

Examining the Role of Instructor-Student Relationship Quality in Yoga: Implications for Participants' Motives, Stress, Affect, and Mindfulness

Paul A. Davis, Louise Davis, Klara Andersson, and Agnes Wallberg

Umeå University, Department of Psychology, Umeå, Sweden

Abstract

Extensive research outlines a broad spectrum of physical and mental health benefits associated with participation in yoga. In particular, yoga can increase mindfulness as well as decrease anxiety, depression, and stress. However, knowledge of the underlying mechanisms and conditions for promoting positive outcomes requires further study. Limited research has examined how the quality of the relationship between the yoga student and instructor may influence potential health benefits derived from participation in yoga. The present study investigated associations between levels of stress, emotional well-being, motives for yoga, relationship quality, and mindfulness during yoga. Analysis of data collected from 219 adults indicated that higher levels of stress and negative emotional well-being increased the likelihood that yoga was practised to address psychological motives rather than perceived physical health benefits. Additionally, relationship quality with the instructor was found to predict greater state mindfulness during the yoga session. The present study highlights the importance of the relationship quality between instructor and student; future research investigating the efficacy of yoga in optimizing mental health should consider how health outcomes might be influenced by motives for participation and interpersonal relationships.

Keywords: interpersonal relationships, emotional well-being, mental health, physical activity

Introduction

Yoga is an ancient practice designed to balance both mental and physical aspects of individual health. Studies comparing the effects of yoga and physical activity interventions in both healthy and clinical population have reported comparable outcomes on a variety of health-related measures (Penedo & Dahn, 2005). Although research evaluating the efficacy of physical activity interventions has highlighted the importance of social factors such as relatedness, social support,

✉ Paul A. Davis, Institutionen för Psykologi, Umeå Universitet, 901 87, Sweden. E-mail: paul.davis@umu.se

and coach/trainer behaviours (e.g., Sørensen et al., 2020), the influence of instructor-student relationship quality in yoga has not been explored.

An ever-increasing body of research notes that yoga can enhance both psychological well-being and physical health (Pascoe et al., 2021; Ross & Thomas, 2010). Systematic reviews examining the use of yoga-based interventions in healthy populations highlight positive effects in decreasing stress (Chong et al., 2011) and improving psychological well-being (Hendriks et al., 2017). Further, it is proposed that yoga practice can address issues related to the worldwide epidemic associated with a sedentary lifestyle as a risk factor for various health problems (Penedo & Dahn, 2005). Physical inactivity has been proposed to double the risk of adverse health outcomes comparable with obesity and smoking, as well as societal burdens due to changing lifestyles including increased costs for health-related diseases (e.g., depression, anxiety; Chekroud et al., 2018; Penedo & Dahn, 2005; Yook et al., 2017). Numerous studies examining yoga as a form of physical activity (e.g., Gokal et al., 2007; Michalsen et al., 2005) outline its positive effects on emotional well-being and stress reduction (Selvamurthy et al., 1998). Specifically, it is proposed that yoga techniques can improve mental health through its down-regulation of the sympathetic nervous system and hypothalamic pituitary adrenal axis in response to stress (Jeter et al., 2015).

Mindfulness-based stress reduction has been widely prescribed for health promotion in both clinical and healthy populations (Grossman et al., 2004; Hofmann et al., 2010; Khoury et al., 2013). The philosophical and traditional orientations of mindfulness and yoga are interconnected (Pascoe et al., 2021). A systematic review of RCTs outlines that regular yoga practice can promote development of greater mindfulness (Domingues, 2018). Mindfulness is often considered the “active ingredient” within yoga practice (Brown et al., 2007; Butterfield et al., 2017) and has been shown to relate to several aspects of general well-being such as low levels of anxiety, depression, and stress (Brown & Ryan, 2003; Chiesa & Serretti, 2009; Evans et al., 2011; Hanley & Garland, 2014).

Research examining mindfulness within exercise contexts (e.g., Cox et al., 2016) has linked the non-judgmental immersive aspects of mindfulness with participants’ motives to participate in physical activity (Schneider et al., 2019). It is noted that individuals that are most successful in adhering to long-term physical activity are most likely motivated by rewards from the practice itself, rather than being motivated by extrinsic factors such as anticipated outcomes of the activity (e.g., changes in appearance associated with weight loss; Ryan & Deci, 2007). As such, maintaining attention to current events associated with the undertaking of performance of physical activity (i.e., mindfulness) has been associated with increased adherence to physical activity behaviours (Ruffault et al., 2016). Specific to the practice of yoga, Park and colleagues (2016) noted that participants’ motives often change over time. That is, individuals who commence practising yoga with a physical fitness orientation as their primary motive often experience a change in their

motives towards more psychologically oriented benefits (e.g., relaxation, stress and anxiety reduction). This noted shift from physical to psychological motives can be associated with related research outlining an evolution from motives that are extrinsic to more intrinsic in nature (Ennis, 2017; Gardner & Lally, 2013). Understanding individuals' motives for engaging with yoga is of central importance as it may facilitate practice over the long term and promote lifelong health benefits (Park et al., 2016).

Individuals' motives for participation in physical activity have also been linked to social aspects of the activity such as affiliation, social support, and interpersonal relationship quality (Molanorouzi et al., 2015; O'Hara et al., 2014; Pedersen et al., 2021). Extensive research in sport and group exercise settings has highlighted the influence of coaches and instructors on participants' motives (Behzadnia et al., 2018; Ntoumanis & Biddle, 1999; Teixeira et al., 2012). Specifically, group fitness instructors are noted to be central in the promotion of physical activity through their interpersonal interactions and coaching behaviours (Ntoumanis et al., 2017). The quality of the relationship formed between instructor and participant can impact the realization of health benefits derived from physical activity as a result of continued participation and exercise adherence (Rodrigues et al., 2020a, 2020b).

