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The psychology of passion: A meta-analytical review of a decade of research on intrapersonal outcomes

Abstract

It is just over a decade since Vallerand and colleagues (Vallerand et al., 2003) introduced the dualistic model of passion. In this study, we conduct a meta-analytical review of relationships between Vallerand et al's two passions (viz. harmonious and obsessive), and intrapersonal outcomes, and test the moderating role of age, gender, domain, and culture. A systematic literature search yielded 94 studies, within which 27 criterion variables were reported. These criterion variables derived from four research areas within the intrapersonal sphere: (a) well-/ill-being, (b) motivation factors, (c) cognitive outcomes and, (d) behaviour and performance. From these areas we retrieved 1,308 independent effect sizes and analysed them using random-effects models. Results showed harmonious passion positively corresponded with positive intrapersonal outcomes (e.g., positive affect, flow, performance). Obsessive passion, conversely, showed positive associations with positive and negative intrapersonal outcomes (e.g., negative affect, rumination, vitality). Correlations were largely invariant across age and gender, but certain relationships were moderated by domain and culture. Implications are discussed.

Philosophers have long contended that without passion people would find no purpose or meaning in their lives (see David Hume, 1711-1776; Jean-Jacques Rousseau, 1712-1778; Georg Wilhelm Friedrich Hegel, 1770-1831). Passion is inherent to the human experience (c.f. Descartes, 1649/1972) and provides the psychological energy underpinning engagement in valued activities. Yet, until recently, passion received very little attention in psychology with researchers opting to study related constructs that fall under the rubric of emotion (e.g., happiness, enjoyment, excitement; see Vallerand, 2015). That was until Vallerand and his colleagues (Vallerand, et al., 2003) published their paper on psychological passion and proposed the first dualistic theory to explain its effects. Just over a decade on, we provide a meta-analytical review of the research that followed this paper, especially as pertains to intrapersonal outcomes. In addition, we explore whether the effects of passion differ as a function of age, gender, domain, and culture.

Passion

Vallerand and colleagues (Vallerand et al., 2003; Vallerand & Houlfort, 2003; Vallerand, 2008) define passion as a strong inclination toward a personally meaningful and highly valued activity that one loves, finds self-defining and to which substantial time and energy is invested. According to these authors, passion can fuel motivation, well-being and enthusiastic task engagement – providing a balanced and purposeful life. Yet passion is not always adaptive and can, at times, overspill into compulsion, negative emotion, and rigid persistence. This dualistic perspective posits that two distinct types of passion are at play. The primary distinction between the types of passion is in how the activity has been internalized into one's identity. In line with organismic integration theory, a mini-theory within self-determination theory (Ryan & Deci, 2002), the internalization of passion leans heavily on how personal and environmental factors permit a full, or only partial, integration of behaviour.

The first type of passion, harmonious passion, emerges from full behavioural integration. This is when the activity and its outcomes are socialized as concordant with pre-existing values and goals of the self ("this passionate activity reflects the qualities I like about myself"; Vallerand et al., 2003). It is purported that a full integration of behaviour is the consequence of an autonomy supportive environment, in which the activity is allowed to be freely chosen without contingency (i.e., for its inherent benefits). This autonomous internalization results in a pattern of behaviour encapsulated by wilful engagement, volition and personal endorsement. As a result, harmoniously passionate individuals do not feel compelled to do the activity but, rather, engage out the sense of identity and enjoyment.

Obsessive passion, on the other hand, emerges from a partial behavioural integration of the activity that one loves. That is, when the activity and its outcomes do not fully integrate into one's identity and thus conflict with pre-existing values and goals ("I often have difficulties controlling the urge to engage in my passionate activity"; Vallerand et al., 2003). Partial integration is understood to result from environmental control in the form of conditional regard, whereby behaviour is socialised to originate from contingencies attached to the activity such as feelings of acceptance or self-worth (Deci & Ryan, 1987). This controlled internalisation manifests a pattern of behaviour reflected by compulsive and rigid engagement to serve an end other than the activity itself. Accordingly, although obsessively passionate individuals love the activity, they nevertheless feel compelled to engage out of a need to self-validate and garner social approval through participation in the beloved activity.

Both passions are highly energising. Nevertheless, on the basis of their divergent internalization processes, harmonious and obsessive passion are hypothesized to be markedly different in terms of their associations with cognitive, affective and motivational outcomes. Harmonious passion derives from an autonomous internalisation, which engenders a secure sense of self-esteem (Hodgins & Knee, 2002). Therefore, when engaged in the harmoniously

passionate activity, people fully focus on the task without recourse to external contingency and, hence, should experience heightened concentration and flow. Likewise, they should also experience heightened positive affect as the flexible task engagement that harmonious passion affords is conducive to higher enjoyment, satisfaction and vitality. Similarly, as the activity is fully integrated in the self, a perceived internal locus of control emerges from harmonious passion that should engender adaptive motivation and self-regulation (i.e., learning goals, intrinsic motives).

For obsessive passion, the cognitive, affective and motivational outcomes are hypothesised to be less desirable and at times maladaptive. Emerging from a controlled internalization that fosters dependency and ego-involvement, obsessive passion emits a sense of insecurity and, as such, it should promote obstructive in-task cognition (e.g., rumination, catastrophizing, worry). In a similar vein, the ego-involvement associated with obsessive passion is likely to promote heightened positive affect when self-worth is validated and heightened negative affect when self-worth is threatened. Finally, since when acting out of obsessive passion the activity is cherished but only partially integrated, a conflicted locus of control (i.e., internal and external) emerges that should foster a mix of adaptive and maladaptive motivation regulation (i.e., learning and outcome goals, intrinsic motives and self-worth strivings). In short, the quality of intrapersonal outcomes in passionate activities hinges on the type of passion at play.

The Conceptual Basis of the Dualistic Model

To appreciate the unique contribution of the dualistic model to motivation and emotion research, it is necessary to trace its theoretical basis. According to Vallerand (2015), the dualistic model of passion consists of seven core elements. These elements are implicit to the passion definition provided earlier, and were derived from philosophical ideas that laid passion's intellectual foundations (Joussain, 1928; Jean-Jacques Rousseau, 1712-1778; Ribot,

1907). The first core element is that passion emerges in the context of a *specific* activity, as opposed to a generalized passion for everything and anything. The second core element is that passion encapsulates a profound and enduring *love* of the activity. The third core element is that passion emerges only towards activities that are personally *valued* or meaningful. The fourth core element is that passion is a *motivational*, rather than affective, construct. The fifth core element is that passion emerges when activities become self-defining and part of one's *identity*. The sixth core element is that passion encompasses high levels of psychological energy, effort and *persistence*. Finally, the seventh core element is that passion takes a *dualistic* form and can confer adaptive or maladaptive outcomes.

Based on these core elements, it is possible to set the dualistic model apart from other conceptualisations of passion and related constructs (see Table 1). To the former, the dualistic model has two central points of divergence from other passion frameworks. First, it distinguishes two types of passion within the same model – to account for the possibility of passion going awry – which is at odds with other approaches that take a unidimentional outlook (e.g., Baum & Locke, 2004; Cardon, 2008). Second, Cardon (2008) and others (e.g., Baum & Locke, 2004) describe excitement, enjoyment and enthusiasm as inherent to passion, whereas Vallerand (2015) describes these emotions as corollaries of passion, not components. The distinctiveness of the dualistic model of passion is thus readily apparent.

Turning to related constructs, there are number of activity valuation constructs that bear resemblance to harmonious and obsessive passion. Yet, as can be seen in Table 1, they differ with the dualistic model's core elements in important ways. Most notably, passion can be compared with personal interests (Renniger & Hidi, 2002) or talent-related activities (Rathunde & Csikszentmihalyi, 1993). Certainly, akin to passion, these constructs attribute high activity value and self-definition to specific activities. However, they differ from passion insomuch as they do not distinguish a dualism in the activity valuation (such that it can be

adaptive or maladaptive) and, like other conceptualisations of passion, are affective, not motivational, constructs.

