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## Exercise and Coping with Stress

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Exercise and Coping with Stress

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Honours Psychology Thesis

School of Behavioral and Social Sciences

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## Abstract

The main objective of the present study was to examine the relationship between the influential effects of participating in habitual exercise regimens and stress perceptions. Previous literature has provided a substantial amount of evidence supporting the physiological underpinnings relative to stress perceptions and the release of stress hormones such as cortisol. It was within this study's interest to investigate both the physiological and cognitive components that contribute to the overall perceptions of stressors throughout an individual's daily functioning. The sample included 52 undergraduate first-year psychology Brescia students, who were recruited via the SONA system in which after informed consent was collected, a Qualtrics link was given, granting access to the survey involving three questionnaires (i.e., Baecke Habitual Physical Activity Questionnaire, Perceived Stress Scale, Hassles and Uplifts Scale) in which the participant completed within one session (i.e., 30 minutes) and was granted one credit (Baecke, 1982; Cohen et al., 1983; DeLongis et al., 1988). It was predicted that individuals who exercised more frequently would demonstrate lower perceived stress levels, although this was not supported in the findings, it was supported, however, that increasing regular exercise routines enhanced perceptions of positive affect in daily functioning. Suggesting that although individuals may not be able to directly control the occurrence of stress perceptions, they can indirectly alter their occurrence by increasing the number of positive appraisals made in regards to their perceptions.

*Keywords:* Exercise, Habitual Physical Activity, Cognitive Appraisal, Perceived Stress, Psychosocial Stressors, Hassles and Uplifts, Undergraduate Students

## **Exercise and Coping with Stress**

Although previous literature has contributed greatly to our understanding of the relationship between the physiological mechanisms underpinning the regulation of stress hormones (i.e., cortisol) secreted in contexts where there is a high degree of perceived stress, through the provision of sufficient amounts of evidence-based studies. Not until more recent years has the exploration into and the expansion of our understanding of the relationship between habitual exercise regimens and their physiological implications on stress hormones been examined from the perspective of the cognitive appraisal of stress perceptions. The focus on mechanisms involved in the functioning and regulation of the release of stress hormones in response to perceived environmental stressors has seemingly shifted research interests. Such systems as the hypothalamic-pituitary-adrenal axis (HPA-axis), which function to regulate the secretion of cortisol levels, influence arousal states within the sympathetic nervous system when there is perceived stress. The relationship between cortisol secretion levels and exposure to daily stressors presents a positive feedback loop, in that once stimuli has been perceived as stressful through the identification of threatening features, a stress response is initiated, creating an associative link between cortisol secretion and the subjective perception of a threat when being exposed to the same stimulus.

The mechanisms involved once cortisol has been released, involves the stimulation of the metabolism as well as gluconeogenesis. Once stimulation of the metabolism occurs, the conversion of different food storages is converted into expendable energy, promoting agility in maintaining a state of being high alert when threat is perceived. Similarly, stimulation of gluconeogenesis involves the production of glucose from non-carbohydrate precursors which ultimately release energy from chemical bonds that have been produced as a result of molecules

being broken down. Although the secretion of cortisol is crucial when faced with serious and real danger, the overproduction of cortisol in situations where threat is merely a perception rather than actual, can lead to consistently high levels of cortisol which have been shown to be associated with symptoms of chronic fatigue and poor immune functioning. This becomes problematic when there is no real threat, but rather just a mere perception of threat, resulting in the overactivation and hypersensitivity to stress responses. As such, it is crucial to understand the lasting impacting effects continuously high levels of cortisol secretion can have in leading to an insufficient functioning in the physiological process of energy conversion for high threat contexts, in which actual survival is required. As a result, it is important to consider protective factors against the overuse and over secretion of mechanisms involved in the production of cortisol.

Recently, identification of psychosocial stressors such as contexts in which we perceive psychological and social stress that contribute to feelings of exclusion, inadequacy, and judgment, have been shown to have influential effects on cortisol secretion levels. Previous studies have found support for associations between an individuals' perceptions of chronic stressors, present and anticipated, with increased levels in the production of salivary cortisol levels in response to such perceived stressors (Smyth et al., 1998). Inversely, the opposite is also plausible, in that cortisol levels may also predict an individuals' responsiveness to perceived stressors due to their level of cortisol secretion, which was supported by the findings demonstrating an increased level of cortisol upon waking that steadily decreased throughout the day leading to influential effects on perceived stressors and affect (Sin et al., 2017). In considering the enhanced effects psychosocial stressors can have on the overall regulation and secretion of stress hormones such as cortisol, it serves as an important point to identify what

