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Testing the Dualistic Model of Passion Using a Novel Quadripartite Approach: A Look at
Physical and Psychological Well-Being

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Abstract

Objective: Passion research has focused extensively on the unique effects of both harmonious passion and obsessive passion (Vallerand, 2015). We adopted a quadripartite approach (Gaudreau & Thompson, 2010) to test whether physical and psychological well-being are distinctly related to subtypes of passion with varying within-person passion combinations: pure harmonious passion, pure obsessive passion, mixed passion, and non-passion.

Method: In four studies (total $N = 3122$), we tested if passion subtypes were differentially associated with self-reported general health (Study 1), health symptoms in video gamers (Study 2), global psychological well-being (Study 3), and academic burnout (Study 4) using latent moderated structural equation modeling.

Results: Pure harmonious passion was generally associated with more positive levels of physical health and psychological well-being compared to pure obsessive passion, mixed passion, and non-passion. In contrast, outcomes were more negative for pure obsessive passion compared to both mixed passion and non-passion subtypes.

Conclusions: This research underscores the theoretical and empirical usefulness of a quadripartite approach for the study of passion. Overall, the results demonstrate the benefits of having harmonious passion, even when obsessive passion is also high (i.e., mixed passion), and highlight the costs associated with a pure obsessive passion.

Keywords: harmonious passion; obsessive passion; health; subjective well-being; burnout

Testing the Dualistic Model of Passion Using a Novel Quadripartite Approach: A Look at Physical and Psychological Well-Being

The dualistic model of passion (Vallerand et al., 2003) differentiates between two dimensions of passion: *harmonious passion* (HP), entailing a balanced, authentic relationship toward an activity that one loves, and *obsessive passion* (OP), involving preoccupation and rigid persistence in the beloved activity. Passion research typically treats both passion dimensions as constructs that, although related, uniquely predict cognitive, emotional, behavioral, and health outcomes (Curran, Hill, Appleton, Vallerand, & Standage, 2015; Vallerand, 2015). However, research has yet to examine the *within-person organization* of both passion dimensions and how levels of both HP and OP interrelate to predict outcomes. Distinct subtypes of passion can be identified by focusing on the varying levels of both HP and OP that coexist within people. This approach leads to novel hypotheses and insights that remain inaccessible when passion dimensions are treated as variables that operate independently of one another. In this research, we outline and highlight the benefits of a *quadripartite approach* – a novel approach to passion research – and apply it across four studies investigating physical and psychological well-being.

The Duality of Passion

The dualistic model of passion (Vallerand et al., 2003) defines passion as a strong desire to engage in an activity that a person enjoys, highly values, spends a great deal of time and energy pursuing, and that has been internalized into a person's identity (Vallerand, 2015).

Importantly, the dualistic model distinguishes between two passion dimensions. The first, HP, is a result of an activity being fully integrated into a person's identity (Deci & Ryan, 2000). This means that a passion is congruent with one's personal values or goals and is pursued with a sense of personal endorsement and volition. The more one has an HP for an activity, the more one accepts the passion as their own and feels to be in control of activity engagement. This type of

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relationship with an activity represents autonomous internalization of the activity (Ryan & Deci, 2017) whereby a person accepts a passion as an important part of the self without any contingencies driving activity engagement. The second passion dimension, OP, is a result of an activity being only partially internalized into one's identity. In this case, although the person loves the activity, activity engagement is driven by contingencies that are linked with the activity, such as a desire for self-esteem or social acceptance (e.g., Mageau, Carpentier, & Vallerand, 2011; Vallerand et al., 2003). The more one has an OP, the more one feels an uncontrollable urge to pursue an activity that one loves, often at the expense of other activities. This relationship with an activity represents controlled internalization of the activity (Ryan & Deci, 2017) whereby a person feels pushed to pursue a passionate activity by forces outside the integrated self. Therefore, although both HP and OP share many conceptual characteristics (e.g., enjoyment of an activity, a strong desire to pursue an activity, finding an activity important and meaningful, and an activity becoming internalized into one's identity), they nevertheless differ in the quality of motivation one has for an activity; the respective sources of activity engagement for HP and OP lie *inside* and *outside* one's true, authentic self (Vallerand, 2015).

The dualistic model posits that HP and OP should lead to adaptive and less adaptive outcomes, respectively (Vallerand, 2015; for a meta-analysis, see Curran et al., 2015). Research studying the unique effects of both passion dimensions has generally supported this hypothesis. HP has been positively associated with outcomes while engaging in an activity such as positive emotions (e.g., Vallerand et al., 2006), enhanced concentration (e.g., Forest, Mageau, Sarrazin, & Morin, 2011) and flow (e.g., Vallerand et al., 2003), whereas OP has been linked with less adaptive outcomes including negative emotions (e.g., Vallerand et al., 2006) and aggression (e.g., Donahue, Rip, & Vallerand, 2009). However, an important postulate of the dualistic model

is that the effects of passion extend *beyond* the passionate domain; more precisely, the extent to which one's passion for a specific activity is harmonious or obsessive should also differentially predict outcomes outside the passionate activity (Vallerand, 2015, 2016). Again, research focusing on various global outcomes such as psychological well-being (e.g., Philippe, Vallerand, & Lavigne, 2009; Vallerand, 2012), physical health (Carbonneau, Vallerand, & Massicotte, 2010), and interpersonal relationship quality (Vallerand et al., 2008) has supported this postulate.

Extending the Dualistic Model of Passion with a Quadripartite Approach

Although much has been learned from research focusing on the unique effects of both passion dimensions, we think that novel research questions and hypotheses can emerge by focusing on the coexistence of both passion dimensions within each person. Theory and research on other dualistic personal or motivational constructs such as attachment (e.g., Bartholomew & Horowitz, 1991), sex-role orientation (e.g., Whitley, 1984), and perfectionism (e.g., Gaudreau, 2012; Hill, 2013) has benefited from a focus on within-person differences in construct dimensions. We advance that a similar approach will shed new light on passion.

The dualistic model outlines that HP and OP lie on two separate continua, meaning that it is possible for people to experience different degrees of *both* HP and OP toward the same activity (Vallerand, 2015). Some people are likely to experience similar levels of both HP and OP whereas others may predominately experience either HP or OP. Correlational research usually reports a positive correlation between HP and OP (e.g., Marsh et al., 2013), thus suggesting that many but not all people who are high (or low) on HP are also high (or low) on OP. Experimental studies have also revealed that experiencing HP or OP toward an activity can be temporarily enhanced using a mindset induction procedure (e.g., Bélanger, Lafrenière, Vallerand, & Kruglanski, 2013), suggesting that specific dimensions of passion can be triggered

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in different situations. Overall, there appears to be sufficient empirical basis to formulate that distinct within-person combinations of HP and OP need to be considered to fully understand the outcomes associated with passion.

From a more theoretical standpoint, the processes that are involved in the initiation, ongoing development, and maintenance of HP and OP also explain why both passion dimensions can coexist within individuals. The dualistic model, much like the processes that are involved in the internalization of non-interesting activities (e.g., Ryan & Deci, 2017), outlines that personal and environmental factors that promote autonomous and controlled activity internalization facilitate the initial development of HP and OP, respectively. Autonomous internalization is facilitated by factors that allow people to feel that they are the source of activity engagement (e.g., autonomy support from others), whereas controlled internalization emerges when people feel forced or compelled to pursue an activity (e.g., controlling, high-pressure environments). The internalization of passionate activities, however, is rarely completely autonomous or completely controlled (Vallerand, 2015), meaning that people may experience different degrees of both HP and OP for the same activity. Indeed, HP and OP are context-specific motivational constructs (Vallerand, 1997) that are sensitive to factors affecting activity internalization at global (e.g., dispositional internalization tendencies), contextual (e.g., autonomy support from others), and situation-specific (e.g., daily fluctuations in autonomy-supporting or controlling factors) levels of generality. Subtle variations in these types of environmental and social factors (e.g., the people with whom we interact, the situations we face, the pressure we feel, the autonomy support we receive) will make both HP and OP coexist within the same person. Furthermore, in most complex environments in which passionate activities are pursued, it is possible for either HP or OP to be promoted through the effects of supporting and controlling

forces present at the global, contextual, and/or situational levels. For example, it is not rare for parents, teachers, coaches, and employers to behave in ways that incorporate subtle pressure along with support provision (Ryan & Deci, 2017). Overall, based on both empirical and conceptual arguments, we advance that the dualistic model of passion provides the needed foundation for a quadripartite approach in which the two passion dimensions coexist within each person but to a different degree across individuals.

Researchers have yet to consider how important outcomes within and outside a passionate domain relate to different within-person combinations of HP and OP. For example, extensive research has found that HP and OP predict adaptive and maladaptive outcomes, respectively (for a meta-analysis, see Curran et al., 2015). However, are people with high levels of HP *combined with* low levels of OP at an advantage compared to people with high levels of both HP and OP? Also, are people with high levels of OP protected against adverse outcomes when HP is also high? The quadripartite approach offers the needed framework to answer such novel questions by examining the extent to which different within-person combinations of the two passion dimensions – *subtypes of passion* – differentially relate to outcome variables.