In the case of related motivational constructs, passion has a number of conceptual similarities with intrinsic motivation and some forms of extrinsic motivation (e.g., identified and introjected regulation). Intrinsic motivation, in particular, has overlap with harmonious passion since both encompass a love for specific activities that are engaged in for their inherent value (Deci, 1971; Vallerand et al., 2003). Yet, within harmonious passion, activities are reflectively endorsed as part one's identity, and hence it regulates them broadly. Intrinsic motivation, on the other hand, is an implicit and spontaneous force that does not involve any reflective endorsement and, as such, it emerges from the person-activity interaction at the short-term level (Koestner & Losier, 2002). As regards forms of extrinsic motivation, the fundamental difference here is that extrinsic motivation hinges on obtaining an outcome separate from the activity (even if there is a high level of autonomy). By contrast, activities are engaged in out of love and their inherent value within harmonious and obsessive passion. To this distinction, studies demonstrate that the statistical effects of passion on affective and behavioral outcomes are unchanged in the presence of motivation providing support for their unique effects (e.g., Bélanger, Lafrenière, Vallerand, & Kruglanski, 2013a; Houlfort, Philippe, Vallerand, & Ménard, 2013; Vallerand et al., 2003, Study 2).

There are also similar behavioural constructs, such as overcommitment (Preckel, von Kanel, Kudielka & Fischer, 2005) and workaholism (Oates, 1971; Spence & Robbins, 1992). Here, however, other differences are notable. In particular, though these behavioural constructs and passion share a common basis in activity specificity and persistent behaviour, they differ on the basis that overcommitment and workaholism do not necessarily invoke a liking for the activity, nor do they stipulate that the activity should be self-defining. Accordingly, persistent behaviour in passion functions via activity valuation and

identification, whereas overcommitment and workaholism are better interpreted as addictive, relentless, behaviours irrespective of any activity love or value (Lavigne, Forest, Fernet & Crevier-Braud, 2014).

Passion may also be said to overlap with state constructs such as engagement (Schaufeli, Salanova, Gonzalez-Roma & Bakker, 2002), burnout (Maslach & Jackson, 1981) and flow (Csikszentmihalyi, 1975). Engagement and burnout are experiential states characterised by positive (engagement) and negative (burnout) affect and cognition. Flow, on the other hand, is an experimental state of immersion. While passion and these constructs are bound insomuch as they emerge in the context of a specific activity and regulate persistent behaviour (in the case of engagement and flow), they differ on a number of important counts. Not least of which is that engagement, burnout and flow are cognitive and/or affective constructs and represent a state of mind. Passion, by contrast, is a motivational construct that, owing to internalisation, resides contextually between the trait and state level of personality (Philippe, Vallerand, Andrianarisoa & Brunel, 2009).

Finally, passion may also be said to resemble certain trait constructs such as zest (Peterson & Seligman, 2004) and grit (Duckworth, Peterson, Matthews & Kelly, 2007). Zest refers to a passion trait whereby people are passionate about most things in life, whereas grit refers to a trait encapsulating high levels of perseverance and passion for long-term goals. Both passion and these trait constructs are defined by activity valuation, motivation and persistence meaning they share obvious overlapping features. Nevertheless, central differences are evident. For example, unlike passion, zest and grit are unrooted in any particular activity and instead reflect motivational typicality across all activities. Similarly, zest and grit are unidimensional and do not encapsulate a dualistic outlook whereby motivation might confer maladaptive outcomes. Overall, then, though passion shares a number of common features with similar affective, motivational, behavioral, state and trait

constructs, it nevertheless differs from them in important ways and hence stands alone as a framework of human motivation and emotion. Having traced these distinguishing conceptual features, we now turn to the empirical basis of the dualistic model.

The Empirical Basis of the Dualistic Model

As research on harmonious and obsessive passion has progressed, the study of their intrapersonal correlates has proliferated in a number of areas (see Vallerand, 2008, 2010, 2015). In the present paper, we focus on research that can be broadly categorised into four areas of enquiry. The first area is well/ill-being and refers to the effects of passion on subjective indices of psychological health that include affect (positive and negative), life satisfaction, vitality, cognitive-emotional engagement, self-esteem and burnout. The second area is motivation and reflects research interested in how passion influences (or is influenced by) acquired and inherent regulatory processes such as achievement goals, behavioural regulations and the basic psychological needs (viz. autonomy, competence and relatedness; Deci & Ryan, 2000). The third area is cognitive outcomes and encompasses research examining how passion effects thought processes and self-perceptions in passionate activities such as concentration and flow, as well as obstructive cognitions such rumination and anxiety. Finally, the fourth area is behaviour and performance and refers to how passion impacts the intensity of behavioural engagement (hours/week), deliberate practice, and activity dependence, as well as its influence on objective and subjective performance.

Over 10 years of empirical support exists for the impact of passion on people's well- and ill-being, motivation, cognition and behaviour (see Vallerand, 2008, 2010; Vallerand, 2015; Vallerand & Verner-Filion, 2013 for reviews). However, the magnitude and direction of this impact is dependent on the type of passion adopted. Harmonious passion, according to cross-sectional, longitudinal, and even experimental studies in diverse domains such as work, education, and sport (among others), carries a number of in-task benefits. These include

higher positive affect, vitality, cognitive-emotional engagement, integrated forms of motivation (i.e., intrinsic motivation, identified regulation), learning goals, flow, deliberate practice and performance (e.g., Bonneville-Roussy, Lavigne & Vallerand, 2011; Philippe et al., 2009; Vallerand, Ntoumanis et al., 2008; Wang, Liu, Chye & Chatzisarantis, 2011). It is also associated with lower negative affect, burnout and ruminative cognition (e.g., Carbonneau, Vallerand & Massicotte, 2010; Donahue et al, 2012; Walker, Nordin-Bates & Redding, 2011; Young, de Jong & Medic, in press). Furthermore, beyond these in-task benefits, harmonious passion also has a number of wider effects outside of the activity, such as higher life satisfaction and lower activity/life conflict (e.g., Caudroit, Bioche, Stephan, Le Scanff & Trouilloud, 2010; Pryzbylski, Weinstein, Ryan, & Rigby, 2009; Vallerand, Paquet, Philippe, & Charest, 2010). In short, harmonious passion appears to have an enriching influence on our lives.

Passion, though, can go awry and promote less desirable outcomes when it becomes obsessive. This theorising has empirical support. Cross-sectional, longitudinal, and experimental research conducted within a number of life's domains including work, education and sport (among others), has shown obsessive passion to positively correlate with indicators of both well- and ill-being (viz. positive and negative affect, cognitive-emotional engagement and burnout; e.g., Carbonneau et al., 2010; Parastatidou, Doganis, Theodorakis, & Vlachopoulos, 2012; Stoeber, Childs et al., 2011), integrated and non-integrated motivation (e.g., Parastatidou et al., 2012; Wang, Khoo, Liu, & Divaharan, 2008; Wang et al., 2011), learning and outcome goals (e.g., Bonneville-Roussy et al., 2011; Vallerand et al., 2008; Vallerand et al., 2007) and activity dependence and performance (e.g., Wang & Chu, 2007; Schellenberg, Gaudreau, & Crocker, 2013; Vallerand et al., 2008). Moreover, in support of the dualistic model, the positive correlations between obsessive passion and adaptive outcomes (viz. well-being, integrated motivation, learning goals and performance)

are typically smaller in magnitude than those of harmonious passion (e.g., Carbonneau et al., 2010; Vallerand et al., 2008; Vallerand et al., 2007). Obsessive passion thus has a largely impoverishing influence on our lives because, unlike harmonious passion, it necessitates the maintenance of negative affect, non-integrated motivation and compulsive behavioural engagement.