Extensive research in sport has outlined the importance of relationship quality between a coach and athlete (for a review see Jowett, 2017). In clinical settings, the therapist-client relationship is highlighted as being central to health outcomes and has been identified as underpinning the efficacy of treatments addressing mental health issues (Messer & Wampold, 2002). However, research examining mental health outcomes of participation in yoga has not examined the relationship quality between the instructor and participants. In consideration of the nature of yoga with its focus upon physical activity that is often undertaken in a group setting, the framework of the coach-athlete relationship in sport offers an applicable theoretical foundation for examining the mechanisms underpinning the relationship between yoga and mental health.

Guided by interdependence theory (Kelley & Thibaut, 1978), Jowett and Ntoumanis (2004) proposed the "3 C's" model, which aims to explain the positive aspects of the quality between coaches and athletes. According to Jowett and Ntoumanis (2004), this relationship has three dimensions defined as Closeness (i.e., the affective bond between coaches and athletes), Commitment (i.e., the shared perspectives on shared goals and values), and Complementarity (i.e., cooperative actions between the coach and athlete; Jowett & Cockerill, 2002; Jowett & Meek, 2000). Across multiple studies, lower levels of the "3 C's" have been associated with interpersonal conflict (Jowett & Meek, 2000), indicating that better quality of the coach-athlete relationship is better for developing skills and emotional well-being (Davis et al., 2018).

According to Davis and colleagues (2021), a high-quality interdependent relationship between coaches and athletes is a fundamental precursor to athletes'

development and underpins both well-being and performance (e.g., thriving). In relation to the development and maintenance of positive mental health, it is well established that coaches can be highly influential to athletes' affective states through the use of emotion regulation (Davis & Davis, 2016) and communication strategies (Davis et al., 2019) that may impact upon the quality of the interpersonal relationship. Yoga instructors can also influence the emotions of the participants in their class (Dick et al., 2014; McMahon et al., 2021) through similar mechanisms such as their use of feedback and communication (Crowe & Van Puymbroeck, 2019).

In consideration of the similarities between the coach-athlete relationship and the instructor-student relationship in yoga, the aim of the present study was to explore potential associations between relationship quality and the possible health benefits of yoga. Further, in light of the central role of mindfulness in promoting the positive health outcomes of yoga, we explored the potential association between instructor-student relationship quality and students' state mindfulness during the yoga class. Further, previous research highlights individual differences in participants' motives for physical activity can be related to health outcomes; as such, we examined relationships between yoga participants' reported stress and emotional well-being in relation to their motives for practising yoga.

Method

Participants

Yoga students ($N = 219$) based in a northern Swedish city from three different yoga studios based in the city centre ($n = 113$) and one sports centre on a university campus ($n = 106$) were recruited to the study. The three yoga studios and the sports centre operate independently from one another, and all provide different types of yoga classes (i.e., vinyasa yoga, yin yoga and classical yoga). The total sample included participants aged from 20 to 84 ($M_{\text{years}} = 39.11$, $SD = 15.08$) and mostly women (86%). The participants' experience of yoga ranged from less than one month to 18 years ($M_{\text{months}} = 48.19$, $SD = 48.14$). At the time of data collection, participants had been practicing yoga with the current yoga instructor ranging from less than one month up to 18 years ($M_{\text{months}} = 18.66$, $SD = 32.27$). The study's protocol was reviewed and approved by the institution's internal review process and the yoga centres provided their approval for the study to be undertaken with yoga students attending their premises.

Measures

The State Mindfulness Scale for Physical Activity (SMS-PA; Cox et al., 2016b). The degree of perceived mindfulness during the yoga classes was measured using the SMS-PA. Participants are instructed to answer 12 items by recalling the recently completed physical activity and rate each item on a 5-point Likert scale from 0 (*not*

at all) to 4 (*very much*). A Swedish version of the SMS-PA was developed for the present study through the process of a translation-back-translation procedure (van der Vijver & Leung, 1997). The SMS-PA has previously demonstrated good internal consistency reliability ($\alpha > .80$) and construct validity with positive correlations with other mindfulness measures in studies examining yoga (Cox et al., 2016b). The internal consistency of the SMS-PA in the present study was acceptable ($\alpha = .77$).

Motives for Yoga Practice. Previous research examining motives for practising yoga (Cox et al., 2016a) has used two related indexes examining psychological and physical health motives; as such, in the present study the same two related indexes were used. The first index labelled *PhysIndex* was comprised of 6 items measuring students' perceptions of: exercise, weight control, flexibility, physical health, appearance/body tone, and strength. The second index *PsychIndex* was comprised of four items measuring: relaxation, spirituality, alleviation of anxiety/depression, and stress-relief (Kilpatrick et al., 2005; Park et al., 2016). Participants were instructed to "indicate how accurately each item relates to your reason for participating in yoga" by rating each item on a 7-point Likert scale from 1 (*not at all*) to 7 (*extremely well*). Internal consistency was acceptable for the items belonging to physical motives ($\alpha = .77$) and slightly below the acceptable limits for the items belonging to psychological motives ($\alpha = .64$).

The Instructor-Student Relationship Questionnaire (ISRT-Q). To measure participants' quality of relationship with the yoga instructor, an adapted form of the *Coach-Athlete Relationship Questionnaire (CART-Q; Jowett & Ntoumanis, 2004)* was used. In the present study items were adapted to be appropriate for use in a yoga setting, specifically the term "coach" was replaced with "yoga instructor"; this change was reviewed by an expert panel and piloted on a representative sample. The ISRT-Q measured cognitive, affective, and behavioural aspects of the relationship with three subscales: Commitment (e.g., I feel committed to my instructor); Closeness (e.g., I like my instructor); and Complementarity (e.g., I feel good and safe when I am instructed by my yoga instructor). The ISRT-Q consists of 11 statements rated on a 7-point Likert scale from 0 (*do not agree*) to 7 (*agree completely*). In the present study internal consistency was good for the total scale ($\alpha = .90$) as well as all the three subscales ($\alpha = .79$ for Commitment; $\alpha = .84$ for Closeness; and $\alpha = .85$ for Complementarity), and is comparable with a Swedish sample validation of the CART-Q (Yang & Jowett, 2012).