Subtypes of Passion and Hypotheses of the Quadripartite Approach

Passion subtypes. The quadripartite approach to passion leads to the formulation of four prototypical subtypes of passion based on the relative strength (i.e., high/low) of both HP and OP (see Figure 1). First, high levels of HP combined with low levels of OP are the definitional characteristics of a subtype of *pure HP* toward an activity. Those with a pure HP have internalized the activity in a completely autonomous way and display all the hallmarks of an HP, including a sense of control, openness, and balance when pursuing a passion. Second, high levels of OP combined with low levels of HP form the basis for a subtype of *pure OP* toward an

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activity. Those with a pure OP have internalized the activity in a completely controlled way and display all the characteristics that define an OP, such as an uncontrollable urge to pursue a passion that comes at a cost to other life pursuits. Third, some people have very low levels of passion for an activity. In fact, previous research has found that between 15% and 25% of people are not passionate about any activity in their lives (see Philippe et al., 2009; Schellenberg & Bailis, 2015; Vallerand et al., 2003). Low levels of passion, as reflected by low levels of both HP and OP, represent the definitional features of a *non-passion* subtype.

Fourth and finally, the subtype *mixed passion* is perhaps the most novel and warrants some elaboration. The mixed passion subtype describes the coexistence of high levels of both HP and OP toward an activity. With mixed passion, individuals experience the passionate activity as being in harmony in their lives, but also acknowledge that their passion can often become an obsession. This subtype therefore involves both HP and OP being highly available and most prone to being accessed in specific situations (e.g., Higgins, 1996). People should be most likely to experience mixed passion toward an activity in complex environments that contain both autonomy supporting and controlling factors. For example, suppose Mariah is a university student who is passionate about her studies. She loves to study because she finds it fun and important, and she usually does not allow it to dominate her identity and get in the way of other activities that she likes to pursue. But on some days, especially during the exam period, or in some of her most demanding courses, she feels obsessed about studying: her thoughts can get preoccupied with school, and she sometimes stays up late and sacrifices sleep so she can study for a few extra hours. When Mariah reflects on her passion for her studies, it is likely that she would feel strong levels of both HP (she frequently feels harmonious toward her studies) and OP (she frequently feels obsessed toward her studies). The mixed passion subtype thus represents an

intriguing subtype given that it involves simultaneously high levels of both passion dimensions.

Hypotheses of the quadripartite approach. Research studying the unique effects of both passion dimensions has, in general, linked HP and OP with better and worse adjustment, respectively (Vallerand, 2015).¹ The use of a quadripartite approach allows for these general predictions about both passion dimensions to be translated into six specific hypotheses concerning the differential associations between the subtypes of passion and adjustment. A visual representation of these hypotheses is presented in Figure 1.

A pure HP subtype should be associated with better adjustment than the other passion subtypes. High levels of HP combined with low levels of OP should help people enjoy all the benefits of having high HP (e.g., control over activity engagement, frequent positive emotions, experiences of flow) without experiencing the costs of having high OP (e.g., frequent negative emotions, rumination, life conflict; Curran et al., 2015). Having a pure HP should therefore be associated with higher levels of adjustment compared to passion subtypes that involve low HP (i.e., pure OP and non-passion subtypes), or that simultaneously combine high levels of HP and OP (i.e., mixed passion subtype). Thus, the first three hypotheses predict that pure HP will be associated with better adjustment compared to subtypes of pure OP (hypothesis 1), mixed passion (hypothesis 2), and non-passion (hypothesis 3).

The fourth hypothesis concerns the similarities and differences between pure OP and mixed passion subtypes. On the one hand, both subtypes involve feeling some degree of OP toward an activity, which should likely detract from one's well-being (e.g., Philippe et al., 2009). On the other hand, those with mixed passion uniquely feel high degrees of HP, which should positively contribute to adjustment. Moreover, research studying passion toward multiple

¹ We use "adjustment" as a broad term to refer to higher levels of adaptive outcomes such as psychological well-being and health, and lower levels of maladaptive outcomes such as depression and negative emotions.

activities has found that people with a predominant HP for one activity but a predominant OP for another activity report levels of well-being that are more similar to those with two passions that are both predominately HPs compared to those with two passions that are both predominantly OPs (Schellenberg & Bailis, 2015). This suggests that, when both passion dimensions are present, HP can compensate for the costs of having OP. Hypothesis 4 therefore predicts that the mixed passion subtype will be associated with better adjustment than the pure OP subtype.

Hypothesis 5 compares subtypes of non-passion with pure OP.² On the one hand, engaging in a passionate activity on a regular basis, even one that is pursued with a pure OP, may lead to higher levels of adjustment compared to people who cannot identify a passion in their lives. Indeed, although OP is typically linked with maladaptive outcomes (Curran et al., 2015), research has shown that OP can, at times, predict higher levels of adjustment, such as high levels of life satisfaction after one achieves success in an activity (e.g., Lafrenière, St-Louis, Vallerand, & Donahue, 2012). People without a passion would not be able to experience these periodic boosts in adjustment. On the other hand, those with a pure OP also engage regularly in an activity that they perceive as producing some negative experiences (Vallerand, 2015), which could potentially lead to lower levels of adjustment compared to the non-passion subtype. We therefore propose two competing hypotheses that predict that pure OP will be associated with better adjustment (hypothesis 5a) or worse adjustment (hypothesis 5b) compared to the non-passion subtype.

The sixth and final hypothesis focuses on the differences between mixed passion and

² Hypotheses 5 and 6 each contain alternative predictions. Past studies have compared high levels of OP with low levels of OP rather than subtypes of pure OP with non-passion (hypothesis 5) or mixed passion (hypothesis 6). We therefore did not feel that there was the needed empirical foundation to generate informed unidirectional hypotheses. Formulating alternative hypotheses is a useful heuristic for theory elaboration (McGuire, 2004), and can promote scientific impartiality and facilitate strong scientific inference by placing an emphasis on disproof (Chamberlin, 1897; Platt, 1964). Overall, alternative versions of hypotheses 5 and 6 were deemed preferable to speculative unidirectional statements, and could eventually lead researchers to identify the conditions in which different versions of the hypotheses work better.

non-passion subtypes. Once again, we propose two competing hypotheses. On the one hand, having mixed passion may be associated with better adjustment compared to non-passion subtypes. This is because those with mixed passion have both high levels of HP, which should contribute positively to adjustment, and high levels of OP which, as previously described, has the potential to contribute positively to some benefits in specific situations. On the other hand, with mixed passion, people might perceive the negative outcomes that accompany high levels of OP to be most salient (e.g., Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001) and thus experience lower levels of adjustment compared to others without any passion. We therefore propose two competing hypotheses that predict that mixed passion will be associated with better adjustment (hypothesis 6a) or worse adjustment (hypothesis 6b) compared to the non-passion subtype.

Current Research

Our goal in the current research was to use our newly proposed quadripartite approach to determine if levels of physical and psychological well-being were distinctly predicted by different passion subtypes. A central tenet of the dualistic model is that passion has the potential to lead to high levels of wellness (Vallerand, 2012, 2015). Therefore, we reasoned that two broad domains of wellness – physical health and psychological well-being – would be appropriate outcomes for this initial investigation using the quadripartite approach. In line with the proposition that passion influences both local (i.e., in the passionate activity) and global (i.e., in one's life in general) outcomes (Vallerand, 2015), we focused on both domain-specific and global assessments of physical and psychological well-being.

We tested the six hypotheses of the quadripartite approach across four studies. In Study 1, we investigated the role of passion subtypes in predicting global self-rated health. In Study 2, we built on these results by testing if passion subtypes predicted the extent to which physical symptoms related to video gaming were experienced in a sample of passionate video game

players. In Studies 3 and 4, we extended these findings by shifting focus to the association between passion subtypes and psychological well-being. More precisely, in Study 3 we examined global levels of psychological well-being, and in Study 4 we focused on academic burnout – a domain-specific index of psychological ill-being of great importance to university students. Study 4 also adopted a prospective design with a three-month time lag between assessments of passion and burnout. Overall, our four studies focus on both physical (Studies 1 and 2) and psychological (Studies 3 and 4) aspects of wellness at both the global (Studies 1 and 3) and domain-specific (Studies 2 and 4) levels.³

Study 1

Method

Participants and procedure. A total of 1218 undergraduates participated in this study ($M_{\text{age}} = 19.40$ years, $SD_{\text{age}} = 3.75$ years). There were more female ($n = 878$) than male ($n = 338$) participants, and most participants identified as being White (58.90%) or Filipino (13.80%). Gender was not reported by two participants. Participants signed up for this study using a subject pool website that linked them to an online survey containing all the study measures. The final page of the online survey debriefed the participants of the purpose and hypotheses of the study. We obtained institutional research ethics approval before data collection for each study that we report. All participants provided informed consent before answering any questions.

Measures. Passion was measured with the Passion Scale (Marsh et al., 2013; Vallerand et al., 2003), which assesses HP (6 items; e.g., “This activity is in harmony with the other activities in my life”), and OP (6 items; e.g., “If I could, I would only do my activity”), toward a

³ Reports have been published based on the data from Study 1 (REFERENCE BLINDED FOR REVIEW), Study 2 (REFERENCE BLINDED FOR REVIEW), and Study 4 (REFERENCES BLINDED FOR REVIEW; REFERENCE BLINDED FOR REVIEW). However, these reports focused on distinct research questions, studied different dependent variables, and did not study passion using a quadripartite approach.

specific activity on a scale ranging from 1 (*not agree at all*) to 7 (*very strongly agree*).

