598 (1990). Psychiatric disorders in first degree relatives of children and adolescents with
599 obsessive-compulsive disorder. *Journal of the American Academy of Child and*
600 *Adolescent Psychiatry, 3,* 407-412.
601 Lewin, A.B., & Piacentini, J. (2010). Evidence-based assessment of child obsessive
602 compulsive disorder: Recommendations for clinical practice and treatment research.
603 *Child Youth Care Forum, 39,* 73-89.
604 National Health Interview Survey (2010). National Center for Health, Centers for Disease
605 Control and Prevention. Hyattsville, Maryland.
606 Neziroglu, F., McKay, D., Yaryura-Tobias, J.A., Stevens, K.P., & Todaro, J. (1999). The
607 overvalued ideas scale: Development, reliability, and validity in obsessive-
608 compulsive disorder. *Behavior Research and Therapy, 37,* 881-902.
609 Pedhazur, E. (1982) *Multiple regression in behavioral research*. New York: Holt.

610 Potter, J. (1998). Qualitative and discourse analysis. In A.S. Bellack & M. Hersen (Eds.)
611 *Comprehensive clinical psychology*: *Volume 3* (pp. 117-144). New York: Elsevier
612 Science.
613 Rosenberg, M. (1965). *Society and the adolescent self-image.* Princeton: Princeton
614 University Press.
615 Rogers, W.M., & Gauvin, L. (1998). Heterogeneity of incentives for physical activity and
616 self-efficacy in highly active and moderately active women exercisers. *Journal of*
617 *Applied Social Psychology*, *28,* 1016-1029.
618 Smith, B. (2007). The sate of the art in narrative inquiry: Some reflections. *Narrative*
619 *Inquiry, 17,* 391-398.
620 Sparkes, A.C., & Smith, B. (2009). Judging the quality of qualitative inquiry:
621 Criteriology and relativism in action. *Psychology of Sport and Exercise, 10,* 491-497.
622 Steketee, G., Grayson, J.B., & Foa, E.B. (1987). A comparison of characteristics of
623 obsessive-compulsive disorder and other anxiety disorders. *Journal of Anxiety*
624 *Disorders, 1,* 325-335.
625 Tabachnick, B.G., & Fidell, L.S. (2007). *Using multivariate statistics* (5th ed.) San
626 Francisco: Allyn and Bacon.
627 Tenenbaum, G., Gershgoren, L., & Schinke, R.J. (2011). Non-numerical data as data: a
628 positivistic perspective. *Qualitative Research in Sport, Exercise, & Health, 3,* 349-
629 361.
630 Thomsen, P.H. (1993). Obsessive-compulsive disorder in children and adolescents.
631 *Psychiatry Scandinavia, 88,* 212-217.

U.S. Department of Health and Human Services (1996). *Physical activity and health: A report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.

U.S. Department of Health and Human Services (2000). *Healthy People 2010: Understanding and Improving Health,* 2nd Ed. Washington, DC: U.S. Government Printing Office.

U.S. Department of Health and Human Services (2004). *Tracking Healthy People 2010: Progress Reports.* Retrieved from http://www.healthypeople.gov/Data/2010prog/focus22/PhysicalFitnessPR.pdf.

U.S Department of Health and Human Services (n.d.). *Healthy People 2020 Objective Topic Areas & Page Numbers.* Retrieved from http://www.healthypeople2020.org.

Weed, M. (2009). Research quality considerations for grounded theory research in sport and exercise psychology. *Psychology of Sport and Exercise, 10,* 502-510.

Table 1. Pearson Correlations

	1	2	3	4	5	6
1. Physical Activity (LTEQ)	-	.231*	-.072	.041	.049	.074
(*p-value*)		(.037)	(.522)	(.716)	(.665)	(.504)
2. Commitment to Exercise (CES)		-	.149	.484**	.328**	.327**
(*p-value*)			(.190)	(.000)	(.003)	(.003)
3. Self-Esteem (RSES)			-	.501**	.597**	.416**
(*p-value*)				(.000)	(.000)	(.000)
4. Obsessive-compulsive symptoms (OCI)				-	.773**	.580**
(*p-value*)					(.000)	(.000)
5. Depression (BDI)					-	.659**
(*p-value*)						(.000)
6. Anxiety (BAI)						-

* $p < .05$. ** $p < .001$. Note: Higher scores on the RSES indicate lower self-esteem.