The Perceived Stress Scale (PSS; Cohen et al., 1983). To measure perceptions of life stress, participants reported the frequency of stress experiences in the last month (e.g., how often have you felt you were unable to control the important things in your life?). The four items are rated on a 5-point Likert scale from 0 (*never*) to 4 (*very often*). The Swedish version of the PSS-4 scale has demonstrated good internal reliability and construct validity (Nordin & Nordin, 2013) with use in physical activity settings (Gustafsson et al., 2013). Internal consistency of the 4-item PSS in the present study was adequate ($\alpha = .75$).

The Positive and Negative Affect Scale (PANAS; Watson et al., 1988). In the present study the *Positive and Negative Affect Schedule Short-Form* (PANAS-SF) was used to measure positive and negative affect during the past month (Thompson, 2007). It consists of five positive (e.g., active) and five negative (e.g., upset) items that are each rated on a 5-point Likert scale from 1 (*not at all*) to 5 (*extremely*). The Swedish version of the PANAS-SF has previously been used in physical activity settings and has shown acceptable internal consistency (Gustafsson et al., 2015). Internal consistency of the NA subscale in the present study was adequate ($\alpha = .74$), and the PA subscale ($\alpha = .68$).

Procedure

Fourteen yoga instructors (86% women), with varying backgrounds of training and duration of teaching experience, that were actively working in the yoga studios were informed about the study and asked if they were interested in participating. Collectively, these yoga instructors were responsible for leading twenty-two classes. The class sizes ranged from 7 to 70 individuals ($M = 26.26$, $SD = 19.77$); the duration of the classes ranged from 1 to 2 hours ($M_{hours} = 1.47$, $SD = 0.32$). Prior to commencing the class, the yoga instructors informed their students that two researchers from a local university would be handing out questionnaires directly after class. Participants were informed that the duration to complete the questionnaire would be approximately 10 minutes and that the purpose of the study was to investigate their experience of the class as well as other aspects of practising yoga. The participants were informed of their right to withdraw their participation from the study at any time and that their responses were anonymous; participants were also instructed not to include any personal information that could make them identifiable. Furthermore, all yoga instructors were informed that the study did not aim to review their personal accomplishments as instructors and that their involvement would remain anonymous. Those students indicating that they were interested in participating were provided with an information sheet outlining the nature of the study; participants provided written informed consent prior to completing the questionnaires following the class. During the completion of the questionnaires the researchers were available to answer any questions from participants. At the time of data collection researchers noted: type of yoga studio (yoga studio or sport centre), how many participants attended the class, the form of yoga taught in the class, the gender of the instructor, which instructor was taking the class, and duration of the class. Data were collected across a three-week period, in the month of October.

Data Analysis

Statistical analyses were carried out using the program IBM SPSS Statistics 24. First, the data were analysed for missing data, participants who had failed to complete an entire scale were excluded from further analyses. In review of the remaining

participants, it was noted there were fewer than 20 missing responses across all of the questionnaires and these were found to be distributed among 18 participants; upon closer inspection, the data were determined to be missing completely at random (Bhaskaran & Smeeth, 2014). In order to minimize the impact of missing data, missing values in the standardized measures were replaced with the mean of the available items from the same subscale for that individual (Graham et al., 2003). Descriptive data were analysed using independent sample *t*-tests to examine differences between groups (e.g., yoga studios). Differences between groups in relation to gender were analysed and reported but were not subject to further analysis as this was beyond the scope of the present study. Pearson product-moment correlations were used to assess correlations between student-instructor relationship quality and all outcome variables. To test associations between PSS, PA, NA, and relationship length in relation to psychological motives for practising yoga and state mindfulness during the session, linear regression analyses were conducted. Effect sizes for the *t*-tests were calculated using guidelines for Cohen's *d* (0 - 0.20 = weak, 0.21 - 0.50 = modest, 0.51 - 1 = moderate, >1 = strong; Cohen, 1988), effect sizes for correlations were calculated using guidelines for Pearson's *r* (0.5 = strong fit; Mujis, 2004).

Results

Means and standard deviations for all the outcome variables and for participants' length of yoga experience are presented in Table 1. In the examination of gender differences, independent samples *t*-test were conducted. A gender difference was observed for scores on SMS-PA and for psychological motives for practising yoga (PsychIndex). There was a significant effect for gender, $t(214) = 2.28, p < .05, d = 0.44$, with women scoring higher on SMS-PA ($M = 3.21, SD = 0.48$) compared to men ($M = 2.99, SD = 0.50$). There was a significant effect for gender, $t(216) = 2.65, p < .05, d = 0.57$, with women scoring higher on PsychIndex ($M = 4.92, SD = 1.24$) compared to men ($M = 4.28, SD = 1.29$). Despite the gender differences observed, it was determined that the inclusion of male participants in the subsequent data analyses was appropriate. The rationale for their inclusion was that it more accurately reflected the composition of the groups at the time of data collection; in general, participants' completion of the measures was based on the group dynamics and composition of the class they had just attended. The inclusion of all participants is particularly important as some classes were comprised of a small number of participants; gender differences were not the focus of the current study therefore no further analyses incorporated gender as an independent variable.

Preliminary bi-variate correlation analyses indicated student-instructor relationship quality was positively associated with the duration of the relationship, participants' state mindfulness during physical activity and psychological motives for yoga (Table 1).