types of psychosocial stressors typically evoke stress responses more severely and consistently. In a study conducted by Bolt (2001) a sample involving undergraduate students was collected that had examined the top 10 Hassles and Uplifts ranking from 1-10 in ascending order of importance. The samples' results ranging from the highest to the lowest ranking in terms of their significance in eliciting stress (i.e., daily stressors) of the Hassles portion of the scale included, troubling thoughts about the future as the highest ranked hassles, with following hassles involving not getting enough sleep, wasting time, inconsiderate smokers, physical appearance, too many things to do, misplacing or losing things, not enough time to do the things you need to do, entertainment, and being lonely (DeLongis et al., 1988).

With the aim to formulate a better understanding of how to control for such effects as high cortisol levels, variables such as the sample you are studying, along with their specific commonalities in what they deem stressful (i.e., chronic stressors), are important indicators into what should be considered when accounting for protective factors, as well as the preservation of the body's physiological homeostasis state for cortisol levels. In the context of psychosocial stressors, daily hassles are typically perceived as being much more demanding than they proportionately are within an individuals' life, which can lead to the accumulation of various routes of perceived stressors, especially in the consideration of demographics such as undergraduate students. Chronic exposure to stressors that create a complex interactive relationship fueled by a positive feedback loop, in which minor inconveniences are perceived as stressors to the extent of producing an influx in cortisol secretion, has led researchers to further investigate protective factors to aid in reducing the impact of risk factors in the secretion of cortisol.

A proposed protective factor that has demonstrated encouraging support towards countering the effects of psychosocial stressors, has been exercise. Exercise, which is a subcategory of physical activity, can be defined as the organized and purposeful movement of one's body and muscles with the intent to improve their physical fitness as well as their health (Caspersen et al., 1985). Exercise has shown beneficial effects in the downregulation of stress responses such as the production of stress hormones to psychosocial stressors (Pauly et al., 2019). As a result, exercise has been most recently examined in relation to its potential beneficial effects in regulating the overproduction of stress hormones (i.e., cortisol). As such, habitual exercise should prove to be a good predictor in attenuating to dysregulated levels of cortisol secretion because of hypersensitive perceptions of threats within contexts where psychosocial stressors are present.

Stress, which can be understood in terms of an individuals' either real or estimated perception of threat, leads to the production of physiological responses such as an influx in the secretion of cortisol which promotes a state of arousal to aid in the protection against a perceived threat. Important, however, is the need to consider cognitive and mental aspects contributing to the perception process of stressors and threats, but also to the process of evaluating one's biological resources that would be required in a situation deemed stressful. Such a process relies on cognitive appraisal, and more specifically, on the theoretical understanding of the threat matrix, which posits that whether a situation is deemed overly stressful or manageable depends on whether it is perceived as a challenge that can be overcome, or as a threat that requires one to retreat (vonRosenberg, 2019). With the current availability within the area of literature focused on providing informative knowledge pertaining to different mechanisms to decrease states of arousal in contexts in which perceived stressors and threats are present, one important aspect

involves the better understanding of how cognitive appraisals can contribute to such bodily reactions. That is, how cognitive appraisals of situations in which there is a high degree of perceived stress or threat, can thereby lead to the overproduction of cortisol which has the potential to ultimately affect functionality of cortisol secretion long-term with associated symptoms like chronic fatigue and poor immune functioning. The process involving cognitive appraisal, can be understood as being broken down into two perspectives when appraising a stimulus or situation as being either a 'threat' or 'challenge'. 'Threats', which can be defined as the occurrence of demands that outweigh an individuals' physiological resources, and 'challenge' which can be defined as the occurrence in which resources are sufficient to meet the demands (Harvey et al., 2010). In a study in which the relationship between the extent in which cognitive appraisals contributed to subjective and physiological stress responses within contexts of high perceived stress, it was found that individuals who appraised situations as a 'threat', demonstrated a positive correlation with cortisol levels and STAI responses (Harvey et al., 2010). It was also found that appraisals were appraised as either a 'threat' or 'challenge' based on the subjectivity of the individuals' which ultimately predicted stress responses within such given contexts (Harvey et al., 2010).