Overview of the Present Meta-Analysis

To date, reviews of the intrapersonal effects of passion have been confined to narrative accounts (see Vallerand, 2008, 2012, 2015). While such accounts provide a useful overview of the literature, they cannot statistically capture the magnitude and direction of effects. The primary purpose of the current study was therefore to meta-analyse the available passion literature with a view to elucidating the magnitude and direction of potentially different relations between the passions and their intrapersonal outcomes. We focus solely on intrapersonal outcomes because: (a) the predominant focus within the extant literature examining the dualistic model of passion has been on such constructs (e.g., cognitive processes, performance, affect, and wellbeing), and; (b) although studies on interpersonal and even societal outcomes are beginning to accrue, they are yet too small in number to warrant a systematic synthesis at this time. In terms of intrapersonal outcomes, our brief review identified a number of key constructs in the passion literature. These include; positive affect, negative affect, satisfaction, vitality, cognitive-emotional engagement, self-esteem and burnout (well/ill-being), integrated and non-integrated forms of motivation, learning and outcome goals, and psychological need satisfaction (motivation factors), concentration, flow, rumination and anxiety (cognitive outcomes), and hours/week behavioural engagement, deliberate practice, performance and activity dependence (behaviour and performance).

In line with the dualistic model of passion, harmonious passion should display mean weighted positive correlations with ‘adaptive’ inter-personal outcomes (enriching life

features; e.g., positive affect, satisfaction and intrinsic motivation). Likewise, harmonious passion should also exhibit mean weighted negative correlations with 'maladaptive' intrapersonal outcomes (impoverishing life features; e.g., negative affect, burnout and introjected regulation). Relative to harmonious passion, obsessive passion should exhibit significantly smaller mean weighted positive correlations with 'adaptive' intrapersonal outcomes. And, unlike harmonious passion, obsessive passion should also display positive mean weighted correlations with 'maladaptive' intrapersonal outcomes.

Controlling for Shared Variance of Harmonious and Obsessive Passion

The secondary purpose of this study was to test the passion-outcome relationships with partial correlations. Partial correlations represent 'pure' effects because they capture the variance explained in outcomes after partialling out the overlapping variance of harmonious and obsessive passion. Across the passion literature, partial correlations for the passions are commonly reported alongside their bivariate counterparts (e.g., Ratelle, Vallerand, Mageau, Rousseau, & Provencher, 2004; Vallerand et al., 2003; Vallerand et al., 2008). This is because obsessive and harmonious passion are typically (positively) correlated and this shared variance can interfere with the 'true' relationship between each type of passion and their various outcomes (Vallerand, 2015). This is most evident in positive relationships between obsessive passion and some 'adaptive' criterion variables (viz. positive affect, vitality, satisfaction) that are reduced to non-significance or reversed when the effects of harmonious passion are controlled (e.g., Gustafsson et al., 2011; Ratelle et al., 2004; Vallerand et al., 2003). Akin to the bivariate correlations, harmonious passion should display positive and negative mean weighted partial correlations with 'adaptive' and 'maladaptive' criterion variables, respectively. In the case of obsessive passion, however, an important difference would be expected. Although the positive bivariate correlations between obsessive passion and 'maladaptive' outcomes should remain at the partial level, in line with extant

research, positive bivariate associations with 'adaptive' outcomes should reduce to non-significance, or reverse, when the effects of harmonious passion are controlled.

Moderation of the Passion-Outcome Relationships

Despite the dualistic model's broad correlational and experimental support, at both the bivariate and partial levels, the literature is not without its inconsistent findings. While harmonious passion typically predicts adaptive outcomes (e.g., vitality, life satisfaction), some studies have failed to substantiate these effects (e.g., Mageau et al., 2005; Stenseng et al., 2011). Moreover, in contrast to the dualistic model, there have been instances in which harmonious passion has had small positive correlations with maladaptive outcomes (e.g., negative affect, exercise dependence; Akehurst & Oliver, 2014; Martin & Horn, 2013). Equivocal findings have also been documented for obsessive passion. It has been associated with: (a) maladaptive outcomes only (e.g., negative affect; Stenseng et al., 2011), (b) both adaptive and maladaptive outcomes (e.g., positive and negative affect; Lafreniere, Vallerand, Donahue, & Lavigne, 2009), and (c) adaptive outcomes only (e.g., psychological need satisfaction; Curran, Appleton, Hill, & Hall, 2011). Although within-study sampling error will account for some of the variability in findings, it is likely that between-study differences may also do so.

An advantage of meta-analysis is that it permits tests of variability between studies, in terms of the observed relationships, by potential moderating factors (Schmidt & Hunter, 2015). A number of between-study differences, in personal and contextual characteristics, may moderate associations between passion and intrapersonal outcomes. With respect to personal characteristics, the internalization process is hypothesized to be invariant across demographics (e.g., age and gender; Deci & Ryan, 1987) and, perhaps because of this, we are unaware of any single study suggesting systematic differences in passion effects. Yet research nonetheless indicates that females are particularly influenced by gendered-role

orientations, such as appearance motives and self-worth strivings (e.g., Duncan, Hall, Wilson & Jenny, 2010; Markland & Ingledew, 2007; Wilson, Rogers, Fraser & Murray, 2004), which are linked with an obsessive passion. Likewise, anecdotally, studies with middle aged and older adults (viz. Carbonneau, Vallerand, Fernet, & Guay, 2008; Houlfort et al., 2013; Philippe & Vallerand, 2007; Vallerand et al., 2010) typically show stronger effects for harmonious passion on indicators of subjective well-being than studies with younger adults or adolescents (viz. Pryzbylski et al., 2009; Vallerand et al., 2007; Verner-Fillion, Lafrenière, & Vallerand, 2012). We therefore seek to explore whether age and gender moderate links between passion and intrapersonal outcomes, but offer no specific hypotheses.

More concrete hypotheses can be made for the moderation of links between passion and intrapersonal outcomes by contextual factors. Most notably, theories of cultural relativity would suggest that the effects of passion should vary across collectivist and individualist societies. Collectivism and individualism are dimensions used to trace differences across cultural norms in Western (e.g., Australia, United States) and Asian countries (e.g., China, Singapore; Hofstede, 2001). Individualism prevails in most Western countries and encapsulates a cultural norm of self-interest, where people typically view themselves as unique, bounded and independent of other people. Collectivism prevails in many of the Asian countries and reflects a cultural norm of interdependence, in which people view themselves as an integral part of a larger social network (Markus & Kitayama, 1991). As agency goals are more valued in individualist societies, harmonious passion may be less desirable, and obsessive passion less undesirable, in this context. Accordingly, we expect that the effects of passion would be stronger in individualist cultures than they are in collectivist cultures.

Another potential contextual moderator of associations between passion and intrapersonal outcomes is activity domain. To date, three domains have been the primary conduits of passion research: (a) sport, performing arts and leisure, (b) work, and (c)

education. These domains are achievement contexts, but they differ in important ways. Within sport, performing arts, and leisure, high performance standards are necessary for success and, hence, obsessive tendencies may be construed as desirable (Gould & Maynard, 2009). Moreover, sport, performing arts, and leisure activities are (typically) freely chosen (Vallerand, 2004). Work and education, on the other hand, are almost the motivational antitheses of sport, performing arts, and leisure as outcome motives (e.g., financial remuneration, academic grades) are pervasive, and engagement is mandated. Based on these social-motivational differences, the effects of harmonious passion on intrapersonal outcomes should be stronger in sport, performing arts, and leisure than they are in work and education, whereas the effects of obsessive passion on intrapersonal outcomes should be stronger in work and education than they are in sport, performing arts, and leisure.