Table 1

Means, Standard Deviations, and Intercorrelations Between Scores on Relationship Duration (Rel-Dur), Duration of Yoga Experience (Yoga-Exp), State Mindfulness (SMS-PA), Quality of the Relationship (ISRT-Q), Perceived Stress (PSS-4), Positive Affect (PA), Negative Affect (NA), Scores on Psychological and Physical Motives for Practicing Yoga (PsychInd and PhysInd) for Total Sample (N = 219)

| Scale | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. |
|-------------|-------|-------|------|-------|--------|--------|--------|-------|-------|
| 1. Rel-Dur | - | .48** | .07 | .29** | -.12 | .07 | -.03 | .02 | -.08 |
| 2. Yoga-Exp | | - | .15 | -.02 | -.21** | .07 | -.02 | -.02 | .09 |
| 3. SMS-PA | | | - | .25** | .04 | .13 | .04 | .42** | .09 |
| 4. ISRT-Q | | | | - | -.01 | .05 | -.04 | .33** | .06 |
| 5. PSS-4 | | | | | - | -.52** | .58** | .39** | -.00 |
| 6. PA | | | | | | - | -.40** | -.12 | .12 |
| 7. NA | | | | | | | - | .33** | .00 |
| 8. PsychInd | | | | | | | | - | .40** |
| 9. PhysInd | | | | | | | | | - |
| <i>M</i> | 18.65 | 48.19 | 3.17 | 6.09 | 1.45 | 3.60 | 2.15 | 4.83 | 4.27 |
| <i>SD</i> | 32.27 | 48.14 | 0.49 | 0.84 | 0.76 | 0.56 | 0.65 | 1.26 | 1.09 |

* $p < .05$, ** $p < .01$.

Linear regression analysis was conducted with state mindfulness as the dependent variable (Table 2) and PSS, PA, NA, and relationship length entered as independent variables. This model indicated these variables predicted SMS-PA, $F(4, 205) = 2.31.6, p = .058$. PA was a significant predictor of SMS-PA ($p < .001$), the relationship was moderate ($\beta = .46$). A second model examined psychological motives as the dependent variable and PSS, PA, NA, and relationship length entered as independent variables. This model indicated these variables significantly predicted PsychIndex, $F(4, 207) = 10.57, p < .001$. PSS, PA and NA significantly predicted PsychIndex, the relationship was strong for PSS ($\beta = .78$) and moderate for PA ($\beta = .39$) and NA ($\beta = .34$).

Table 2

Summary of Hierarchical Regression of PSS, PA, NA, and Rel-Dur as Predictors of SMS-PA and PsychIndex Scores

| Variable | Model 1 – SMS-PA | | | Model 2 – PsychIndex | | |
|--------------|------------------|---------|-----------|----------------------|---------|-----------|
| | <i>B</i> | β | <i>SE</i> | <i>B</i> | β | <i>SE</i> |
| Constant | 27.3*** | | 3.93 | 9.34* | | 4.13 |
| PSS | 0.26 | .14 | 0.18 | 0.78 | .36*** | 0.18 |
| PA | 0.46 | .22** | 0.17 | 0.16 | .17* | 0.17 |
| NA | 0.06 | .03 | 0.15 | 0.34 | .17* | 0.16 |
| Rel-Dur | 0.02 | .09 | 0.01 | 0.02 | .08 | 0.01 |
| R^2 | | .04 | | | .17 | |
| Adj. R^2 | | .03 | | | .15 | |
| ΔR^2 | | .04 | | | .17*** | |

* $p < .05$, ** $p < .01$, *** $p < .001$.

Discussion

The present study explores associations between individuals' reported motives for practising yoga and their mental health. In consideration of previous research outlining the use of yoga to promote positive mental health (e.g., Jonsson et al., 2020), individuals' perceived stress and negative affect were examined in relation to motives underpinning their yoga practice. Additionally, mindfulness has been identified as being a central mechanism to positive mental health benefits derived from yoga (Gaiswinkler & Unterrainer, 2016). In particular, health professionals have been identified as having a role in promoting mindfulness in yoga targeting the treatment of negative emotions (Butterfield et al., 2017; La Torre et al., 2020); as such the quality of the relationship between yoga instructors and students was explored in relation to the central factor of state mindfulness experienced during the practice of yoga. In the examination of the first aim of the study, results indicated that levels of perceived stress and negative affect correlated with higher ratings on the index for psychological motives guiding the practice of yoga. The relationship observed between perceived stress and negative affect aligns with previous research (e.g., Kanner et al., 1981; Wills, 1986) highlighting the co-occurrence of stress and negative affect and suggests yoga participants may be aware of the potential positive mental health outcomes perceived to be derived from yoga. One potential explanation for this finding relates to the central tenets of Ryan and Deci's (2007) self-determination theory, where intrinsic motivators derived from the practice itself (e.g., enjoyment derived from the undertaking of the activity) as opposed to extrinsic motivators (e.g., outcome goals such as weight control); the positive emotions experienced during yoga may have underpinned individuals' decision to participate.

Previous research (e.g., Park et al., 2016) highlights that intrinsic motivation is associated with long-term adherence to physical activity behaviours; findings in the present study share a similar pattern, as participants reporting to have practised yoga for a greater length of time also reported higher levels of psychological motives for participation. It also warrants acknowledging an alternative explanation that may relate to the growing interest and promotion of yoga (Ross & Thomas, 2010) as a modality to reduce stress; as a result of this connotation, participants may be motivated to practice yoga to address central issues underlying health concerns reflected in contemporary research (Pascoe et al., 2021; Ross & Thomas, 2010). Stress-related issues have been the focus of extensive research in recent years (Chekroud et al., 2018; Jeter et al., 2015); therefore, interventions targeting stress reduction have risen in terms of interest for clinical application (e.g. Mindfulness-Based Stress Reduction; Kabat-Zinn, 1990) and research scrutiny (Grossman et al., 2004). Extensive research investigating the relationship between mindfulness and stress-related emotions as well as cognitions has advanced mindfulness practices and refined protocols for use in the reduction of stress (Kriakous et al., 2021; Querstret et al., 2020). It warrants noting that the research design used in the present study is unable to determine a cause-and-effect relationship between mindfulness and stress

in relation to yoga practice. It is possible that participants that reported experiencing greater negative affect and stress were attracted to the practice of yoga due to its associations with mindfulness. Participants in the present sample may have practised yoga in pursuit of stress reduction, mindfulness, and relaxation, rather than deriving these outcomes as a result of practising yoga. The temporal relationship of these variables cannot be determined using a cross-sectional research design and require further study.