Participants completed the items while thinking of their favorite activity. Evidence supporting the validity and reliability of responses from the Passion Scale has been reported by multiple sources (e.g., Marsh et al., 2013; Vallerand, 2015). Participants reported spending on average 12.22 hours per week ($SD = 12.25$ hours, Median = 8 hours) engaging in their favorite activity.

Self-rated health was assessed with five items from the 36-item Short Form Survey (SF-36; Ware & Sherbourne, 1992). Each item was rated on a five-point scale; the first item (“In general, would you say your health is...”) was rated on a scale ranging from *poor* to *excellent*, whereas the final four items (e.g., “My health is excellent”) were each rated on a scale ranging from *definitely false* to *definitely true*. Responses ranging from the lowest to the highest ratings were coded as 0, 25, 50, 75, and 100, such that higher scores corresponded to more positive self-rated health (Ware et al., 1992).

Analyses. The following plan of analyses was used in the four studies of this article. Our analyses were conducted in Mplus using robust full information maximum likelihood estimation (MLR) to account for potential deviations in normality. We tested the main and interactive effects of HP and OP on dependent variables using latent moderation structural equation modeling (LMS; e.g., Klein & Moosbrugger, 2000). Scores of HP and OP were mean centered. Correlations between latent variables, descriptive statistics, and composite reliability values are displayed in the accompanying supplementary file (Table S1 to Table S4).

We followed a 3-step hierarchical approach when testing LMS models (e.g., Gaudreau, Franche, & Gareau, 2016). LMS models could not be evaluated using model fit indices because they are not estimated for LMS. However, following the procedure of Gaudreau et al. (2016), we compared nested models using a scaled χ^2 difference test (Satorra & Bentler, 2001) by

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calculating differences in scaled log likelihood using a publicly available online calculator:

<http://www.uoguelph.ca/~scolwell/lldiffptest.html>. First, a *null model* was specified in which the

main and interactive effects of both passion dimensions were constrained to zero. The purpose of this model was to obtain initial log likelihood and residual variance values to compare nested models and estimate the change in percentage of explained variance (R^2) in subsequent models.

Second, a *main effects model* was specified in which the main effects of both passion dimensions were freely estimated, but the interaction effects were constrained to zero. Finally, an *interactive model* was tested in which both the main and interaction effects were freely estimated. The results from the main and interactive models from each study are reported in Table 1.

We interpreted significant interactive effects by estimating the simple intercept and simple slopes of one passion dimension at high (+1 *SD*) and low (-1 *SD*) levels of the other passion dimension. This analytic strategy allowed us to calculate four simple slopes: HP at low and high levels of OP, and OP at low and high levels of HP. These simple slope analyses were also used as planned contrasts to compare the predicted values of the four subtypes of passion. It is important to emphasize that it is not necessary to have a significant interactive effect to test and support our hypotheses. In such cases, we interpreted the main effects models and used the slopes for each main effect to calculate and compare the predicted values for each subtype of passion (Gaudreau, 2012). In the case of a positively valenced dependent variable, a significant positive main effect of HP would provide support for hypotheses 3 and 4, and a significant negative main effect of OP would provide support for hypotheses 2 and 5b. We also had hypotheses about two subtype comparisons that could not be tested with simple slopes from interactive models or slopes from main effects models: pure HP versus pure OP (hypothesis 1) and mixed passion versus non-passion (hypothesis 6). We compared these subtypes by

interpreting Cohen's d values for each comparison, along with corresponding p values. Cohen's d values were estimated using the predicted values of two passion subtypes and the standard deviation of the dependent variable (calculated using the square root of the variance from the initial confirmatory factor analysis [CFA]; Gaudreau et al., 2016).

Finally, in each study we checked for the influence of potential outliers and managed missing data. We identified potential multivariate outliers by inspecting Mahalanobis distances for the items that were used as indicators of latent variables and in computation of item parcels, and identified potential univariate outliers by calculating Z scores on the observed average scores for the variables using SPSS. We examined the influence of these potential outliers by repeating our analyses with models that excluded all potential univariate and multivariate outliers. These results did not differ in any meaningful way from results that were based on complete samples. We therefore included all participants in the analyses in each study. We also inspected the percentage of missing data in each study, which was quite small (Study 1: 0.03%, Study 2: 0.35%, Study 3: 0.06%, Study 4: 1.15%). Given the small amount of missing data, we managed missing data using the default robust full information maximum likelihood procedure in Mplus.

Results

CFA and LMS model testing. Items from the HP, OP, and health scales were used as indicators of each latent variable. The results of a CFA that included all three latent variables revealed an unacceptable model fit: MLR χ^2 (116) = 819.973, $p < .001$, CFI = .893, TLI = .874, RMSEA = .071, 90% CI = [.066, .075]. We tested a revised model that specified correlated residuals between three sets of items from HP subscale (items 1 with 8, 1 with 10, and 8 with

10).⁴ This revised model yielded acceptable fit indices: MLR χ^2 (113) = 502.364, $p < .001$, CFI = .941, TLI = .929, RMSEA = .053, 90% CI = [.048, .058]. The standardized factor loadings ranged from .386 to .891, and composite reliabilities ranged from .789 to .835 (see Table S1).

The *null model* resulted in a log likelihood of -53861.468. The *main effects model* resulted in a log likelihood of -53824.230, which was an improvement in model fit compared the null model ($\Delta \chi^2 = 49.3688$, $\Delta df = 2$, $p < .001$) and accounted for 5.41% of additional variance in self-rated health. Finally, the *interactive model* resulted in a log likelihood of -53833.499, which was not a significant improvement in model fit compared the main effects model ($\Delta \chi^2 = 1.3720$, $\Delta df = 1$, $p = .241$) and accounted for only 0.30% of additional variance in self-rated health. Therefore, we interpreted the results from the main effects model.

Hypothesis testing. Figure 2 displays the associations between subtypes of passion and self-rated health. Hypothesis tests are reported in Table 2. Overall, our results supported the first three hypotheses: pure HP was associated with more positive health perceptions compared to pure OP (hypothesis 1, $d = 0.743$, $p < .001$), mixed passion (hypothesis 2; $d = 0.181$, $p = .024$) and non-passion subtypes (hypothesis 3; $d = 0.561$, $p < .001$). We also obtained support for hypothesis 4 by finding that pure OP was associated with more negative health perceptions compared to mixed passion ($d = -0.561$, $p < .001$). Pure OP was associated with poorer self-rated health than non-passion subtypes, supporting hypothesis 5b ($d = -0.181$, $p = .024$). Finally,

⁴ Allowing residuals to correlate indicates that measures are related to each other for reasons other than the latent variable of interest (e.g., item wording; see Cole, Ciesla, & Steiger, 2007). Previous CFA research using many of the scales administered in this research, including the Passion Scale (e.g., Marsh et al., 2013) and Subjective Vitality Scale (e.g., Bostic et al., 2000), specified small subsets of correlated residuals between scale items to attain acceptable model fit. Therefore, we anticipated that we would also need to allow a small number of residuals to correlate in CFA models. For correlated residuals among items from the Passion Scale, we refer to items numbers that correspond to the item ordering presented by Vallerand (2015, p. 72; see also <http://www.lres.uqam.ca/en/scales/>). All other correlated items are specified in the text. We also ran alternative models that excluded the item(s) with the lowest loading(s) from each pair of correlated residuals. In each case, the fit indices did not improve; thus, we proceeded using CFA model with correlated residuals.

the mixed passion subtype was associated with more positive self-rated health than the non-passion subtype, supporting hypothesis 6a ($d = 0.380, p < .001$).

Brief Discussion

Self-rated health is a valuable dimension of health that independently predicts future objective health outcomes (Idler & Benyamini, 1997). Study 1 revealed that passion subtypes are associated with distinct levels of self-rated health. These results supported our hypotheses, and informed two sets of competing hypotheses, with pure OP being associated with worse self-rated health compared to non-passion (hypothesis 5b), and the mixed passion subtype being associated with better self-rated health than the non-passion subtype (hypothesis 6a). Consistent with the extant literature on the dualistic model, the results from the main effects model revealed that self-rated health was positively and negatively predicted by HP and OP, respectively (Table 1). Moreover, the quadripartite approach yielded unique insights by revealing that high levels of HP are linked with more positive self-rated health than having low levels of HP, even when high HP is combined with high OP as in mixed passion. Results such as these make a clear case for the usefulness of adopting the quadripartite approach.

Study 2

In Study 2, we built on the results from Study 1 by examining the association between passion subtypes and physical health in the context of a specific activity: playing video games. Playing video games is a very popular activity that is pursued by about half of American adults (Duggan, 2015). Video gaming, however, can put people at risk of experiencing adverse activity-specific physical symptoms, including carpal tunnel syndrome, headaches, and sleep disturbances (Griffiths & Meredith, 2009). Not everyone is likely to experience these symptoms and subtypes of passion may explain why certain gamers experience significantly more adverse physical symptoms than others. For example, those with a pure OP may engage in video gaming

in a way that makes them most susceptible to experiencing these negative physical symptoms (e.g., by not taking breaks from gaming, or by continuing to play after symptoms start to appear), whereas those with a pure HP may be able to temporarily stop gaming to prevent negative physical symptoms from developing. In Study 2, we tested if the extent to which video game players experienced specific physical symptoms was associated with passion subtypes from the quadripartite model.