Method

Selection of studies

A four stage strategy was employed to retrieve relevant studies. In the first stage, we searched Medline, PsycINFO, PsycARTICLES, Psychology and Behavioral Sciences Collection and Dissertation Abstracts International databases for all years covering 2002 (date of first dualistic passion study; Rousseau, Vallerand, Ratelle, Mageau, & Provencher, 2002) to 2014 using *"harmonious passion"* and *"obsessive passion"* as search terms. In the second stage, in order to retrieve studies omitted from the databases, we undertook a search of relevant review articles and book chapters (e.g., Vallerand, 2008, 2015; Vallerand & Verner-Filion, 2013). In the third stage, we examined the reference lists of the studies derived from steps one and two to identify any additional literature. Finally, we contacted the corresponding authors of the retrieved studies requesting any unpublished data they might possess (i.e., conference papers or unpublished datasets). The four stage strategy yielded 272

papers. Following the removal of duplicates, 127 papers remained (115 peer-reviewed journal articles, 7 dissertations and 3 unpublished datasets) containing 153 datasets.

Papers were included in the meta-analysis provided the following criteria were met: (a) harmonious and obsessive passion were measured using the Passion Scale (Vallerand et al., 2003; Marsh et al., 2013), (b) criterion variables were measured using continuous scales, which yielded quantitative values, (c) the study contained a relationship that was reported in at least three other studies (so that the number of independent samples for each criterion variable ≥ 4; Berry, Ones, & Sackett, 2007), (d) the study reported an effect size or enough information to calculate one, (d) the report was published in English and, (e) each study included a dataset that was not reproduced elsewhere (e.g., in a dissertation and peer-reviewed journal article). In the event of duplicate studies, we included only the published version.

Coding of Studies

We coded studies that met the inclusion criteria using a coding sheet that included: (a) the study reference, (b) the criterion variables, (c) the effect size (Pearson's *r*), (f) the sample size, (d) the internal reliability of individuals' scores on the passion scales and scales used to measure criterion variables, (g) the domain of passion measurement, (h) the mean age of participants, (i) the percentage of females, (j) the cultural dimension of the study's participants and, (k) the inter-correlation of harmonious and obsessive passion. None of the studies omitted information regarding age and gender. However, a handful of studies did not report effect sizes or reported metrics other than *r*. In these cases, authors were contacted for this information and, if they did not reply, *r* was derived from available statistics (e.g., *t*, *F*, or χ^2) using formulas provided by Hunter and Schmidt (1990) where possible.

A number of studies reported the correlations between the passions and sub-dimensions of a higher-order construct (viz. burnout, cognitive-emotional engagement and

psychological need satisfaction). When this was the case we employed composite formulas (Ghiselli, Campbell, & Zedeck, 1981, p. 163-164) to calculate the relationship between the two passions and the latent criterion variable. In order to record internal reliabilities for the latent criterion variables, the Spearman-Brown formula was used (Schmidt & Hunter, 2015). Finally, for the remaining non-composite variables, there were a number of studies that omitted information regarding internal reliability. In each case, we coded internal reliability as the grand mean of the reliabilities for that respective construct across all studies.

Alongside bivariate correlations (*r*), we were also interested in meta-analysing relationships of each type of passion independent of the other (e.g., obsessive passion controlling for harmonious passion). To do so, we calculated partial correlation coefficients (*pr*) using formula provided by Cohen, Cohen, West and Aiken (2003 p. 73). Partial correlations capture independent effects because they reflect the relationship between a residualized passion variable and a residualized criterion variable – having controlled for the other type of passion. In the case that the correlation between the passions was not reported (information necessary to calculate partial correlations), authors were contacted for this information. If we received no reply, only *r* from such studies was coded. There were also some instances in which only partial correlations were reported and, if Pearson's *r* could not be retrieved from authors, we coded only the partial correlations.

Having coded the studies that met the inclusion criteria, we then produced a set of independent effect sizes. This was to ensure that each *r* and *pr* from a given dataset was represented only once in the analysis. Multiple effect sizes were present in studies reporting longitudinal data and, in these cases, we derived a single effect size by taking the mean of the correlations across the time points. Overall, 70 papers with 94 studies providing 1308 independent effect sizes (634 bivariate and 674 partial correlations) were included in subsequent analyses. Out of the 70 papers retained, 62 (88.6%) were published journal

articles, 5 (7.1%) were Master's or Doctoral dissertations and 3 (4.3%) were unpublished datasets provided by authors (Jowett, 2010; Paradis, 2014; Verner-Filion, 2014). These papers are marked with an asterisk in the reference section.

Inter-Rater Reliability

The datasets in this meta-analysis were all coded by the first author. In addition, a sub-sample of 36 (46%) studies were independently coded by the third author. Both authors are regular contributors to the passion literature. We did this to generate an estimate of inter-rater reliability. Comparing the coded information, agreement was high (94%). Any discrepancies were reconciled by revisiting the paper or dataset and reaching a consensus.

Analytic Strategy

Our hypotheses were tested using a meta-analysis to produce mean weighted bivariate and partial correlations (corrected for sampling error; r^+ and pr^+) between the types of passion and each criterion variable. Meta-analyses were performed using random effects models (unless $k \leq 5$, in which case fixed effects models were employed; Hedges & Vevea, 1998). This approach assumes that between study heterogeneity in effect size is attributable to both sampling and systematic (e.g., differences in settings or procedures) error (Schmidt & Hunter, 2015), and thus permits inferences beyond the set of meta-analysed studies (Borestein, Hedges, Higgins, & Rothstein, 2010). As is conventional in random effect models, effect sizes were first transformed into Fisher's *z*, meta-analysed, and then transformed so that the weighted mean effect sizes and confidence intervals can be expressed in terms of *r* and *pr*. Effect sizes are deemed statistically significant when their 95% confidence intervals exclude zero. We opted to use Cochran's (1954) total Q_T and Higgins and Thompson's (2002) I^2 to quantify the degree of between study heterogeneity in effect sizes. The former is a chi-square statistic that quantifies the total variance in the meta-analysis whereas the latter is the percentage of variance in the meta-analysis that is explained

by between study differences (Richardson, Abraham & Bond, 2012). A statistically significant total Q_T is understood to reflect substantial heterogeneity in effect sizes and I^2 proportions of 25%, 50% and 75% represent low, moderate and high heterogeneity, respectively (Higgins, Thompson, Deeks & Altman, 2003).

Alongside the weighted mean *r* and *pr*, we also calculated weighted mean ρ correlations for *r* and *pr*. ρ correlations reflect *r* and *pr* corrected for measurement error using the artefact distributions of the alpha coefficients. The corresponding 80% credibility intervals associated with the weighted mean ρ correlations indicate the degree of variation in the effects across studies, and thereby the extent to which they are valid in the population (Field & Gillett, 2010). As an adjunct to mean weighted *r*, *pr* and ρ correlations, we also quantified the extent of publication bias in our meta-analysis by employing Duval and Tweedie's (2000) "trim and fill" procedure. This procedure estimates the number of studies (*k*) missing due to publication bias and, with this information, imputes the missing studies to recalculate the effect size. A difference of > .05 in the effect size (i.e., observed vs imputed) is indicative of a significant number of *k* studies missing from either side of the distribution.

Finally, we conducted moderator analyses with age, gender, activity domain of passion (sport, leisure and performing arts vs work vs education) and culture (individualistic vs collectivist) as the moderating factors. For the categorical moderators, we grouped studies by: (a) their activity domain of passion and, (b) their culture (using Hofstede's 2001 country list). We then performed a subgroup analysis, using a mixed-effects model with restricted maximum likelihood estimation, to test for between-group differences. Here, a significant between-group heterogeneity statistic (Q_B) indicates that there are differences between subgroups in terms of their effect sizes. Specific differences can be examined via a comparison of the 95% confidence intervals for effect sizes. For the continuous moderators, we regressed the mean age of participants and percentage of females in the sample on the

inverse variance weighted effect sizes (i.e., random intercepts, fixed slopes model). Here, a significant beta statistic is indicative of moderation by a continuous variable. Analyses were conducted using the Comprehensive Meta-Analysis software (CMA version 2.2.064; Biostat, Englewood, NJ), Wilson's (2006) MetaReg SPSS macro, and Field and Gillet's (2010) Meta_Basic SPSS macro.