The role of the yoga instructor was a focus of the present study; specifically, the quality of the relationship between the yoga instructor and a student was examined. It was noted that levels of mindfulness during the yoga class were associated with relationship quality. Further, in line with previous research examining temporal aspects of the coach-athlete relationship (e.g., Jowett & Ntoumanis, 2004), results in the present study indicated that the duration of the relationship with the current instructor significantly predicted the strength of the association between relationship quality and state mindfulness during yoga practice. Taken collectively, scrutiny of participants' reports suggests that the relationship quality within the sample was high, meaning that the participants reported feelings of trust, cooperation, and care in regard to their instructor. It may be deduced that the relationship between a yoga instructor and a yoga student can provide some basic functions that participants appreciate. This finding is despite the nature of group-based yoga classes that can limit one-to-one interaction; consequently, guidance and communication often targets the entire class and is predominantly unidirectional from the instructor to the students.

The present study is the first investigation of the dynamics underpinning the relationship between yoga instructors and students, as well as the outcomes associated with the quality of this relationship. The high ratings reported by yoga students in scoring relationship quality might indicate that the three components of the coach-athlete relationship (i.e., closeness, commitment, and complementarity; Jowett & Ntoumanis, 2004) can be addressed by effective yoga instructors. As proposed by Davis and colleagues (2019), high-quality coach-athlete relationships can promote skill development and well-being. It may be suggested that participants' high scores on both quality of the relationship and state mindfulness during the yoga class are in support of previous coach-athlete relationship research. In exploring potential explanations of this finding, and considering attachment theory (cf. Bowlby, 1988), as it has been recognized in the coach-athlete relationship (Davis & Jowett, 2010), high-quality yoga instructor-student relationships may be characterized by a non-judgmental and accepting environment which supports participants' perceptions of a secure base (i.e., the instructor) and facilitates growth and development (Davis & Jowett, 2014).

The results of the present study suggest that relationship quality between a yoga instructor and a student may relate to outcomes of yoga practice, however further study is required to address limitations of the present study. Future research may

adopt a longitudinal research design to include baseline measures (i.e., taken prior to commencing yoga practice) to better understand changes over time as well as causal relationships. This is particularly pertinent as both concepts of state mindfulness and relationship quality may be influenced by variables associated with time/duration (Davis & Jowett, 2014).

It is also worth noting that at the time point of data collection, participants would have developed some form of a relationship with the instructor. Participants in the present study knew in advance which instructor was leading the class; it may be deduced that participants comprising the sample were those that were somewhat satisfied with the quality of the relationship with the instructor and outcomes associated with participation. It is possible that the study design excluded those who were not satisfied with the outcomes of the class, or the relationship quality associated with the instructor. Therefore, future studies may attempt to collect data from yoga students that either do not have a relationship or even poor-quality relationship with the instructor, to examine whether the observed associations are present across relationships of varying quality.

An additional limitation of the present study is that despite the use of validated measures that have been used in previous studies in similar research areas, the SMS-PA required translation to Swedish; however, analyses highlighted the measure demonstrated acceptable reliability. On a related note, the CART-Q is a well-established instrument to measure the quality of the coach-athlete relationship; however, it has not been applied to yoga settings. Further, the wordings of the items are oriented to capture positive aspects of a relationship, and the scale normally shows high mean values (Yang & Jowett, 2012). Future research may include the use of instruments that better capture potential negative aspects of poor relationship quality to identify varying nuances that may underlie a wider range of relationships in yoga and exercise settings. A qualitative study could possibly identify what aspects of the relationships to the yoga instructor is meaningful to investigate further.

In summary, research investigating the positive health outcomes of physical activity has documented its effects on both physical and mental well-being (Chekroud et al., 2018). In consideration that yoga combines both mental and physical aspects, yoga has the potential to function as a bridge between regular physical activity and traditional psychological treatments (Jonsson et al., 2020). The growing popularity of yoga has increased its accessibility, therefore further research is warranted to determine both its efficacy as well as the underpinning mechanisms that influence health outcomes. In light of increasing awareness of the importance of mental health and growing waiting lists at primary health care centres, yoga might offer a viable alternative treatment and a preventive intervention that can ease the pressure currently being placed on health care services.

References

- Behzadnia, B., Adachi, P. J., Deci, E. L., & Mohammadzadeh, H. (2018). Associations between students' perceptions of physical education teachers' interpersonal styles and students' wellness, knowledge, performance, and intentions to persist at physical activity: A self-determination theory approach. *Psychology of Sport and Exercise, 39*, 10–19. <https://doi.org/10.1016/j.psychsport.2018.07.003>
- Bhaskaran, K., & Smeeth, L. (2014). What is the difference between missing completely at random and missing at random? *International Journal of Epidemiology, 43*, 1336–1339. <https://doi.org/10.1093/ije/dyu080>
- Bowlby, J. (1988). *A secure base: Clinical applications of attachment theory*. Routledge.
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*, 822–848. <https://doi.org/10.1037/0022-3514.84.4.822>
- Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry, 18*, 211–237. <https://doi.org/10.1080/10478400701598298>
- Butterfield, N., Schultz, T., Rasmussen, P., & Proeve, M. (2017). Yoga and mindfulness for anxiety and depression and the role of mental health professionals: A literature review. *The Journal of Mental Health Training, Education and Practice, 12*, 44–54. <https://doi.org/10.1108/JMHTEP-01-2016-0002>
- Chekroud, S. R., Gueorguieva, R., Zheutlin, A. B., Paulus, M., Krumholz, H. M., Krystal, J. H., & Chekroud, A. M. (2018). Association between physical exercise and mental health in 1·2 million individuals in the USA between 2011 and 2015: A cross-sectional study. *The Lancet Psychiatry, 5*(9), 739–746. [https://doi.org/10.1016/S2215-0366\(18\)30227-X](https://doi.org/10.1016/S2215-0366(18)30227-X)
- Chiesa, A., & Serretti, A. (2009). Mindfulness-based stress reduction for stress management in healthy people: A review and meta-analysis. *The Journal of Alternative and Complementary Medicine, 15*, 593–600. <https://doi.org/10.1089/acm.2008.0495>
- Chong, C. S., Tsunaka, M., Tsang, H. W., Chan, E. P., & Cheung, W. M. (2011). Effects of yoga on stress management in healthy adults: A systematic review. *Alternative Therapies in Health and Medicine, 17*(1), 32–38.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*, 385–396. <https://doi.org/10.2307/2136404>
- Cox, A., Ullrich-French, S., Cole, M. N., & D'Hondt-Taylor, M. (2016a). The role of state mindfulness during yoga in predicting self-objectification and reasons for exercise. *Psychology of Sport and Exercise, 22*, 321–327. <https://doi.org/10.1016/j.psychsport.2015.10.001>