Method

Participants and procedure. A total of 269 video game players participated in this study and completed all study measures ($M_{\text{age}} = 26.28$ years, $SD_{\text{age}} = 8.46$ years). There were more male ($n = 184$) than female ($n = 70$) participants (15 participants did not report their gender). Participants were recruited through calls for voluntary participation posted on online forums dedicated to video games.

Measures. The Passion Scale was once again administered to assess HP and OP for playing video games. As in past research, the items were altered to refer to playing video games (e.g., “If I could, I would only play video games”). On average, participants had been playing their favorite video game 11.72 hours per week ($SD = 12.52$ hours, Median = 7 hours) for 4.56 years ($SD = 4.43$ years, Median = 3 years). Participants also indicated the extent to which they experienced the following negative physical symptoms related to video gaming over the last month: carpal tunnel syndrome, dry eyes, appetite loss, tremors and/or numbness, dizziness and/or light headedness, and sleep disorders (e.g., Griffiths & Meredith, 2009). Scale items were assessed using a Likert-type scale ranging from 1 (*never*) to 7 (*almost always*).

Results

CFA and LMS model testing. Items from scales assessing HP, OP, and physical symptoms were used as indicators of each latent variable. The results of a CFA that included

three latent variables revealed an unacceptable model fit: MLR χ^2 (132) = 400.366, $p < .001$, CFI = .831, TLI = .804, RMSEA = .087, 90% CI = [.077, .097]. We tested a revised model that specified correlated residuals between items from the HP (items 1 with 10, 5 with 6, and 8 with 10), OP (item 2 with 4), and physical symptoms (items 2 [“dry eyes”] with 6 [“sleep disorders”], and 2 [“dry eyes”] with 4 [“tremors and/or numbness”]) scales. This revised model yielded the following acceptable fit indices: MLR χ^2 (126) = 250.321, $p < .001$, CFI = .922, TLI = .905, RMSEA = .061, 90% CI = [.050, .072]. The standardized factor loadings ranged from .476 to .873, and composite reliabilities ranged from .755 to .882 (see Table S2).

The *null model* resulted in a log likelihood of -8437.425. The *main effects model* resulted in a log likelihood of -8415.803, which was an improvement in model fit compared the null model ($\Delta \chi^2 = 43.257$, $\Delta df = 2$, $p < .001$) and accounted for 15.52% of additional variance in physical symptoms. Finally, the *interactive model* resulted in a log likelihood of -8410.040, which was a significant improvement in model fit compared the main effects model ($\Delta \chi^2 = 12.404$, $\Delta df = 1$, $p < .001$) and accounted for 12.17% of additional variance in physical symptoms. Therefore, we interpreted the results from the interactive effects model.

Hypothesis testing. The association between both passion types and physical symptoms is displayed in Figure 3.⁵ Hypothesis tests are reported in Table 3. The results supported the first two hypotheses: pure HP was associated with lower levels of negative physical symptoms compared to pure OP (hypothesis 1; $d = -1.579$, $p < .001$) and mixed passion (hypothesis 2; $d = -0.664$, $p = .002$). Contrary to hypothesis 3, pure HP was not significantly associated with less reported physical symptoms than non-passion ($d = 0.213$, $p = .104$). We also obtained support

⁵ We analyzed an additional model that included weekly hours spent playing video games as a covariate. The interaction term remained significant, $b = -0.324$, $SE = .140$, $p = .021$, 95% CI [-0.599, -0.049], and all subtype associations did not differ from the original model. Therefore, these effects were not explained by differences in time spent playing video games.

for hypothesis 4 by showing that pure OP was associated with greater levels of negative physical symptoms compared to mixed passion ($d = 0.915, p = .048$). Support was also found for hypothesis 5b as pure OP was associated with more physical symptoms than non-passion ($d = 1.792, p < .001$). Mixed passion was also associated with greater levels of reported physical symptoms compared to non-passion ($d = 0.887, p < .001$), thus supporting hypothesis 6b.

Brief Discussion

This study extended the findings from Study 1 by testing the associations between passion subtypes and a domain-specific measure of physical health. In general, the results replicated those obtained with global self-rated health in Study 1, with two exceptions. First, levels of negative physical symptoms were not significantly different between the non-passion and pure HP subtypes, failing to support hypothesis 3. Second, Study 1 and Study 2 respectively found that mixed passion was associated with better (hypothesis 6a) and worse (hypothesis 6b) self-reported health than the non-passion subtype. It is important to highlight that Study 1 focused on general health perceptions whereas Study 2 assessed physical symptoms that can result from engaging in a specific activity. Video gamers whose passion is best represented by the non-passion subtype may easily stop playing if these symptoms begin to emerge. Similarly, video gamers whose passion is best represented by the pure HP subtype have control over activity engagement and may play video games in a way that prevents physical symptoms from appearing in the first place (e.g., by taking frequent breaks). This likely explains why the non-passion and pure HP subtypes were no different in reported levels of physical symptoms. It also explains why the non-passion subtype was associated with lower levels of physical symptoms than the mixed passion subtype. Although having mixed passion involves high HP, it also involves high OP, which could make it more difficult to disengage from video game playing when symptoms begin to appear. Importantly, these results were obtained even after controlling

for time spent playing video games, highlighting the importance of passion subtypes in predicting negative physical symptoms, rather than simply the amount of time spent playing video games.

Study 3

Studies 1 and 2 revealed that predicted levels of physical well-being are distinctly associated with passion subtypes. Our final two studies aimed to determine if these effects generalize to assessments of psychological well-being. In Study 3, we began by testing the association between passion subtypes and global psychological well-being.

Method

Participants and procedure. A total of 1192 undergraduates participated in this study ($M_{\text{age}} = 19.46$ years, $SD_{\text{age}} = 3.65$ years). Two additional students were excluded from analysis because they did not complete the Passion Scale. There were more female ($n = 866$) than male ($n = 324$) participants, and most participants identified as being White (49.8%) or Filipino (17.1%). Two participants did not report their gender or ethnicity. Participants signed up for this study using a subject pool website that linked them to an online survey. The final page of the survey debriefed the participants of the purpose and hypotheses of the study.

Measures. Passion was assessed with the same version of the Passion Scale that was administered in Study 1: participants answered the items while thinking of their favorite activity. Participants reported spending on average 14.52 hours per week ($SD = 19.38$ hours, Median = 8 hours) engaging in their favorite activities.

Well-being research can be approached from two traditions: *hedonism*, which focuses on one's positive and negative experiences, and *eudaimonism*, which focuses on the process of fulfilling one's true potential in life (Deci & Ryan, 2006). Our aim was to measure global levels of psychological well-being using scales that assess well-being from both perspectives (see also

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Philippe et al., 2009). To assess hedonic forms of well-being, participants completed the 5-item Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), which asks participants to rank their agreement with statements about their overall satisfaction in life (e.g. “In most ways my life is close to my ideal”) on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). They also completed the 12-item Scale of Positive and Negative Experiences (SPANE; Diener et al., 2010), which asks respondents to report how much they had experienced positive (e.g., “Joyful”) and negative (e.g., “Angry”) feelings over the past 4 weeks on a scale from 1 (*very rarely or never*) to 5 (*very often or always*). To assess eudaimonic forms of well-being, participants completed the Subjective Vitality Scale (SVS; Ryan & Frederick, 1997), which assesses one’s general sense of energy and feeling of aliveness (e.g., “I feel alive and vital”) on a scale from 1 (*not at all true*) to 7 (*very true*). Based on recommendations provided by Bostic, Rubio, and Hood (2000), a 6-item version of the SVS was administered. Next, participants completed the 8-item Flourishing Scale (FS; Diener et al., 2010), which assesses aspects of well-being that include social-psychological prosperity, optimism, and general positive psychological functioning (e.g., “My social relationships are supportive and rewarding”) on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Finally, participants completed the personal growth, purpose in life, and self-acceptance subscales of the Psychological Well-Being Scales (PWB; Ryff, 1989). These three subscales were targeted to be consistent with previous passion research (Philippe et al., 2009) and because they have been identified as being most distinct from hedonic approaches to well-being (Keyes, Shmotkin, & Ryff, 2002); we considered responses to these subscales as an additional assessment of eudaimonic well-being and labeled them as such. Participants answered 21 items assessing the three PWB subscales (e.g., “I have a sense of direction and purpose in life”) on a scale from 1 (*strongly agree*) to 7 (*strongly disagree*).