Results

Data description

Overall, 1308 independent correlations (634 bivariate and 674 partial) were analysed. Half of these (654, of which 317 were bivariate and 337 partial) were construct correlations with harmonious passion and the other half were construct correlations with obsessive passion. Twenty six of these independent correlations (13 bivariate and 13 partial) were mean longitudinal associations and 1282 (611 bivariate and 661 partial) were cross-sectional. In line with recommendations (Hedges & Vevea, 1998), fixed-effects meta-analyses (assuming only sampling error) were performed on the two constructs with fewer than 5 independent samples; cognitive-emotional engagement and subjective performance (N range = 633-2202; k range = 3-4). The remaining random-effects meta-analyses were conducted on 'good' number of independent samples (N range = 711-9283; k range = 5-28).

Tables 2 and 3 report the meta-analysis results for each of the constructs' r and pr. They include information of sample size (N) and the number of independent studies (k) upon which the weighted mean correlation and ρ is based. For each construct we have detailed the mean weighted correlation corrected for sampling error (r^+ and pr^+) and its associated 95% confidence interval (CI), I^2 and Q_T. The weighted mean ρ correlation corrected for measurement error is also reported alongside its 80% credibility interval (CV). Lastly, based on r^+ and pr^+, the number of missing studies is estimated with the trim and fill procedure and,

where this is greater than 0, the corresponding adjusted effect size is reported. We employed Cohen's (1992) criteria for small (.10), moderate (.30) and large (.50) effect sizes.

Well/Ill-Being

At the bivariate level, positive affect, life satisfaction and vitality shared moderate positive correlations with harmonious passion. Cognitive-emotional engagement had a large positive correlation with harmonious passion. By contrast, harmonious passion shared no relationship with negative affect and had a large negative correlation with burnout. Obsessive passion shared a small positive correlation with positive affect, which was significantly smaller in magnitude than that of harmonious passion (Hotelling's $T = -16.75$, $p < .01$). It also had a small positive correlation with negative affect, but the confidence intervals for its bivariate correlation with life satisfaction, vitality burnout and cognitive-emotional engagement crossed zero indicating null effects.

At the partial level, unlike at the bivariate level, harmonious passion had a small and significant negative relationship with negative affect. In addition, the positive correlation of obsessive passion on positive affect at the bivariate level reduced to non-significance at the partial level with confidence bands that cross zero. Moreover, the small mean weighted positive correlation between obsessive passion and burnout at the bivariate level strengthened to significance at the partial level. No other correlations were significantly reduced or reversed. Overall, harmonious passion exhibited significantly larger (small-to-moderate vs small and non-significant) positive mean weighted bivariate correlations with indicators of well-being (i.e., positive affect, satisfaction, vitality and cognitive-emotional engagement) than obsessive passion. Harmonious passion also correlated negatively, whereas obsessive passion correlated positively, with indicators of ill-being (i.e., negative affect and burnout) at both the bivariate and partial levels.

Motivation Factors

Harmonious passion exhibited moderate and large positive correlations with intrinsic motivation (large), identified regulation (large), a mastery approach goal (moderate) and psychological need satisfaction (moderate) at the bivariate level. It also shared a small negative bivariate association with amotivation. Harmonious passion also shared small and moderate positive bivariate associations with introjected regulation (moderate) and a performance approach goal (small). It did not correlate at the bivariate level with external regulation and a performance avoidance goal because the confidence bands crossed zero.

Obsessive passion shared small, moderate and large positive bivariate correlations with introjected regulation (large), external regulation (moderate), a performance approach goal (small) and a performance avoidance goal (small). It also exhibited small and moderate positive bivariate correlations with intrinsic motivation (moderate), identified regulation (moderate), a mastery approach goal (small) and psychological need satisfaction (small). Notably, though, these relationships were smaller in magnitude than those of harmonious passion (intrinsic motivation [Hotelling's T = -19.62, p < .01]; identified regulation [Hotelling's T = -10.73, p < .01]; mastery approach goal [Hotelling's T = -5.11, p < .01]; psychological need satisfaction [Hotelling's T = -11.40, p < .01]). Obsessive passion did not share any bivariate association with amotivation.

Some relationships differed at the partial level. Here the small positive bivariate correlations of harmonious passion on introjected regulation and a performance approach goal reduced to non-significance with confidence bands crossing zero. Furthermore, at the partial correlation level, the confidence bands for the small positive bivariate relationships between obsessive passion and intrinsic motivation and psychological need satisfaction included a null effect, whereas obsessive passion's small bivariate correlation with amotivation strengthened to significance. No other correlations were significantly reduced or reversed. In all, harmonious passion shared significantly larger (moderate-to-large vs small-

to-moderate) positive mean weighted bivariate correlations with 'adaptive' motivation regulation (i.e., intrinsic motivation, identified regulation, mastery approach goal and psychological need satisfaction) than obsessive passion. Likewise, obsessive passion had moderate-to-large positive correlations with 'maladaptive' (or poor quality) forms of motivation regulation (i.e., introjected regulation, external regulation, amotivation and performance avoidance goal), whereas harmonious passion was either negatively or unrelated to these criterion variables (at the partial level).

Cognitive Outcomes

At the bivariate level, harmonious passion shared moderate and large positive correlations with concentration (moderate), flow (large) and self-esteem (moderate). It also had small-to-moderate negative correlations with anxiety and activity/life conflictat the bivariate level. The confidence band for the bivariate correlation between harmonious passion and rumination included zero. Obsessive passion, conversely, had small and moderate bivariate positive associations with anxiety (small), rumination (moderate) and activity/life conflict (moderate). It exhibited a small bivariate negative relationship with self-esteem. Further obsessive passion also had small positive bivariate correlations with concentration and flow. Both of these positive correlations, though, were smaller in magnitude than those of harmonious passion (concentration [Hotelling's T = -7.41, p < .01]; flow [Hotelling's T = -18.23, p < .01]).

The results were similar at the partial level, although the small positive bivariate correlations of obsessive passion with concentration and flow were reduced to non-significance with confidence bands crossing zero. All other relationships retained their significance and direction. Overall, harmonious passion exhibited positive mean weighted bivariate and partial correlations with positive cognition (i.e., concentration, flow and self-esteem) and negative mean weighted bivariate and partial correlations with negative

cognition (i.e., anxiety, rumination, and activity/life conflict). Obsessive passion, on the other hand, exhibited negative or non-significant mean weighted correlations with positive cognition and positive mean weighted correlations with negative cognition (at the partial level).

Behaviour and Performance

At the bivariate level, harmonious passion shared small and moderate positive correlations with deliberate practice (moderate), hours per week of behavioural engagement (small), objective performance (small) and subjective performance (small). Similarly harmonious passion also had a moderate positive bivariate correlation with activity dependence, but it was notably smaller than obsessive passion (Hotelling's $T = -19.46$, $p < .01$).

Obsessive passion had a similar set of correlates. It exhibited a moderate positive bivariate correlation with deliberate practice that did not differ from harmonious passion (Hotelling's $T = .48$, $p > .05$). Obsessive passion also had a small positive bivariate correlation with hours per week of behavioural engagement, which was larger than harmonious passion (Hotelling's $T = 9.03$, $p < .01$), as well as a large positive bivariate correlation with activity dependence. It also had a small bivariate positive correlation with subjective performance, which was smaller in magnitude than harmonious passion (Hotelling's $T = -3.17$, $p < .01$), and was unrelated to objective performance.