Findings from a study examining the relationship between exercise and the regulation of cortisol secretion levels, found support for a dose-dependent effect in which the level of exercise was a good predictor of cortisol secretion levels, which in turn, had influential effects on HPA reactivity to psychosocial stressors (Caplin et al., 2021). Additional findings provided by a study examining the effects of exercise as a protective factor in older adults vulnerable to increased cortisol:DHEA ratios, as well as flatter DHEA diurnal rhythms, found that exercise was effective in its ability to mitigate the negative effects of individuals exposed to high degrees of stress



(Heaney et al., 2014). Taken altogether then, the association between the level of participation in physical activity and the directionality of the diurnal cortisol slope is predicted by an inverse relationship in which the more an individual exercises, the steeper their diurnal cortisol slope has been shown to be, demonstrating implications of enhanced regulatory mechanisms proportionate to cortisol secretion (Moyers & Hagger, 2023).

As a result, although psychosocial stressors can pose as a potential factor towards the development and maintenance of chronically high levels of cortisol, especially when considering a population of individuals that endure various types of stressors in high-demand contexts, exercise continues to demonstrate protective characteristics in mitigating the negative effects resulting from poor stress reactivity. With great efforts extended into examining the relationship between stress regulation and exercise, aspects that may lead to enhancement in the responses to perceived stressors, tend to be overlooked such as the frequency and consistency in which someone participates in exercise (regularly), as well as the cognitive appraisal aspects of perceiving stress and using exercise as a way to cope with the overstimulation of stress hormones such as cortisol. Habitual exercise, which can be defined as the purposeful practice of repetitive engagement in bodily movements with intent to improve one's physical health, may propose additional health benefits that go beyond that of acute single bouts of exercise training. Habitual exercise offers the opportunity for the body's physiological systems to re-adjust and adapt to alternative modes of functionality, in that the activation of the nervous system while exercising has demonstrated support towards enhanced effects in controlling for not only physiological changes, but also subjective perceptual responses pertaining to cognitive inhibitory control (Sugimoto et al., 2020). Overtime, the threshold for tolerance of psychosocial stressors in producing stress hormones in a compensatory manner, is increased resulting in a higher tolerance

towards psychosocial stressors. The repetitive activation of the nervous system increases physiological responses (e.g., breathing, heart rate) indirectly produces a higher threshold for psychosocial stressors through the hormone cortisol, by demonstrating dampening effects, demonstrated by the cross-stressor adaptation hypothesis (Sothmann et al., 1996).

The development in the body's ability to downregulate stress responses to psychosocial stressors can be seen as an effect exhibited through the engagement in specifically habitual exercise (Wunsch et al., 2019). Such an engagement in habitual exercise has demonstrated encouraging findings in support of such forms of exercise having the capacity to control for peak cortisol levels. Additional literature has also provided support towards the cross-stressor adaptation hypothesis through the demonstration that with increased participation in exercise, enhancement in the regulatory mechanisms involved in the systemic and cellular immune responses to both psychological and chronic life stressors is exhibited (Slusher & Acevedo, 2023). The present availability in literature examining the relationship between increased tolerance towards psychosocial stressors through the application of physiological adaptations produced by participation in habitual exercise regimens, has seemingly posited as limited in scope concerning the generalizability in its ability to support the effectiveness exercise has the potential to have in regulating stress responses. The literature is especially limited among samples that require mechanisms involved in regulating the secretion of cortisol, the most, such as undergraduate samples. Demonstration of encouraging findings were found in a study, in which evidence supporting the physiological underpinnings of the stress response provided further understanding for the mechanisms involved leading to adaptations to stress responses to perceived stress that was accounted for by the implementation of excessive participation in exercise regimens, leading to re-adjustments in stress-related perceptions (Rimmele et al., 2009).

Adaptations made to baseline threshold for perceptions of psychosocial stressors and their associated effects (e.g., decreased cortisol secretion), was accounted for through the implementation of regular exercise regimens, in which a correlation between trained individuals and lower rates of cortisol levels as well as physiological and psychological effects were found to be predictive of stress perceptions (Rimmele et al., 2009). Optimization of effects relating to the management of stress perceptions through the implementation of exercise regimens, is suggestive in that in order to see the most beneficial effects in the physiological adaptations as well as the psychological adaptations to stress responses, exercise must occur on a continuous basis.