Results

CFA and LMS model testing. Individual items from the Passion Scale were modeled as indicators of HP and OP latent variables. Eudaimonic well-being was measured with 21 items from three subscales of the PWB. Therefore, we created a latent variable with three parceled indicators that we computed by averaging scores from the personal growth, self-acceptance, and purpose in life subscales. All other well-being measures were represented by individual scale items. The six measures of well-being (i.e., satisfaction with life, positive feelings, negative feelings, subjective vitality, flourishing, and eudaimonic well-being) were, in turn, modeled as indicators of a second-order latent variable representing psychological well-being. The results of this second-order CFA revealed an unacceptable model fit: MLR $\chi^2(980) = 3498.761, p < .001$, CFI = .903, TLI = .898, RMSEA = .046, 90% CI = [.045, .048]. We tested a revised model that specified one correlated residual between item 5 (“I nearly always feel alert and awake”) and 6 (“I feel energized”) of the SVS. This revised model yielded acceptable fit indices: MLR $\chi^2(979) = 3234.845, p < .001$, CFI = .913, TLI = .908, RMSEA = .044, 90% CI = [.042, .046]. The standardized factor loadings for the first-order latent variables (HP, OP and the six measures of well-being) ranged from .464 to .874. The second-order psychological well-being latent variable loaded positively onto all well-being measures (standardized loading range: .795 to .885) except for negative feelings (standardized loading = -.586). Composite reliabilities for the HP, OP, and second-order psychological well-being latent variable ranged from .837 to .910 (see Table S3).⁶

The *null model* resulted in a log likelihood of -79075.094. The *main effects model* resulted in a log likelihood of -78934.220, which was an improvement in model fit compared the null model, $\Delta \chi^2 = 228.395, \Delta df = 2, p < .001$. The main effects model accounted for 27.8% of additional variance in psychological well-being. Finally, the *interactive model* resulted in a log

⁶ The supplementary file reports separate LMS analyses for each individual well-being measure.

likelihood of -78927.864, which was an improvement in model fit compared the main effects model, $\Delta \chi^2 = 10.01$, $\Delta df = 1$, $p = .002$. The interactive model accounted for 3.3% of additional variance in psychological well-being. Therefore, we interpreted the results from the interactive effects model.

Hypothesis testing. Figure 4 displays the associations between subtypes of passion and psychological well-being. Hypothesis tests are reported in Table 4. The results supported the first three hypotheses: pure HP was associated with greater levels of well-being compared to pure OP (hypothesis 1, $d = 1.839$, $p < .001$), mixed passion (hypothesis 2, $d = 0.405$, $p < .001$) and non-passion (hypothesis 3, $d = 0.997$, $p < .001$). We also obtained support for hypothesis 4 by showing that pure OP was associated with poorer psychological well-being compared to mixed passion ($d = -1.435$, $p < .001$). Pure OP was associated with poorer psychological well-being than the non-passion subtype, supporting hypothesis 5b ($d = -0.842$, $p < .001$). Finally, the mixed passion subtype was associated with higher levels of psychological well-being than the non-passion subtype, supporting hypothesis 6a ($d = 0.592$, $p < .001$).

Brief Discussion

Building on the results obtained with assessments of physical well-being from Studies 1 and 2, this study revealed that passion subtypes predict distinct levels of psychological well-being. The results supported our hypotheses, along with hypothesis 5b, which predicts that the pure OP will be associated with lower levels of well-being compared to the non-passion subtypes, and hypothesis 6a, which predicts that the mixed passion subtype will be associated with greater levels of well-being than the non-passion subtype. Therefore, not only does one's combination of HP and OP matter for how one feels physically, these results suggest that it also matters for how one feels psychologically.

Study 4

Study 3 was a cross-sectional study in which participants identified a favorite activity in their lives, reported levels of HP and OP for this activity, and completed measures assessing global psychological well-being. In Study 4, we built on this study by focusing on the academic domain and assessing associations between passion subtypes and academic burnout – a context-specific form of ill-being. We also assessed the participants across two time-points with a three-month time lag between assessments of passion at time 1 and burnout at time 2, allowing us to look at the downstream relationship between passion subtypes and subsequent ill-being.

Method

Participants. A total of 443 undergraduates participated in this study ($M_{\text{age}} = 19.05$ years, $SD_{\text{age}} = 3.40$ years). There were more female ($n = 349$) than male ($n = 93$) participants. Gender was not reported by one participant. Most participants identified as being White (51.70%) or Filipino (19.00%).

Measures. Participants completed the Passion Scale (Vallerand et al., 2003) to assess levels of HP and OP for academics. In accordance with prior research with students (e.g., Verner-Filion & Vallerand, 2016), the items were altered to refer to studying (e.g., “If I could, I would only study”). Participants answered the questions while thinking of their experiences preparing for exams, attending classes, and completing assignments. Participants reported studying on average 20.43 hours per week ($SD = 15.71$ hours, Median = 16 hours). Burnout was assessed with a version of the Maslach Burnout Inventory that has been adapted for university students (MBI-SS; Schaufeli, Martínez, Pinto, Salanova, & Bakker, 2002). The 15-item MBI-SS assesses academic exhaustion (5 items; e.g., “I feel emotionally drained by my studies”), cynicism (4 items; e.g., “I doubt the significance of my studies”), and professional efficacy (6 items, all reverse scored; e.g., “In my opinion, I am a good student”) on a scale ranging from 0 (*never*) to 6 (*always*). We chose to focus only on the exhaustion and cynicism components

because they represent the core of the burnout construct, and because previous validation of the MBI-SS with undergraduates has shown that the professional efficacy subscale is a better indicator of engagement rather than burnout (Salanova, Schaufeli, Martínez, & Bresó, 2010).

Procedure. At the start of the academic year, participants signed up for a longitudinal study that involved completing a series of online surveys throughout the year. Three months into the academic year, participants completed the Passion Scale for academics. Approximately three months later, participants completed the MBI-SS (77% of participants completed both time points; see our earlier discussion regarding the handling of missing data). Participants were debriefed about the study purpose and hypotheses at the conclusion of the study.

Results

CFA and LMS model testing. Items from the HP and OP subscales were used as indicators of both passion latent variables. To facilitate model convergence, the latent burnout variable was represented by four randomly-determined item parcels, two composed of items from the exhaustion subscale and two composed of items from the cynicism subscale. Due to the odd number of items, the second exhaustion parcel was composed of three items.⁷ The results of a CFA that included HP, OP, and the burnout latent variables revealed an unacceptable model fit: $MLR \chi^2(101) = 463.370, p < .001, CFI = .872, TLI = .848, RMSEA = .090, 90\% CI = [.082, .098]$. We inspected the standardized loadings and modifications indices to determine the source of misfit. We tested a revised model that specified correlated residuals between three sets of items from HP subscale (items 1 with 8, 1 with 10, and 8 with 10). This revised model yielded acceptable fit indices: $MLR \chi^2(98) = 311.130, p < .001, CFI = .925, TLI = .908, RMSEA = .070,$

⁷ The four burnout parcels were composed of the following MBI-SS items: items 2 and 5 (exhaustion parcel 1), items 1, 3, and 4 (exhaustion parcel 2), items 6 and 9 (cynicism parcel 1) and items 7 and 8 (cynicism parcel 2). Item numbers correspond with the item ordering presented by Schaufeli et al. (2002).

90% CI = [.061, .079]. The standardized factor loadings ranged from .498 to .928, and composite reliabilities ranged from .837 to .887 (see Table S4).

The *null model* resulted in a log likelihood of -10482.121. The *main effects model* resulted in a log likelihood of -10477.442, which was an improvement in model fit compared the null model ($\Delta \chi^2 = 8.050$, $\Delta df = 2$, $p = .018$) and accounted for 3.9% of additional variance in burnout. Finally, the *interactive model* yielded a log likelihood of -10476.259, which was not a significant improvement in model fit compared the main effects model ($\Delta \chi^2 = 1.920$, $\Delta df = 1$, $p = .166$) and accounted for only 0.5% of additional variance in burnout. Therefore, we interpreted the results from the main effects model.

Hypothesis testing. Figure 5 displays the associations between subtypes of passion and academic burnout. Hypothesis tests are reported in Table 5. Our results once again supported our first three hypotheses: pure HP was associated with lower levels of academic burnout compared to pure OP (hypothesis 1, $d = -0.971$, $p = .009$), mixed passion (hypothesis 2, $d = -0.395$, $p = .050$), and non-passion (hypothesis 3, $d = -0.575$, $p = .003$). We also obtained support for hypothesis 4, as pure OP was associated with higher levels of burnout compared to mixed passion ($d = 0.575$, $p = .003$). Consistent with hypothesis 5b, we also found that pure OP was associated with higher levels of burnout compared to non-passion ($d = 0.395$, $p = .050$). Finally, mixed passion was not associated with significantly higher or lower burnout than non-passion ($d = -0.180$, $p = .226$), which failed to support either hypothesis 6a or hypothesis 6b.

Brief Discussion

Overall, these results replicate those obtained in Study 3, and extend them by finding these associations longitudinally with context-specific assessments of passion and ill-being. Interestingly, the mixed passion and non-passion subtypes did not differ in reported academic burnout (hypothesis 6). Although the mixed passion subtype may be associated with higher

levels of psychological well-being than the non-passion subtype, a different pattern may be operative when assessing relationships with psychological ill-being. We elaborate more on this point in the General Discussion.

General Discussion

Instead of concentrating on the unique associations of each passion dimension – which has been the traditional approach taken when studying passion – our quadripartite approach focuses on four prototypical passion subtypes based on within-person combinations of HP and OP (see Figure 1). Although we are not the first to suggest this approach to passion research (Curran et al., 2015), to our knowledge we are the first to rely on it to formalize a quadripartite approach with testable hypotheses to study outcomes linked with subtypes of passion. Our results across four studies generally supported our predictions by finding associations between indices of wellness, both in terms of physical health and psychological well-being, and the extent to which a passion was harmonious and obsessive. Table 6 summarizes the hypotheses that were supported in each study. Many of these associations were found when predicting both global (Studies 1 and 3) and domain-specific (Studies 2 and 4) wellness outcomes.