- Cox, A. E., Ullrich-French, S., & French, B. F. (2016b). Validity evidence for the state mindfulness scale for physical activity. *Measurement in Physical Education and Exercise Science, 20*, 38–49. <https://doi.org/10.1080/1091367X.2015>
- Crowe, B. M., & Van Puymbroeck, M. (2019). Enhancing problem-and emotion-focused coping in menopausal women through yoga. *International Journal of Yoga Therapy, 29*(1), 57–64. <https://doi.org/10.17761/2019-00020>
- Davis, L., Appleby, R., Davis, P., Wetherell, M., & Gustafsson, H. (2018). The role of coach-athlete relationship quality in team sport athletes' psychophysiological exhaustion: Implications for physical and cognitive performance. *Journal of Sports Sciences, 36*(17), 1985–1992.
- Davis, L., Brown, D. J., Arnold, R., & Gustafsson, H. (2021). Thriving through relationships in sport: The role of the parent–athlete and coach–athlete attachment relationship. *Frontiers in Psychology, 12*, 1–14. <https://doi.org/10.3389/fpsyg.2021.694599>
- Davis, L., & Jowett, S. (2010). Investigating the interpersonal dynamics between coaches and athletes based on fundamental principles of attachment. *Journal of Clinical Sport Psychology, 4*(2), 112–132. <https://doi.org/10.1123/jcsp.4.2.112>
- Davis, L., & Jowett, S. (2014). Coach–athlete attachment and the quality of the coach–athlete relationship: Implications for athletes' well-being. *Journal of Sports Sciences, 32*, 1454–1464. <https://doi.org/10.1080/02640414.2014.898183>
- Davis, L., Jowett, S., & Tafvelin, S. (2019). Communication strategies: The fuel for quality coach-athlete relationships and athlete satisfaction. *Frontiers in Psychology, 10*, 1–12. <https://doi.org/10.3389/fpsyg.2019.02156>
- Davis, P. A., & Davis, L. (2016). Emotions and emotion regulation in coaching. In P. A. Davis (Ed.), *The psychology of effective coaching and management* (pp. 1–11). Nova Science Publishers Inc.
- Dick, A. M., Niles, B. L., Street, A. E., DiMartino, D. M., & Mitchell, K. S. (2014). Examining mechanisms of change in a yoga intervention for women: The influence of mindfulness, psychological flexibility, and emotion regulation on PTSD symptoms. *Journal of Clinical Psychology, 70*(12), 1170–1182. <https://doi.org/10.1002/jclp.22104>
- Domingues, R. B. (2018). Modern postural yoga as a mental health promoting tool: A systematic review. *Complementary Therapies in Clinical Practice, 31*, 248–255. <https://doi.org/10.1016/j.ctcp.2018.03.002>
- Ennis, C. D. (2017). Educating students for a lifetime of physical activity: Enhancing mindfulness, motivation, and meaning. *Research Quarterly for Exercise and Sport, 88*(3), 241–250. <https://doi.org/10.1080/02701367.2017.1342495>
- Evans, S., Cousins, L., Tsao, J. C., Sternlieb, L. K., & Zeltzer, L. K. (2011). Protocol for a randomized controlled study of Iyengar yoga for youth with irritable bowel syndrome. *Trials, 12*, 1–15. <https://doi.org/10.1186/1745-6215-12-15>
- Gaiswinkler, L., & Unterrainer, H. F. (2016). The relationship between yoga involvement, mindfulness and psychological well-being. *Complementary Therapies in Medicine, 26*, 123–127. <https://doi.org/10.1016/j.ctim.2016.03.011>

- Gardner, B., & Lally, P. (2013). Does intrinsic motivation strengthen physical activity habit? Modeling relationships between self-determination, past behaviour, and habit strength. *Journal of Behavioral Medicine, 36*(5), 488–497. <https://doi.org/10.1007/s10865-012-9442-0>
- Gokal, R., & Shillito, L. (2007). Positive impact of yoga and pranayama on obesity, hypertension, blood sugar, and cholesterol: A pilot assessment. *Alternative Complementary Medicine, 13*, 1056–1057. <https://doi.org/10.1089/acm.2007.0679>
- Graham, J. W., Cumsille, P. E., & Elek-Fisk, E. (2003) Methods for handling missing data. In J. Graham (Ed.), *Handbook of psychology* (1 ed., pp. 87–114). John Wiley and Sons. <https://doi.org/10.1002/0471264385.wei0204>
- Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-based stress reduction and health benefits: A meta-analysis. *Journal of Psychosomatic Research, 57*(1), 35–43. [https://doi.org/10.1016/S0022-3999\(03\)00573-7](https://doi.org/10.1016/S0022-3999(03)00573-7)
- Gustafsson, H., Skoog, T., Davis, P., Kenttä, G., & Haberl, P. (2015). Mindfulness and its relationship with perceived stress, affect, and burnout in elite junior athletes. *Journal of Clinical Sport Psychology, 9*, 263–281. <https://doi.org/10.1123/jcsp.2014-0051>
- Gustafsson, H., Skoog, T., Podlog, L., Lundqvist, C., & Wagnsson, S. (2013). Hope and athlete burnout: Stress and affect as mediators. *Psychology of Sport and Exercise, 14*, 640–649. <https://doi.org/10.1016/j.psychsport.2013.03.008>
- Hanley, A. W., & Garland, E. L. (2014). Dispositional mindfulness co-varies with self-reported positive reappraisal. *Personality and Individual Differences, 66*, 146–152. <https://doi.org/10.1016/j.paid.2014.03.014>
- Hendriks, T., de Jong, J., & Cramer, H. (2017). The effects of yoga on positive mental health among healthy adults: A systematic review and meta-analysis. *The Journal of Alternative and Complementary Medicine, 23*(7), 505–517. <https://doi.org/10.1089/acm.2016.0334>
- Hofmann, S. G., Sawyer, A. T., Witt, A. A., & Oh, D. (2010). The effect of mindfulness-based therapy on anxiety and depression: A meta-analytic review. *Journal of Consulting and Clinical Psychology, 78*(2), 169–183. <https://doi.org/10.1037/a0018555>
- Jeter, P. E., Slutsky, J., Singh, N., & Khalsa, S. B. S. (2015). Yoga as a therapeutic intervention: A bibliometric analysis of published research studies from 1967 to 2013. *The Journal of Alternative and Complementary Medicine, 21*, 586–592. <https://doi.org/10.1089/acm.2015.0057>
- Jonsson, G., Franzén, L., Nyström, M. B., & Davis, P. A. (2020). Integrating yoga with psychological group-treatment for mixed depression and anxiety in primary healthcare: An explorative pilot study. *Complementary Therapies in Clinical Practice, 41*, 101250. <https://doi.org/10.1016/j.ctcp.2020.101250>
- Jowett, S. (2017). Coaching effectiveness: The coach–athlete relationship at its heart. *Current Opinion in Psychology, 16*, 154–158. <https://doi.org/10.1016/j.copsyc.2017.05.006>
- Jowett, S., & Cockerill, I. M. (2002). Incompatibility in the coach-athlete relationship. In I. M. Cockerill (Ed.), *Solutions in sport psychology* (pp. 16–31). Thompson Learning.