In evaluating the most optimal measurement tool for measuring variables such as the engagement in habitual exercise, and the frequency and types of stressors to occur in daily, psychosocial contexts, it is essential to understanding relevant factors that pertain to a specific population and demographic group. Undergraduate students, for example, typically undergo considerable amounts of stress and tension when attempting to balance and structure their life. In understanding the aspects that contribute to stress, examination of the top 10 Hassles within an undergraduate sample, with troubling thoughts about the future ranking highest, and being lonely ranked the lowest in terms of importance (Bolt, 2001). The Hassles and Uplifts Scale (DeLongis et al., 1988) is a self-report measurement tool that offers efficient and accurate depictions of what types of stressors are leading to increased levels of cortisol secretion. Another measurement tool used within the measurement of stress perceptions is the Perceived Stress Scale (Cohen et al., 1983) which has demonstrated reliability and validity in measuring subjects' self-reported frequency and occurrence of experienced stressors within the past month. This scale has been used on a wide range of samples (i.e., older adults, undergraduate students) and has been proven

to be adequate in measuring and predicting severity and occurrence of perceived stressors (Heaney et al., 2014). Although self-report measurement tools have become common, especially within the discipline of the social sciences, when conducting research concerning psychological well-being or disorderly affect, it has not been so common in practice among areas of research that measure physiological effect in bodily alterations. However, there are adequate self-report measurement tools shown to be effective in predicting an individuals' engagement in habitual exercise regimens relative to the occurrence of physiological changes. The International Physical Activity Questionnaire was most frequently used within studies using self-report measurement tools for monitoring physical activity (Moyers & Hagger, 2023). However, with limitations such that monitoring of physical activity only corresponds with measures taken within the past seven days, an alternative self-report measurement was required within this specific study. As such, the use of the Baecke Habitual Physical Activity Questionnaire (Baecke et al., 1982), which records physical activity within the past 12 months, and is a comprehensible and applicable measurement tool effective in its ability to measure an individual's habitual participation in exercise both within the context of sports or exercise, as well as any physical activity done within personal leisure time.

The aim of this study was to examine what predicts improvements in the regulation of stress perceptions. It was predicted that habitual exercise would lead to enhancements in cognitive appraisals made concerning stress perceptions of psychosocial stressors (i.e., perceived stress, daily hassles). It was hypothesized that students' stress scores on the PSS and the Hassles and Uplifts Scale would be predicted by the level of their participation in habitual exercise scores, indicated by BHPAQ scores (Baecke, 1982; Cohen et al., 1983; DeLongis et al., 1988). Suggesting that as participants' participation in regular exercise regimens increased (or remained

high) there would be a demonstration of lower perceived stress scores among the physically active group, then when compared to participants who were deemed inactive in regular exercise participation who were predicted to have higher perceived stress scores. Additionally, it was also hypothesized that there would be correlational effects beyond that of the correlational effects between time spent exercising and perceived stress score, in that time spent exercising would also be a predictive factor for uplift scores (i.e., daily comforts).

## **Method**

### **Participants**

53 undergraduate first-year Brescia psychology students were recruited via the SONA system, in which participants read the description for the ‘call for participants’, and those who were interested in participating in the study were then guided to a Qualtrics link to complete the survey. However, due to uncompleted data regarding participants’ Uplift scores, three participants were excluded from data analyses for average Uplift scores, with a total of 50 students sufficiently completing the Uplifts’ section within the Hassles and Uplifts Scale for comprehensible data analyses. In total 50 students (50 women) with a mean age of 19.4, data was collected throughout the entire study. All the procedures were granted and conducted in accordance with approval from the Brescia Research Ethics Board. Prior to conducting any testing or collection of data, participants were informed about the study and asked to sign an informed consent form if they were interested in participating within the study.

### **Materials**

The current level of participation in regular exercise routines was measured using the Baecke Habitual Physical Activity Questionnaire (Baecke, 1982), which measures an individuals’ current participation in habitual exercise through the measurement of three separate

components of physical activity: work activity, sports activity, and leisure activity (see Appendix A). The scale provides precision and accuracy in understanding the various subdomains that contribute to an individual's participation in physical activity within their daily functioning. The scale consists of eight items that measure all three components that contribute to the analysis of habitual exercise participation. The scale is based on a semi-structured format, with the first item consisting of an open-ended question prompting the participant to indicate the frequency of their current level of participation in sports or exercise regimens. The total amount of time spent exercising was broken down into two continuous variables (i.e., total hours per week spent exercising and total months per year spent exercising) in which the total hours per week spent exercising was accounted for in considering both participation in primary sports or exercise as well as secondary sports or forms of exercise. Similarly, total months per year spent exercising or playing sports also accounted for primary and secondary forms of participation. Following the first item, the remaining seven items within the scale operate off a Likert scale that ranges from 5= higher frequencies in participation in exercise or sports, to 1= low or no participation in exercise or sports, with two items on the scale reverse-coded (i.e., item 2, and item 3). Note that the wording of one item on the Habitual Physical Activity Questionnaire, Question 1, was edited to provide participants with more clarity and better comprehension regarding the intent of the question.