These results, again, differed in places at the partial level. Here, unlike at the bivariate level, harmonious passion shared no correlation with hours per week of behavioural engagement or objecitve performance as confidence bands crossed zero. Likewise, at the partial level, the relationship between obsessive passion and subjective performance reduced to non-significance with a confidence interval that included a null effect. No other correlations were significantly reduced or reversed. Collectively these mean weighted

correlations indicate that, with the exception of activity dependence (which has a larger relationship with obsessive passion), both of the passions positively associate, or do not correlate, with behavioural engagement and performance to approximately equal degrees.

Publication Bias

The trim and fill procedure was employed to detect publication bias. A difference of > .05 between the mean weighted and imputed mean weighted effect size was identified in 15 of the 98 independent relationships. Of the 15 relationships, seven were significant with 95% CIs that crossed zero (see Tables 1 and 2). Hence, for these seven (7% of effects), mean weighted relationships may reflect an overestimation of the effect size. We turn to the implication of this finding in the limitations.

Moderator Analysis

We conducted the moderator analysis on only partial correlations as there were more effect sizes to include (674 vs 634) and the effects represent associations of 'pure' harmonious and 'pure' obsessive passion with constructs. Of the 50 relationships probed, 12 had non-significant Q_T values indicating statistical homogeneity in effect size across studies. For the 38 relationships that remained, all had moderate-to-large I^2 values or wide credibility intervals around the ρ correlation indicating substantial between-study variation in the effect sizes. Age and gender were examined as continuous moderators when there was significant heterogeneity and $k \geq 10$ (Clark, Michel, Zhdanova, Pui & Baltes, in press). Activity domain of passion (sport, performing arts, and leisure vs work vs education) and culture (individualist vs collectivist) were examined as categorical moderators where there was significant heterogeneity. Ten relationships met this criterion for the continuous moderation analysis, 19 met this criteria for the domain categorical moderation analysis, and 33 met this criteria for the culture categorical moderation analysis.

Moderation by Age and Gender

A random intercept fixed slopes multiple meta-regression was performed to test for moderation by age and gender. In the regression model, the mean partial correlation coefficient weighted by its inverse variance was the criterion variable. The mean age of participants (age) and percentage of females (gender) were the predictor variables. Two significant regression models emerged (see Table 3). The first showed that gender significantly predicted the positive mean inverse variance weighted partial correlation between harmonious passion and life satisfaction. This is consistent with the interpretation that the correlation of harmonious passion with life satisfaction is larger for females than for males. The second significant regression model showed that age significantly predicted the positive mean inverse variance weighted partial correlation between obsessive passion and burnout. This is consistent with the interpretation that as people get older the correlation of obsessive passion with burnout gets larger.

Moderation by Culture and Domain

Sub-group analyses were performed to test for moderation by culture and domain. For activity domain, 9 subgroup analyses yielded a significant between-group difference (see Table 4). The positive relationship between harmonious passion and life satisfaction was larger in work than in sport, performing arts, and leisure, and education. Similarly, the negative correlation between obsessive passion and life satisfaction was larger in sport, performing arts, and leisure, and education, than in work. Harmonious passion exhibited larger positive correlations with vitality in work and education than it did in sport, performing arts, and leisure. In contrast, obsessive passion had a larger positive correlation with burnout in work than it did in sport, performing arts, and leisure, and education.

The positive correlation of harmonious passion with flow was larger in sport, performing arts, and leisure and work than it was in education. Likewise, the negative relationship between obsessive passion and flow was larger in sport, performing arts, and

leisure than in work and education. Obsessive passion also had a larger positive correlation with rumination in sport, performing arts, and leisure than in work and education. Finally, harmonious passion exhibited a larger correlation with objective performance in work and education than in sport, performing arts, and leisure. In contrast, obsessive passion had a larger negative relationship with objective performance in work than in sport, performing arts, and leisure, and education.

For culture, 13 subgroup analyses yielded a significant between-group difference (see Table 5). The positive association of obsessive passion with negative affect was larger in collectivistic cultures than in individualistic cultures. The positive correlation of harmonious passion with life satisfaction was larger in collectivistic cultures than in individualistic cultures. Obsessive passion exhibited a positive relationship with life satisfaction in collectivistic cultures but a negative relationship with life satisfaction in individualistic cultures. This was similarly the case for the relationship between obsessive passion and vitality that was positive in collectivistic cultures but non-significant in individualistic cultures.

Harmonious passion had a larger negative correlation with amotivation in individualistic cultures than it did in collectivistic cultures. Likewise, obsessive passion exhibited a larger positive relationship with amotivation in individualistic cultures than it did in collectivistic cultures. The positive correlation of harmonious passion with a mastery approach goal was larger in individualistic cultures than in collectivistic cultures. In contrast, the positive relationship between obsessive passion and a mastery approach goal was larger in collectivistic cultures than in individualistic cultures.

Obsessive passion exhibited a positive relationship with a performance avoidance goal in individualistic cultures, but was this association was non-significant in collectivistic cultures. By contrast, harmonious passion had a larger negative correlation with activity/life

conflict in collectivistic cultures than in individualistic cultures. Harmonious passion also exhibited a larger positive association with hours/week of behavioural engagement in collectivistic cultures than in individualistic cultures. For the positive correlation of obsessive passion with hours/week of behavioural engagement, it was larger in individualistic cultures than it was in collectivistic cultures. Finally, the association of obsessive passion with objective performance was negative in collectivistic cultures but non-significant in individualistic cultures.

Discussion

In this study, we used meta-analysis to synthesise data from 94 independent studies on the intrapersonal correlates of harmonious and obsessive passion. Supporting Vallerand et al.'s (2003) dualistic model, mean weighted bivariate and partial correlations showed harmonious passion to be an enriching motivational construct that positively corresponds with positive intrapersonal outcomes (e.g., positive affect, satisfaction, flow, performance). By contrast, the mean weighted bivariate and partial correlations for obsessive passion revealed a less desirable and at times maladaptive pattern of association with both positive and negative intrapersonal outcomes (e.g., negative affect, rumination, vitality). These aggregate findings were further qualified by the results of moderation analysis, which revealed that certain correlations differed depending on age, gender, domain and culture. We now turn to a discussion of the implications of our findings.

Passion and Intrapersonal Outcomes

In line with expectations, harmonious passion had significant positive mean weighted bivariate and partial correlations with 'adaptive' criterion variables (e.g., positive affect, mastery goals, performance). By contrast, and also in line with our hypotheses, harmonious passion had either non-significant or negative mean weighted bivariate and partial correlations with 'maladaptive' criterion variables (e.g., negative affect, performance

avoidance goals and activity/life conflict). It is nevertheless noteworthy that there were a couple of occasions where findings did not support the hypotheses at the bivariate level. For instance, harmonious passion had positive mean weighted correlations with introjected regulation and activity dependence. However, these relationships were significantly reduced (activity dependence) or non-significant (interjected regulation) at the partial level.

Such findings substantiate claims made by researchers that harmonious passion is an enriching motivational force. Harmoniously passionate individuals report high levels of positive emotionality and cognition. They also tend to approach activities with an adaptive pattern of motivation encapsulated by learning, development and volition. This adaptive pattern of motivation is influential in deliberate practice and thus higher performance. We also found, on top of these in-task benefits, that harmoniously passionate individuals experience positive effects outside of their passionate activity. These include lower activity/life conflict and higher life satisfaction.