The Benefits of HP

Many of the results highlight the benefits that feeling harmoniously passionate toward an activity can have on one's overall physical health and psychological well-being. In general, the pure HP subtype was associated with the greatest levels of physical health and psychological well-being compared to the other three subtypes of passion. The effect sizes were particularly large, especially when pure HP was compared with pure OP. People with pure HP are therefore most likely to experience the many benefits that can come from HP without suffering the deleterious consequences associated with OP.

The potency of HP for one's well-being was further revealed by the mixed passion subtype. Across all measures of health and well-being, we found that the mixed passion subtype was more similar to the pure HP than to the pure OP subtype. This finding suggests that the benefits that come with HP likely protect against the costs associated with OP, a pattern that has been found in research focusing on passion for multiple activities (Schellenberg & Bailis, 2015). One potential reason for this effect is that HP predicts more frequent experiences of positive emotions (Curran et al., 2015; Vallerand, 2015), which may contribute positively to one's overall sense of wellness by triggering an upward spiral of increasing well-being, while at the same time undoing the effects of negative emotions (e.g., Fredrickson, 2001; Fredrickson, Mancuso, Branigan, & Tugade, 2000). The powerful role of positive emotions could explain why the mixed passion subtype was associated with higher levels of adjustment than pure OP in each study (hypothesis 4), and higher levels of global health and psychological well-being than non-passion in Studies 2 and 4 (hypothesis 6a). Additional research is needed to test this hypothesis. Overall, the present research suggests that HP is the dominant form of passion that has the greatest potential for physical and psychological well-being when people experience high levels of both HP and OP in their lives. This finding clearly illustrates the theoretical and empirical advantages of the quadripartite approach to better interpret and explicate the combinatory effect of the two passion dimensions.

When HP is Low

Using a quadripartite approach, the construct of passion can be differentiated according to whether low HP is combined with either high (pure OP) or low (non-passion) levels of OP. This conceptual differentiation is an important advance in the field of passion research because it allows empirical investigation of whether pure OP confers some relative advantages or disadvantages compared to a subtype of non-passion (hypotheses 5a and 5b). Previous research

studying differences in predominant passion dimensions has not found any difference in well-being between people with a predominant OP and people without any passion (Philippe et al., 2009). Our results contribute to this line of inquiry and provided initial but consistent support for hypothesis 5b by finding that pure OP was associated with lower adjustment than non-passion subtypes in each study. Although there are specific situations when OP can predict higher adjustment (e.g., Lafrenière et al., 2012), this evidence indicates that these periodic boosts are either not strong enough or are too infrequent to counteract the negative outcomes that are associated with a pure OP (Vallerand, 2015). The results also suggest that it may be preferable to have low levels of passion rather than having a pure OP to experience high levels of wellness in life. However, we caution against taking these findings a step further and concluding that people with pure OPs should abandon their favorite activity altogether and instead live a life devoid of passion. In light of the present findings, a more realistic recommendation would be to foster greater levels of HP toward an activity, perhaps by seeking environments in which people can pursue their passionate activities that support autonomy (see Vallerand, 2015). As we have seen, the highest levels of physical health and psychological well-being are most often enjoyed by those with the highest levels of HP.

Additional Remarks and Limitations

There are several additional notes and limitations of this research that need to be addressed. We need to highlight that the technique that we used to test differences between passion subtypes was sample-specific; that is, predicted values for each subtype were calculated using the standard deviation of the sample (i.e., $\pm 1 SD$; e.g., Gaudreau, 2012) rather than absolute scale values. Although we recommend this approach because of its flexibility to accommodate differences in average levels of HP and OP across different activities (see Tables

S1 to S4), it means that high and low levels of HP and OP should be interpreted as being *relative* to the sample average.

There are also some limitations to the design of this research. Studies 1 to 3 adopted cross-sectional designs while relying on self-rated assessments of both passion and outcome variables, meaning that we cannot rule out the possibility that the observed associations were affected by common method variance. In the measurement models tested in each study, acceptable levels of model fit were obtained only after allowing a small subset of item residuals to correlate. Although commonly applied to most of the scales that we administered (see footnote 4), this procedure is a data-driven modeling technique and underscores the need for replication. Finally, each study focused primarily on young adult populations, which indicates the need to conduct additional research to test the six hypotheses in more diverse samples.

A Quadripartite Approach to Passion Research: Moving Forward

Important theoretical and empirical advances have been made from research that has focused on the independent effects of both HP and OP (Vallerand, 2015). We believe that a quadripartite approach offers a complementary viewpoint that enables researchers to identify prototypical subtypes of passion that can be compared to one another with six specific hypotheses. In essence, the quadripartite approach allows researchers to take their analyses one step further by calculating simple slopes for each passion dimension at high and low levels of the other passion dimension and testing associations with outcome variables. It is an intuitive approach because it predicts scores on outcome variables based on within-person combinations of passion, and allows researchers to visually present these predicted scores (see Figures 2 to 5). It is also a flexible approach. Although we chose to use LMS in to take advantage of analyzing models with latent variables – including the ability to obtain fit indices for measurement models

and to examine associations between error-free theoretical constructs (e.g., Cole & Preacher, 2014) – a quadripartite approach can be applied using multiple regression with observed variables (e.g., Gaudreau & Thompson, 2010). It can also be employed as part of more complex analyses, such as those testing mechanisms that are proposed to mediate significant interaction effects (Gaudreau et al., 2016) as well as within-person multilevel effects (e.g., Franche & Gaudreau, 2016). An important direction for future research is to explore why certain passion subtypes predict greater levels of well-being, an aim that can be accomplished with the quadripartite approach by testing mediating mechanisms (i.e., mediated moderation analyses).

Finally, the six hypotheses that we present are intended to serve as a general framework to guide research adopting a quadripartite approach. Although indices of adjustment and wellness are, in general, positively predicted by HP and negatively predicted by OP (Curran et al., 2015), exceptions have been found when passionate activities are pursued in highly competitive environments (Amiot, Vallerand, & Blanchard, 2006), or following success (Lafrenière et al., 2012; Mageau et al., 2011). Similarly, rather than labeling specific passion subtypes as being inherently adaptive or maladaptive, it is important to emphasize that differences between passion subtypes will depend on the outcome under investigation and the context in which an activity is pursued (see McNulty & Fincham, 2012). Indeed, this research assessed different global and domain-specific wellness outcomes, which may explain why the support for several hypotheses varied across studies (Table 6). For instance, the pure HP subtype was associated with higher levels of wellness than the non-passion subtype in each study except for Study 2, which assessed physical symptoms among video gamers (i.e., hypothesis 3). This could mean that, when it comes to protecting oneself from experiencing adverse physical symptoms, it is most important to have low levels of OP. Also, compared to the non-passion

subtype, the mixed passion subtype was associated with higher levels of wellness in Studies 1 and 3, supporting hypothesis 6a, but lower levels of wellness in Study 2, supporting hypothesis 6b. These results could highlight the advantages of having high HP, even when combined with high OP, compared to the non-passion subtype when predicting positively-laden forms of adjustment (i.e., global health and psychological well-being), and once again point to the consequences of having high OP for predicting activity-related physical symptoms (Study 2). Overall, the six hypotheses we present may or may not be supported depending on the specific outcome under investigation and the context in which they are studied. We believe that additional research adopting a quadripartite approach will help identify potential moderating variables and inform hypotheses that are tailored to specific outcomes, contexts, and cultures.

Conclusion

The dualistic model of passion posits that HP contributes to increases in physical and psychological well-being, whereas OP does not promote well-being and can instead detract from wellness in life (Vallerand, 2012, 2015). Using a quadripartite approach, we found that high HP combined with low OP (pure HP) generally predicted the highest levels of physical and psychological well-being, whereas low HP combined with high OP (pure OP) predicted the lowest levels of well-being, even compared to instances when both types of passion are low (non-passion). Although attaining high levels of well-being can be achieved most effectively with pure HP, our results also suggest that having high HP can compensate for the potential negative effects that surface when an activity is also pursued with high OP (mixed passion). Going forward, researchers can use the quadripartite approach to study the associations between passion subtypes and outcomes across different time periods and in different samples, contexts and cultures, while also exploring the processes that explain why certain passion subtypes predict greater levels of physical health, psychological well-being, and other indices of adjustment.