The Perceived Stress Scale (Cohen et al., 1983) is one of the most used psychological instruments for measuring an individual's perceptions of stress (see Appendix B). The scale items inquire about recent (e.g., within the past month) thoughts and feelings related to stress perceptions. The PSS measures the frequency in which certain feelings or thoughts are likely to occur and the way in which they occur and are perceived. The PSS functions on a Four-point

Likert scale in which the items are evaluated ranging from 0= never, to 4= very often. The scale consists of 10 items all based on the premise of frequency, occurrence, and severity.

The Hassles and Uplifts Scale (DeLongis et al., 1988) is a psychological instrument that was used within the present study to measure the extent of individuals' exposure to 'hassles' such as chronic daily stressors, as well as 'uplifts' such as daily comforts, that contribute to an individuals' perceptions within their daily functioning. 'Hassles' scores and 'Uplifts' scores were also broken down into two continuous variables that were measured among participants in correlation with other variables. The scale operated on a three-point Likert scale, ranging from 0= none or not applicable, to 3= a great deal (see Appendix C). The Three-point Likert scale is applied to both sides of the item scale, the hassles, and the uplifts, and operates on the premise that participants rate both categories for each item provided on the scale to indicate the frequencies of both stressors and comforts.

### **Procedure**

Participants were recruited via the SONA system, which they had been informed of by their first-year psychology course administrators. Once participants had read over the description for the 'call for participants' and were interested, participants were then given a link which granted them access to the Qualtrics survey, allowing for the completion of the questionnaires. Participants were granted one credit for 30 minutes of participation. The study involved one session in which participants were asked to indicate their current level of participation in exercise regimens by answering items on the Baecke Habitual Physical Activity Questionnaire (Baecke, 1982), after activity level was indicated on behalf of the participant they were then asked to indicate the occurrence in which a given stimulus is typically seen as a significant stressor within the individuals' functioning (Cohen et al., 1983). Following the measurement of recent stress

perceptions, participants were then finally asked to indicate whether certain items on the scale were typically appraised as being a ‘hassle’ or an ‘uplift’ to their daily functioning (DeLongis et al., 1988).

## Results

A correlational analysis was performed using Jamovi version 2.3.28 to evaluate the correlations between the hours per week spent exercising or playing sports, the months per year spent exercising or playing sports, Perceived Stress Scale (PSS) scores, Hassles score, and Uplifts score. A correlational analysis was conducted to assess the significance of correlations between the different dependent variables.

Table 1 includes the correlation coefficients, the degrees of freedom, and the significance levels between hours spent per week exercising, months per year spent exercising, PSS scores, Hassles scores and Uplifts scores. There was a strong, significant, positive correlation found between total hours spent exercising and Uplifts score,  $r(49) = .327^*$ ,  $p < .01$ ,  $r^2 = .06$  (see Figure 1). There was a weak, positive correlation that had approached significance, found between total hours spent exercising and Hassle's scores,  $r(52) = .245$ ,  $p = .074$ ,  $r^2 = .06$  (see Figure 2). There was a weak, non-significant, positive correlation found between total hours spent exercising and PSS scores,  $r(52) = .017$ ,  $p > .1$  (see Figure 3).