Obsessive passion, as expected, had a less desirable and at times maladaptive pattern of intrapersonal correlates. It exhibited mean weighted positive bivariate associations with both well- and ill-being (e.g., positive and negative affect) and integrated and non-integrated motivation regulation (e.g., intrinsic motivation and external regulation). In line with hypotheses, the effect sizes for the positive bivariate correlations of obsessive passion with 'adaptive' outcomes (e.g., well-being and integrated motivation regulation) were significantly smaller in size (small-to-moderate) compared to harmonious passion (moderate-to-large). Mean weighted bivariate correlations similarly suggested that obsessive passion contributed to higher negative in-task cognition (i.e., rumination, anxiety and activity/life conflict) and, unlike harmonious passion, had only small positive (viz. concentration and flow) or negative correlations (viz. self-esteem) with positive cognition. The bivariate effects of obsessive passion on behaviour and performance outcomes were akin to those of harmonious passion

(i.e., higher behavioural engagement, deliberate practice, activity dependence and performance).

Controlling for harmonious passion provided clarity. As expected, where obsessive passion had small positive correlations with well-being (viz. positive affect), integrated motivation regulation (viz. intrinsic motivation and psychological need satisfaction) and positive cognition (viz. concentration and flow) at the bivariate level, these effects were reduced to non-significance at the partial level. By contrast, all positive correlations with 'maladaptive' outcomes remained when harmonious passion was controlled. Such a pattern of partial associations is supportive of the notion that 'pure' obsessive passion underpins largely impoverished functioning (Vallerand, 2015). This is because, in the absence of harmonious passion, obsessive passion requires the continual maintenance of negative affect, non-integrated motivation and compulsive behavioural engagement.

Moderation by Age and Gender

In addition to the aggregate correlations, we also examined age and gender as continuous moderators of the partial associations between passion and intrapersonal outcomes. Only two of these moderation effects were significant. Accordingly, and in line with the demographic invariance hypothesis, relationships between passion and intrapersonal outcomes were largely invariant. This conclusion notwithstanding, gender of participants did moderate the size of the relationship between harmonious passion and life satisfaction such that it was stronger when females constitute a greater proportion of the sample. Perhaps this reflects the broader range of sources from which females, relative to males, draw their life satisfaction (Blais, Vallerand, Briere, Gagnon & Pelletier, 1990) – magnifying the effects of harmonious passion. Another possibility is that the statistical effects of harmonious passion are accentuated because females typically show a stronger preference for social support than males (Su, Rounds, & Armstrong, 2009) and better interpersonal relationships are an

important source of life satisfaction for harmoniously passionate individuals (e.g., Jowett et al., 2013; Lafrenière, Jowett, Vallerand, Donahue & Lorimer, 2008; Paradis, Martin, & Carron, 2012).

The second significant continuous moderation effect concerned the partial correlation of obsessive passion and burnout. Here, age moderated the size of the effect such that the relationship was stronger when older people formed a greater proportion of the sample. On its own, meta-analyses indicate that age is inversely associated with burnout (Brewer & Shapard, 2004). Obsessive passion thus reverses this dissipating age effect. This is perhaps because obsessive passion promotes a compulsive commitment underpinned by ego-involvement toward the activity that one loves, which can lead to a perception that one has too much self-worth invested to quit (Vallerand, 2015). With age, this dysfunctional commitment is likely to spill over into entrapment which in turn precipitates burnout (Raedeke, Granzyk, & Warren, 2000). Relatedly, obsessive passion precludes psychological detachment from the passionate activity (Donahue et al., 2012). Psychological detachment is a necessary resource for physical and emotional recovery, which, as one ages, becomes an increasingly important waylay to burnout (Derks & Bakker, 2014).

Moderation by Domain and Culture

We also examined domain and culture as categorical moderators of the partial associations between passion and intrapersonal outcomes. When examining the domain of passion, a number of moderation effects were significant. Contrary to our hypotheses, the positive partial correlation of harmonious passion with life satisfaction and vitality were stronger in the work domain than in sport, performing arts, and leisure and education. There is some evidence that positive experiences in work, relative to other domains, have a particularly large effect on positive experiences outside of work given the importance of a job to lifestyle maintenance and economic security (see Bowling, Eschleman, & Wang, 2010).

Hence, it is possible that the spill-over effects of positive experiences in work accentuate relationships between harmonious passion and broader, out-of-activity experiences, such as life satisfaction and vitality.

In partial concordance with our hypotheses, harmonious passion shared a stronger positive relationship with flow in sport, performing arts, and leisure, and work, than it did in education. This finding is probably indicative of the cognitive burden placed on students, which is likely to weaken relationships between harmonious passion and experiences that require a narrow attentional focus. Moreover, contrary to expectations, harmonious passion had a stronger positive partial association with objective performance in work and education than it did in sport, performing arts, and leisure. One might speculate that this finding is consistent with the environmental congruence hypothesis. That is, the flexible engagement engendered by harmonious passion is antagonistic to the compulsive engagement typically associated with higher sports and artistic performances – meaning harmonious passion is likely to have smaller effects on performance in sport, performing arts, and leisure than in other domains in which compulsive engagement is less desirable.

As regards obsessive passion, in line with our hypotheses, it displayed a stronger positive partial association with burnout in work than in sport, performing arts, and leisure, and education. The opposite was the case for the obsessive passion-life satisfaction partial association, which was stronger in sport, performing arts, and leisure, and education, than in work. Perhaps the work domain precipitates more entrapment (i.e., quitting is easier in sport, performing arts, and leisure vs education), and thus the association of obsessive passion with burnout and life satisfaction in work are respectively exacerbated and mitigated because of an inability to withdraw. Another explanation is that obsessive passion takes place within a context of more external regulators in work (e.g., financial remuneration). Hence, any social-motivational safeguard from burnout, or facilitator of life satisfaction, is diminished relative

to sport, performing arts, and leisure or education, which are domains typically lower in these regulators.

Also in line with expectations, obsessive passion had a stronger positive partial correlation with objective performance in sport, performing arts, and leisure than in work and education (where it was negative and non-significant, respectively). As with harmonious passion, this finding is probably a function of environmental congruence because compulsive engagement is desirable for performance in sport and the arts but less so for work and education. Furthermore, and finally, the partial correlations of obsessive passion with rumination (positive) and flow (negative) were stronger in sport, performing arts, and leisure than in work and education – findings that are in contrast to our hypotheses. A possible explanation here is that sport and the performing arts encapsulate many discrete, in-the-moment, performance pressures (Mor, Day, Flett, & Hewitt, 1995; McCann, 2008) that are not ubiquitous to work or education. These discrete pressures may, in turn, magnify the effects of obsessive passion on proximal cognitive outcomes such as flow and rumination.

Turning to the moderated effects of culture, a number of significant between-group differences emerged that were largely in the hypothesised directions. Specifically, the partial correlations of harmonious passion with amotivation and a mastery approach goal were stronger in an individualist culture than a collectivist culture. As were the partial correlations of obsessive passion with amotivation, a performance avoidance goal, hours/week of behavioural engagement and objective performance. It therefore appears that the autonomous motivation encapsulated by harmonious passion, and the controlled motivation captured by obsessive passion, interacts with the preference for agency in individualist cultures to accentuate positive and negative effects on certain intrapersonal outcomes. This is not the case for collectivist cultures, which value interdependence and, as such, may be less affected by motivational differences hinging on perceptions of agency.

It is noteworthy, though, that a handful of subgroup differences across culture did not align with our hypotheses. Most notably, obsessive passion was positively correlated with vitality and life satisfaction in collectivistic cultures but unrelated or negatively related to these outcomes in individualistic cultures. These findings are intriguing. Obsessive passion appears ego-depleting and dissatisfying in settings that value independence and personal autonomy, but contributes to psychological energy and satisfaction in settings that value interdependence and subordination. A possible explanation here is that because people in collectivist cultures have internalised an interdependent self-construal, they expect members of their social network to have an impact on their thoughts and feelings (Singelis, Bond, Sharkey, & Lai, 1999). Accordingly, members of collectivist cultures may perceive vitalising effects of obsessive passion because a sense of social-evaluative concern helps them to tackle future problems that cannot be overcome alone. In all, these moderation effects qualify the dualistic model in a number of important ways and require careful consideration in subsequent research.