- Jowett, S., & Meek, G. (2000). Coach–athlete relationships in married couples: An exploratory content analysis. *The Sports Psychologist, 14*, 157–175. <https://doi.org/10.1123/tsp.14.2.157>
- Jowett, S., & Ntoumanis, N. (2004). The Coach-Athlete Relationship Questionnaire (CART-Q): Development and initial validation. *Scandinavian Journal of Medicine and Science in Sports, 14*, 245–257. <https://doi.org/10.1111/j.1600-0838.2003.00338>
- Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain and illness*. Delacourt.
- Kanner, A. D., Coyne, J. C., Schaefer, C., & Lazarus, R. S. (1981). Comparison of two modes of stress measurement: Daily hassles and uplifts versus major life events. *Journal of Behavioral Medicine, 4*, 1–39. <https://doi.org/10.1007/BF00844845>
- Kelley, H. H., & Thibaut, J. W. (1978). *Interpersonal relations: A theory of interdependence*. Wiley.
- Khoury, B., Lecomte, T., Fortin, G., Masse, M., Therien, P., Bouchard, V., Chaplea, M.-A., Paquin, K., & Hofmann, S. G. (2013). Mindfulness-based therapy: A comprehensive meta-analysis. *Clinical Psychology Review, 33*(6), 763–771. <https://doi.org/10.1016/j.cpr.2013.05.005>
- Kilpatrick, M., Hebert, E., & Bartholomew, J. (2005). College students' motivation for physical activity: Differentiating men's and women's motives for sport participation and exercise. *Journal of American College Health, 54*, 87–94. <https://doi.org/10.3200/JACH.54.2.87-94>
- Kriakous, S. A., Elliott, K. A., Lamers, C., & Owen, R. (2021). The effectiveness of mindfulness-based stress reduction on the psychological functioning of healthcare professionals: A systematic review. *Mindfulness, 12*(1), 1–28. <https://doi.org/10.1007/s12671-020-01500-9>
- La Torre, G., Raffone, A., Peruzzo, M., Calabrese, L., Cocchiara, R. A., D'Egidio, V., Leggieri, P. F., Dorelli, B., Zaffina, S., Mannocci, A., & YOMIN Collaborative Group. (2020). Yoga and mindfulness as a tool for influencing affectivity, anxiety, mental health, and stress among healthcare workers: Results of a single-arm clinical trial. *Journal of Clinical Medicine, 9*(4), 1037. <https://doi.org/10.3390/jcm9041037>
- McMahon, K., Berger, M., Khalsa, K. K., Harden, E., & Khalsa, S. B. S. (2021). A non-randomized trial of kundalini yoga for emotion regulation within an after-school program for adolescents. *Journal of Child and Family Studies, 30*(3), 711–722.
- Messer, S. B., & Wampold, B. E. (2002). Let's face facts: Common factors are more potent than specific therapy ingredients. *Clinical Psychology: Science and Practice, 9*, 21–25. <https://doi.org/10.1093/clipsy.9.1.21>
- Michalsen, A., Grossman, P., & Acil, A. (2005). Rapid stress reduction and anxiolysis among distressed women as a consequence of a three-month intensive yoga program. *Medical Science Monitor, 11*, 555–561.