Table 1

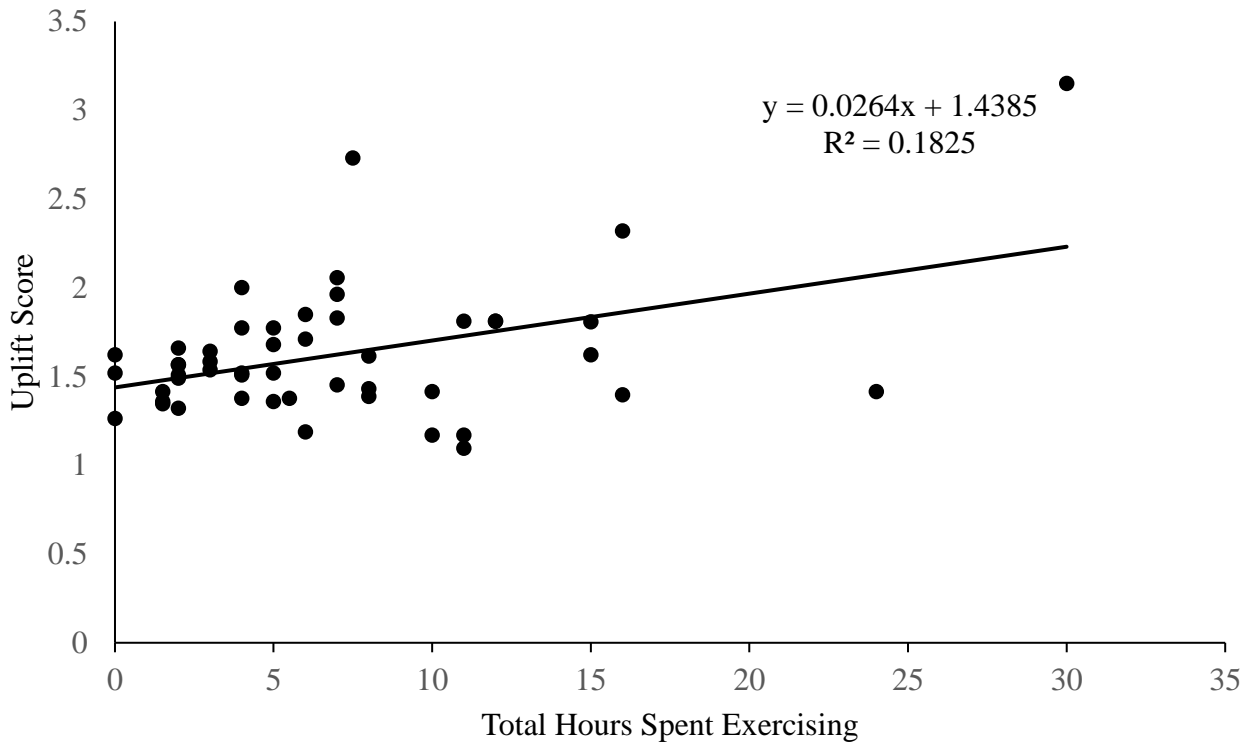
|               |             | Total Hours | Total Months | PSS Score | Hassles Score | Uplifts Score |
|---------------|-------------|-------------|--------------|-----------|---------------|---------------|
| Total Hours   | Pearson's r | —           |              |           |               |               |
|               | df          | —           |              |           |               |               |
|               | p-value     | —           |              |           |               |               |
| Total Months  | Pearson's r | 0.739***    | —            |           |               |               |
|               | df          | 52          | —            |           |               |               |
|               | p-value     | < .001      | —            |           |               |               |
| PSS Score     | Pearson's r | 0.017       | -0.097       | —         |               |               |
|               | df          | 52          | 52           | —         |               |               |
|               | p-value     | 0.905       | 0.486        | —         |               |               |
| Hassles Score | Pearson's r | 0.245       | 0.128        | 0.348**   | —             |               |
|               | df          | 52          | 52           | 52        | —             |               |
|               | p-value     | 0.074       | 0.355        | 0.010     | —             |               |
| Uplifts Score | Pearson's r | 0.327*      | 0.135        | 0.309*    | 0.438**       | —             |
|               | df          | 49          | 49           | 49        | 49            | —             |
|               | p-value     | 0.019       | 0.347        | 0.027     | 0.001         | —             |