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Accepted Article

Table 1
Results from Main Effects and Interactive Models

	Main Effects Model			Interactive Model		
	HP	OP	HP × OP	HP	OP	HP × OP
Study 1						
Self-Rated Health	6.845** [4.752, 8.939]	-1.468* [-2.741, -0.195]	.000 ^a	7.077** [4.886, 9.268]	-1.660* [-3.002, -0.318]	0.980 [-0.682, 2.642]
Study 2						
Physical Symptoms	-0.041 [-0.230, 0.148]	0.374** [0.208, 0.541]	.000 ^a	-0.236 [-0.548, 0.076]	0.527** [0.312, 0.742]	-0.315* [-0.583, -0.047]
Study 3						
Psychological Well-being	0.388** [0.326, 0.450]	-0.166** [-0.216, -0.117]	.000 ^a	0.409** [0.341, 0.477]	-0.189** [-0.243, -0.134]	0.068** [0.027, 0.109]
Study 4						
Academic Burnout	-0.479** [-0.829, -0.165]	0.240* [0.000, 0.480]	.000 ^a	-0.412* [-0.758, -0.065]	0.102 [-0.174, 0.378]	0.165 [-0.084, 0.415]

Note. Unstandardized beta coefficients are reported with 95% confidence intervals in parentheses. ^a Identifies parameters that were fixed at zero. HP = harmonious passion; OP = obsessive passion. * $p \leq .05$; ** $p \leq .01$

Table 2
Study 1: Association Between Passion Subtypes and Self-Rated Health

Dependent Variable	<i>d</i>	Description	<i>B</i>	<i>SE</i>	95% CI
Self-Rated Health					
H1: PHP v. POP	0.743**	-----	-----	-----	-----
H2: PHP v. MP	0.181*	OP main effect	-1.468*	0.649	[-2.741, -0.195]
H3: PHP v. NP	0.561**	HP main effect	6.845**	1.068	[4.752, 8.939]
H4: POP v. MP	-0.561**	HP main effect	6.845**	1.068	[4.752, 8.939]
H5: POP v. NP	-0.181*	OP main effect	-1.468*	0.649	[-2.741, -0.195]
H6: MP v. NP	0.380**	-----	-----	-----	-----

Note. H1-H6 corresponds to hypotheses 1 to 6. PHP = pure harmonious passion; POP = pure obsessive passion; MP = mixed passion; NP = non-passion; HP = harmonious passion; OP = obsessive passion. * $p \leq .05$; ** $p \leq .01$

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Table 3

Study 2: Association Between Passion Subtypes and Physical Symptoms

Dependent Variable	<i>d</i>	Description	<i>B</i>	<i>SE</i>	95% CI
Physical Symptoms					
H1: PHP v. POP	-1.579**	-----	-----	-----	-----
H2: PHP v. MP	-0.664**	OP at High HP	0.285**	0.094	[0.101, 0.470]
H3: PHP v. NP	0.213	HP at Low OP	0.143	0.088	[-0.030, 0.315]
H4: POP v. MP	0.915*	HP at High OP	-0.614*	0.311	[-1.224, -0.004]
H5: POP v. NP	1.792**	OP at Low HP	0.769**	0.193	[0.391, 1.148]
H6: MP v. NP	0.877**	-----	-----	-----	-----

Note. H1-H6 corresponds to hypotheses 1 to 6. PHP = pure harmonious passion; POP = pure obsessive passion; MP = mixed passion; NP = non-passion; HP = harmonious passion; OP = obsessive passion. * $p \leq .05$; ** $p \leq .01$

Table 4

Study 3: Association Between Passion Subtypes and Psychological Well-Being

Dependent Variable	<i>d</i>	Description	<i>B</i>	<i>SE</i>	95% CI
Psychological Well-Being					
H1: PHP v. POP	1.839**	-----	-----	-----	-----
H2: PHP v. MP	0.405**	OP at High HP	-0.122**	0.026	[-0.174, -0.071]
H3: PHP v. NP	0.997**	HP at Low OP	0.335**	0.032	[0.272, 0.399]
H4: POP v. MP	-1.435**	HP at High OP	0.482**	0.049	[0.386, 0.578]
H5: POP v. NP	-0.842**	OP at Low HP	-0.255**	0.041	[-0.335, -0.174]
H6: MP v. NP	0.592**	-----	-----	-----	-----

Note. H1-H6 corresponds to hypotheses 1 to 6. PHP = pure harmonious passion; POP = pure obsessive passion; MP = mixed passion; NP = non-passion; HP = harmonious passion; OP = obsessive passion. * $p \leq .05$; ** $p \leq .01$

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Table 5
 Study 4: Association Between Passion Subtypes and Academic Burnout

Dependent Variable	<i>d</i>	Description	<i>B</i>	<i>SE</i>	95% CI
Academic Burnout					
H1: PHP v. POP	-0.971**	-----	-----	-----	-----
H2: PHP v. MP	-0.395*	OP main effect	0.240*	0.122	[0.000, 0.480]
H3: PHP v. NP	-0.575**	HP main effect	-0.497**	0.169	[-0.829, -0.165]
H4: POP v. MP	0.575**	HP main effect	-0.497**	0.169	[-0.829, -0.165]
H5: POP v. NP	0.395*	OP main effect	0.240*	0.122	[0.000, 0.480]
H6: MP v. NP	-0.180	-----	-----	-----	-----

Note. H1-H6 corresponds to hypotheses 1 to 6. PHP = pure harmonious passion; POP = pure obsessive passion; MP = mixed passion; NP = non-passion; HP = harmonious passion; OP = obsessive passion. * $p \leq .05$; ** $p \leq .01$

Table 6
 Summary of Hypotheses Supported in Studies 1 – 4

Hypotheses	Study 1: Global Health	Study 2: Negative Physical Symptoms	Study 3: Psychological Well-being	Study 4: Burnout	Overall Support For Each Hypothesis
1. PHP > POP	Yes	Yes	Yes	Yes	4/4
2. PHP > MP	Yes	Yes	Yes	Yes	4/4
3. PHP > NP	Yes	No	Yes	Yes	3/4
4. POP < MP	Yes	Yes	Yes	Yes	4/4
5a. POP > NP	No	No	No	No	0/4
5b. POP < NP	Yes	Yes	Yes	Yes	4/4
6a. MP > NP	Yes	No	Yes	No	2/4
6b. MP < NP	No	Yes	No	No	1/4

Note. PHP = pure harmonious passion; POP = pure obsessive passion; MP = mixed passion; NP = non-passion. Hypotheses refer to adjustment: > represents higher adjustment and < represents lower adjustment.

Figure Captions

Figure 1. A visual depiction of the four passion subtypes and six hypotheses (H1-H6) using the quadripartite approach. Hypotheses refer to adjustment: > represents higher adjustment and < represents lower adjustment. PHP = pure harmonious passion; POP = pure obsessive passion; MP = mixed passion; NP = non-passion.

Figure 2. Association between harmonious passion, obsessive passion and self-rated health. High and low values of harmonious and obsessive passion were plotted at one standard deviation (SD) above and below the mean. All scores were mean centered. PHP = pure harmonious passion; POP = pure obsessive passion; MP = mixed passion; NP = non-passion.

Figure 3. Association between harmonious passion, obsessive passion and physical health symptoms. High and low values of harmonious and obsessive passion were plotted at one standard deviation (SD) above and below the mean. All scores were mean centered. PHP = pure harmonious passion; POP = pure obsessive passion; MP = mixed passion; NP = non-passion.

Figure 4. Association between harmonious passion, obsessive passion and psychological well-being. High and low values of harmonious and obsessive passion were plotted at one standard deviation (SD) above and below the mean. All scores were mean centered. PHP = pure harmonious passion; POP = pure obsessive passion; MP = mixed passion; NP = non-passion.

Figure 5. Association between harmonious passion, obsessive passion and academic burnout. High and low values of harmonious and obsessive passion were plotted at one standard deviation (SD) above and below the mean. All scores were mean centered. PHP = pure harmonious passion; POP = pure obsessive passion; MP = mixed passion; NP = non-passion.