- Molanorouzi, K., Khoo, S., & Morris, T. (2015). Motives for adult participation in physical activity: Type of activity, age, and gender. *BMC Public Health*, *15*(1), 1–12. <https://doi.org/10.1186/s12889-015-1429-7>
- Muijs, D. (2004). *Doing quantitative research in education with SPSS* (Electronic resource). Sage Publications Ltd.
- Nordin, M., & Nordin, S. (2013). Psychometric evaluation and normative data of the Swedish version of the 10-item Perceived Stress Scale. *Scandinavian Journal of Psychology*, *54*, 502–507. <https://doi.org/10.1111/sjop.12071>
- Ntoumanis, N., & Biddle, S. J. (1999). A review of motivational climate in physical activity. *Journal of Sports Sciences*, *17*(8), 643–665. <https://doi.org/10.1080/026404199365678>
- Ntoumanis, N., Thøgersen-Ntoumani, C., Quested, E., & Hancox, J. (2017). The effects of training group exercise class instructors to adopt a motivationally adaptive communication style. *Scandinavian Journal of Medicine and Science in Sports*, *27*(9), 1026–1034. <https://doi.org/10.1111/sms.12713>
- O'Hara, S. E., Cox, A. E., & Amorose, A. J. (2014). Emphasizing appearance versus health outcomes in exercise: The influence of the instructor and participants' reasons for exercise. *Body Image*, *11*(2), 109–118. <https://doi.org/10.1016/j.bodyim.2013.12.004>
- Park, C. L., Riley, K. E., Bedesin, E., & Stewart, V. M. (2016). Why practice yoga? Practitioner's motivations for adopting and maintaining yoga practice. *Journal of Health Psychology*, *21*, 887–896. <https://doi.org/10.1177/1359105314541314>
- Pascoe, M. C. J., de Manincor, M. J., Hallgren, M., Baldwin, P. A., Tseberja, J., & Parker, A. G. (2021). Psychobiological mechanisms underlying the mental health benefits of yoga-based interventions: A narrative review. *Mindfulness*, *12*, 2877–2889. <https://doi.org/10.1007/s12671-021-01736-z>
- Pedersen, M. R. L., Hansen, A. F., & Elmoose-Østerlund, K. (2021). Motives and barriers related to physical activity and sport across social backgrounds: Implications for health promotion. *International Journal of Environmental Research and Public Health*, *18*(11), 5810. <https://doi.org/10.3390/ijerph18115810>
- Penedo, F. J., & Dahn, J. R. (2005). Exercise and well-being: A review of mental physical health benefits associated with physical activity. *Current Opinions in Psychiatry*, *18*, 189–193. <https://doi.org/00001504-200503000-00013>
- Querstret, D., Morison, L., Dickinson, S., Copley, M., & John, M. (2020). Mindfulness-based stress reduction and mindfulness-based cognitive therapy for psychological health and well-being in nonclinical samples: A systematic review and meta-analysis. *International Journal of Stress Management*, *27*(4), 394–411. <https://doi.org/10.1037/str0000165>
- Rodrigues, F., Macedo, R., Mallett, C. J., Kawabata, M., & Monteiro, D. (2020a). Examining the Coach Motivation Questionnaire in Fitness Professionals (CMQ-FP): Factor structure, invariance, and predictive analysis. *Research Quarterly for Exercise and Sport*, 1–12. <https://doi.org/10.1080/02701367.2020.1846674>

- Rodrigues, F., Teixeira, D. S., Neiva, H. P., Cid, L., & Monteiro, D. (2020b). Understanding exercise adherence: The predictability of past experience and motivational determinants. *Brain Sciences*, *10*(2), 98. <https://doi.org/10.3390/brainsci10020098>
- Ross, A., & Thomas, S. (2010). The health benefits of yoga and exercise: A review of comparison studies. *The Journal of Alternative and Complementary Medicine*, *16*, 2–12. <https://doi.org/10.1089/acm.2009.0044>
- Ruffault, A., Bernier, M., Juge, N., & Fournier, J. F. (2016). Mindfulness may moderate the relationship between intrinsic motivation and physical activity: A cross-sectional study. *Mindfulness*, *7*(2), 445–452. <https://doi.org/10.1007/s12671-015-0467-7>
- Ryan, R. M., & Deci, E. L. (2007). Active human nature: Self-determination theory and the promotion and maintenance of sport, exercise, and health. In M. S. Hagger & N. Chatzisarantis (Eds.), *Intrinsic motivation and self-determination in exercise and sport* (pp. 1–19). Human Kinetics.
- Schneider, J., Malinowski, P., Watson, P. M., & Lattimore, P. (2019). The role of mindfulness in physical activity: A systematic review. *Obesity Reviews*, *20*(3), 448–463. <https://doi.org/10.1111/obr.12795>
- Selvamurthy, W., Sridharan, K., Ray, U. S., Tiwary, R. S., Hegde, K. S., Radhakrishnan, U., & Sinha, K. C. (1998). A new physiological approach to control essential hypertension. *Indian Journal of Physiology and Pharmacology*, *42*, 205–213.
- Sørensen, M., Bentzen, M., & Farholm, A. (2020). Lessons learned from a physical activity intervention in psychiatric treatment: Patient, staff, and leader perspectives. *Frontiers in Psychiatry*, *11*, 87. <https://doi.org/10.3389/fpsy.2020.00087>
- Teixeira, P., Carraca, E., Markland, D., Silva, M., & Ryan, R. (2012). Exercise, physical activity, and self-determination theory: A systematic review. *International Journal of Behavioral Nutrition & Physical Activity*, *9*(1), 78. <https://doi.org/10.1186/1479-5868-9-78>
- Thompson, E. R. (2007). Development and validation of an internationally reliable short-form of the Positive and Negative Affect Schedule (PANAS). *Journal of Cross-Cultural Psychology*, *38*, 227–242. <https://doi.org/10.1177/0022022106297301>
- van der Vijver, F., & Leung, K. (1997). *Methods and data analysis for cross cultural research*. SAGE Publications.
- Watson, D., Clark, L. A., & Carey, G. (1988). Positive and negative affectivity and their relation to anxiety and depressive disorders. *Journal of Abnormal Psychology*, *97*, 346–353. <https://doi.org/10.1037/0021-843X.97.3.346>
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*, 1063–1070. <https://doi.org/10.1037/0022-3514.54.6.1063>
- Wills, T. A. (1986). Stress and coping in early adolescence: Relationships to substance use in urban school samples. *Health Psychology*, *5*, 503–529. <https://doi.org/10.1037/0278-6133.5.6.503>

- Yang, S. X., & Jowett, S. (2012). Psychometric properties of the Coach–Athlete Relationship Questionnaire (CART-Q) in seven countries. *Psychology of Sport and Exercise, 13*(1), 36–43. <https://doi.org/10.1016/j.psychsport.2011.07.010>
- Yook, Y. S., Kang, S. J., & Park, I. (2017). Effects of physical activity intervention combining a new sport and mindfulness yoga on psychological characteristics in adolescents. *International Journal of Sport and Exercise Psychology, 15*(2), 109–117. <https://doi.org/10.1080/1612197X.2015.1069878>

Received: December 6, 2021