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

Figure 1

Figure 1

Exercise and Uplifts

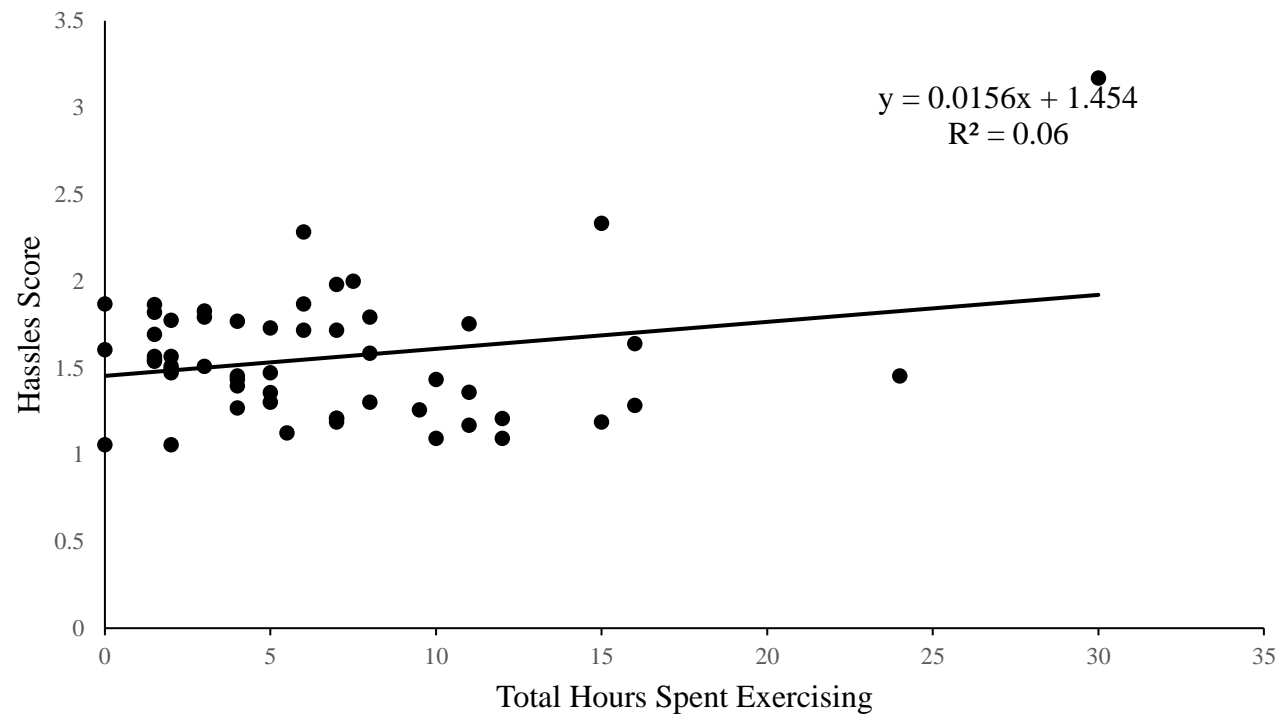


Note. This figure represents the correlation between total hours spent exercising and uplift scores. Data points represent hours spent exercising and uplift scores for one or more participants. There is a strong, significant, positive correlation between total hours spent exercising and uplift scores,  $r(49) = .327^*$ ,  $p < .01$ ,  $r^2 = .06$

Figure 2

Figure 2

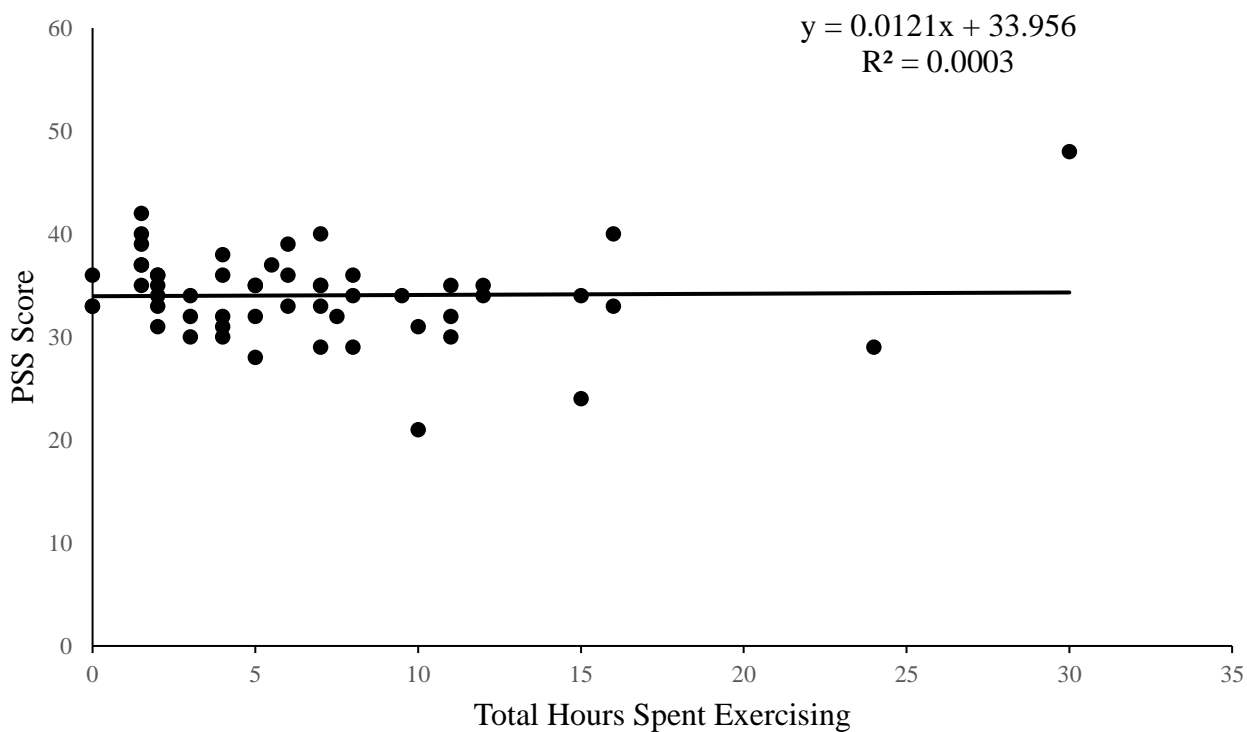
Exercise and Hassles



Note. This figure represents the correlation between total hours spent exercising and Hassles score. Data points represent total hours exercising and hassles score for one or more participants. There was a weak, positive correlation found between total hours exercising and hassle score, that was approaching significance,  $r(52) = .245, p = .074, r^2$