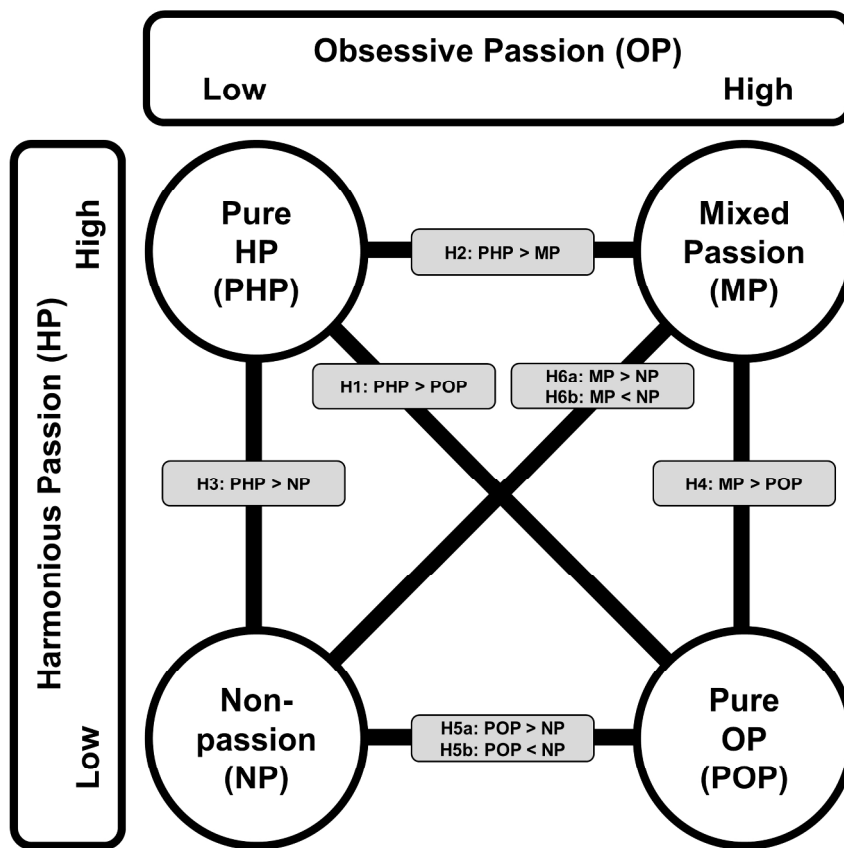


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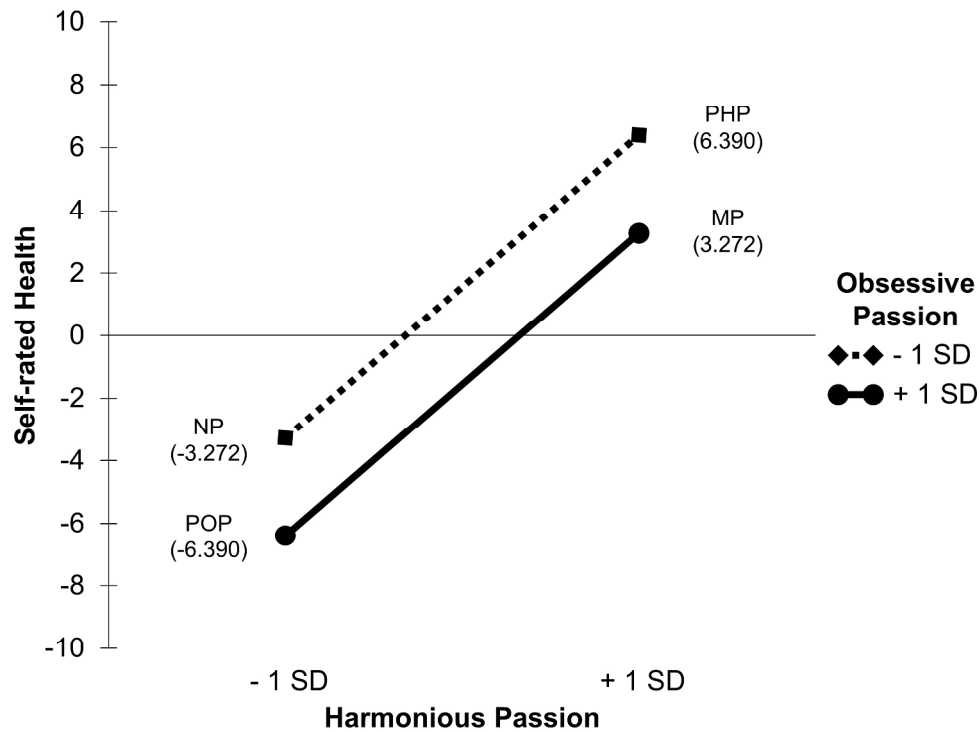


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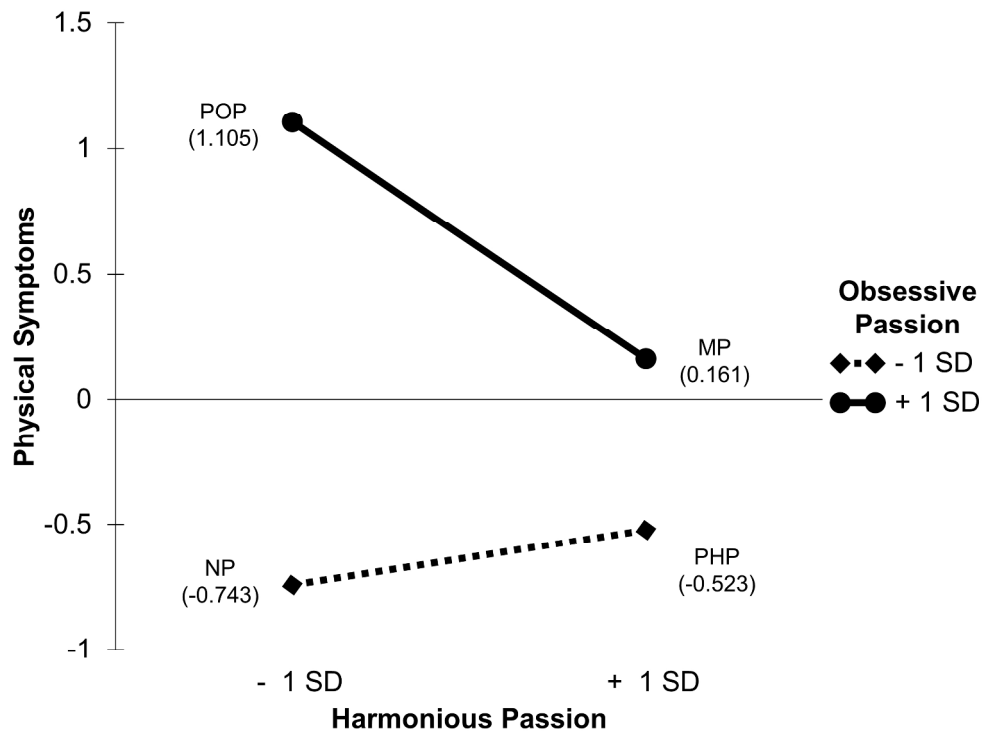


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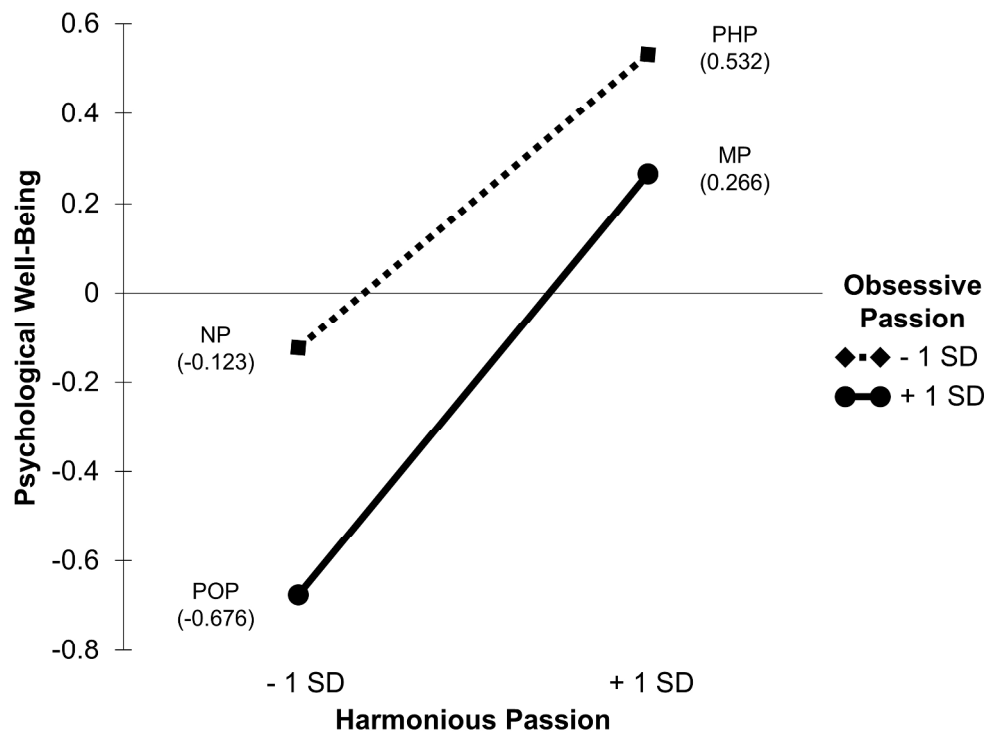


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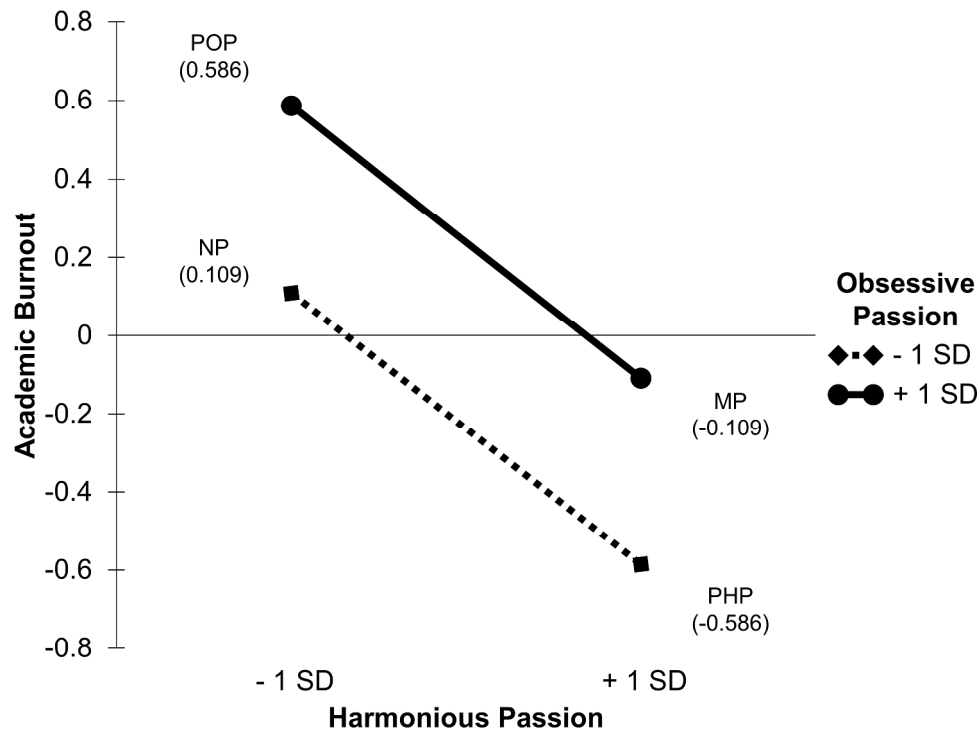


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