Figure 3

Figure 3

*Exercise and PSS*

*Note.* This figure represents the correlation between total hours spent exercising and perceived stress scale (PSS) scores. Data points represent total hours exercising and PSS score for one or more participants. There was a weak, non-significant, positive correlation between total hours spent exercising and PSS scores,  $r(52) = .017, p > .1$

## Discussion

Results indicated that although the correlation between total hours spent exercising and hassles score, as well as PSS score did not demonstrate significance, total hours spent exercising and uplifts score did. That is, although the initial hypothesis was not supported, in that increased number of hours spent exercising was not a significant predictor of lower Hassle scores and PSS scores, a strong effect was found between total hours spent exercising and Uplift scores. This suggests that increasing efforts in the participation of regular exercise routines may not directly affect stress perceptions in a sample such as undergraduate students who are chronically at an increased risk for facing copious amounts of daily stressors. It does suggest that increasing participation in regular exercise regimens can lead to the enhancement of the cognitive appraisals of perceiving certain stimuli as more of an ‘uplift’ rather than a ‘hassle’. Indicating that although we may not be able to alter our stress perceptions to decrease what we may perceive as a ‘threat’, we can initiate the process of increasing the number of perceptions we have that we perceive as a ‘challenge’, therefore improving on our tendencies to appraise our perceptions of stress-related contexts as significantly stressful.

The aim of this study was to examine whether regular exercise routines influenced enhancing and regulating stress perceptions. An important contributor to the overall perception of whether a stimulus is perceived as stressful, and its perceived severity, is dependent on the subjectivity of the individual. In the attempt to understand why some individuals may be more prone to appraising their perceptions as more positive in comparison to others who may appraise it as more negative, one important predictor includes approaching the analyses of an individuals’ tendencies from a biopsychosocial model (Engel, 1977). This approach considers all aspects of

an individuals' life that may be contributing to the cognitive appraisal process underpinning stress perceptions, and more specifically, why stress-related contexts have the potential to be appraised as either a 'threat' or a 'challenge' (Harvey et al., 2020). Additionally, the biopsychosocial model also considers the biological predispositions to the subjectivity concerning an individuals' stress perceptions. The results within the present study provide additional support towards the understanding that through increased efforts in maintaining regular exercise regimens, individuals can re-adjust their perceptions by enhancing the 'uplifts' within their lives. Furthermore, the contexts in which an individual has previously been exposed to, or previously perceived as 'threatening' or stressful, does not necessarily permanently predict their association to the specified stimulus, and in fact, with adequate practice and implementation of regular exercise routines, combined with the active effort to alter one's cognitive appraisals of perceived 'stressors', an individual can begin to promote a healthier positive feedback loop, which prompts more positive affect.

The limitations within the present study included a restricted sample size, in that participants included only first-year undergraduate female psychology students. Further limitations involved the lack of feasibility in measuring and collecting additional data on cortisol secretion levels as well as the time restrictions imposed due to restrictions of students only having access during the school year. Future research should aim to include a larger and more diverse sample that can account for various characteristics that can not only contribute to perceived stressors within a sample such as undergraduate students but can also lead to a better understanding of the types of stressors such a specific sample endures while in school. This would allow for better accountability in the variance of perceived stress among students of all ages, genders, and programs. Future research should strive to implement approaches centered

around the biopsychosocial model (Engel, 1977), as accounting for an individuals' variability in their exposure to chronic stressors, the severity of the types of stressors, their support systems, and other contributing factors that take on the role of either being a protective factor or a risk factor, should be accounted for during data collection.

Taken altogether then, although increasing participation in regular exercise routines did not decrease the likelihood in stress perceptions occurring, it did increase positive perceptions of uplifts and daily comforts. Although fluctuations in the ways in which we perceive and make appraisals of certain situations may not always be consistent, we can help reduce the amount we are exposed to perceived stress, through indirectly altering our appraisals of contexts as more positive and uplifting.

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