Beyond Correlation: Passion Research in the Next Decade

This meta-analysis gives an aggregate overview of the magnitude and direction of associations between passion and intrapersonal outcomes. It also offers a number of novel insights into the moderating factors of these associations. In the main, the relationships presented here provide broad correlational support for the basic tenets of the dualistic model. Notwithstanding the importance of these findings, however, co-variance between two variables merely alludes to causality (Gollob & Reichardt, 1987). Accordingly, based on the research reviewed here, we cannot concretely conclude that passion causes intrapersonal outcomes or that the associations are necessarily uni-directional.

To test for causality, Bélanger and colleagues have recently developed a methodology that experimentally induces harmonious and obsessive passion (Bélanger et al., 2013a).

Employing it, these authors found that university students randomly assigned to an induction of harmonious passion[1] reported more use of adaptive learning strategies (e.g., "I usually call friends in my class and we quiz each other") than those assigned to an induction of obsessive passion[2]. Using the same methodology of Bélanger et al., similar findings have been documented in more recent experimental studies (Bélanger, Lafrenière, Vallerand, & Kruglanski, 2013b; Lafrenière, Vallerand, & Sedikides, 2013, Study 2). Initial manipulations of passion, then, appear to yield causal relationships that are in broad concordance with their correlational counterparts presented in this study.

It must be noted, though, that experimental designs are not always feasible or externally valid (to, for instance, the sport domain). Therefore, alongside them, longitudinal and diary studies, which have the advantage of being conducted in ecologically valid settings, should also be considered in future research. Longitudinal studies permit autoregressive paths that test the temporal assumptions underlying the dualistic model. Diary studies permit tests of within-person fluctuation in intrapersonal outcomes, and whether they vary as a function of passion. Longitudinal and diary studies are beginning to accrue that, like the initial experimental work, support the findings from cross-sectional research (e.g., Carbonneau et al., 2010; Fernet, Lavigne, Vallerand, & Austin, 2014; Philippe et al., 2010). As the next decade of passion research beckons, we call on researchers to employ experimental, longitudinal and diary designs so that the dualistic model is subjected to broad empirical scrutiny – beyond the proliferation of single time-point correlational studies.

Limitations of this Meta-Analysis

[1] In the harmonious passion condition, participants were instructed to: "Write about a time when your favorite activity was in harmony with other things that are part of you and you felt that your favorite activity allowed you to live a variety of experiences. Recall this event vividly and include as much details as you can to relive the experience".

[2] In the obsessive passion condition, participants were instructed to: "Write about a time where you had difficulties controlling your urge to do your favorite activity and you felt that your activity was the only thing that really turned you on. Recall this event vividly and include as much details as you can to relive the experience".

The present meta-analysis has a number of salient limitations. First, it focused solely on the univariate relationships between passion and intrapersonal outcomes. Such a focus did not accommodate an examination of the more nuanced characteristics of the passion-outcomes interplay. It would be interesting to determine whether the passions predict unique variance above and beyond that explained by similar constructs such as intrinsic motivation and flow. It would also be interesting to meta-analyse models that might explain these relationships via explanatory processes (e.g., coping, relationship quality; Jowett et al., 2013; Philippe et al., 2009; Schellenberg et al., 2013). Yet this work is still emerging and, at present, is too small in number to warrant a synthesis. This is similarly the case for relationships between passion and interpersonal and/or inter-group processes (e.g., Jowett et al., 2013; Lafrenière et al., 2008; Paradis et al., 2012), and the social-motivational antecedents of passion (e.g., Bonneville-Roussy, Vallerand, & Bouffard, 2013; Liu, Chen, & Yao, 2011; Mageau et al., 2009). When the number of such mediation, interpersonal and antecedent studies reach a level at which a synthesis is appropriate, this represents an important area for further analyses.

Second, to date, approximately half (46%) of the research on the dualistic model of passion has largely been conducted by a single research group (viz. Vallerand and colleagues). As a new construct emerges in the literature, it is inevitable that the founding group would focus on its study. However, researcher homogeneity does have a couple of implications. One of which is researcher bias, the other is a reliance on a single measure (viz. the Passion Scale). To the former, our results yielded a very low proportion (7%) of associations showing evidence of positive publication bias – meaning systematic researcher bias is highly unlikely. To the later, a single measure of passion restricts the literature to only one conceptualisation of the framework. As work on the dualistic model of passion matures, we encourage research groups to refine and develop further passion research instruments.

Third, our meta-analysis examined the outcomes each of type of passion, rather than testing how the passions are differentially organized within-individuals. This is important because the passions can coexist – alluding to potential moderating effects missed in the present study (Vallerand, 2015). Accordingly, research should now move beyond the additive correlations of the passions to attend to their interactive effects. A 2 x 2 model may be appropriate here, where four clusters are created (viz. high HP/high OP; high HP/low OP; low HP/high OP; low HP/low OP) and their effects on intrapersonal outcomes tested (see Gaudreau & Thompson, 2010 for similar approach concerning perfectionism). This model builds on Vallerand et al's. (2003) dualistic framework of passion, and proposes that within-individual combinations of the passions, instead of each passion per-se, should be the basis of analyses differentiating their effects.

Finally, seven of the relationships in our analysis were significant but had imputed mean weighted correlations that suggested positive publication bias. In meta-analyses that review many independent relationships, it is not unusual to find that a number of these have evidence of publication bias (Richardson et al., 2012). Likewise, of the independent relationships reviewed, seven represents a very small proportion (7%) and indicates that, in general, publication bias is not an issue for the passion literature. Yet it is important to recognise that, for these seven relationships specifically (see Tables 1 and 2), the presence of publication bias necessarily decreases the confidence in the findings as studies are missing from the distribution. Furthermore, some of the subgroup analyses relied on small clusters of studies (i.e., $k < 3$) and the relationships from such clusters are more susceptible to reversal by newly conducted studies. Therefore, relationships with evidence of publication bias and/or emerging from small subbgroups must be interpreted tentatively and require particular attention in future research.

Conclusion

This meta-analytical review provides a synthesis of just over a decade of passion research. The results indicate that harmonious passion is likely to be a largely enriching motivational force that co-varies with a number of in and out of activity benefits including; greater well-being, adaptive cognition, integrated motivation, performance, and deliberate practice. It may also help to keep ill-being and negative cognition in check. Obsessive passion, on the other hand, is a far less desirable motivational force that, at times, co-varies with maladaptive intrapersonal outcomes including; higher ill-being, negative cognition, non-integrated motivation and activity dependence. Across age and gender, aggregate effect sizes were largely invariant. However, certain correlations differed according to domain and culture with effects typically larger in work (vs sport, performing arts, and leisure and education) settings and individualist (vs collectivist) societies. Overall, this review provides strong empirical support for the dualistic model of passion, indicating that people experience the full array of benefits attached to engagement in a beloved activity when passion is harmonious.

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Table 1
The Core Elements of Passion and Similar Constructs (adapted from Vallerand, 2015).

Passion Core Elements	**Affective constructs (e.g., personal interest, talent-related activities)**	**Intrinsic motivation**	**Extrinsic motivation (e.g., identified and introjected regulation)**	**Behavioral constructs (e.g., overcommitment, workaholism)**	**State constructs (e.g., engagement, burnout, flow)**	**Trait constructs (e.g., zest and grit)**
1. Specific activity	✓	✓	✓	✓	✓	×
2. Love or liking	×	✓	×	×	×	×
3. Meaning and value	✓	×	✓	×	×	✓
4. Motivation	×	✓	✓	✓	×	✓
5. Persistence	✓	✓	✓	✓	✓	✓
6. Identity	✓	×	×	×	×	×
7. Duality	×	×	×	×	×	×

Note. ✓ = core passion element present; × = core passion element absent

Table 2

Results of the Primary Meta-Analysis for Bivariate Correlations

Measure	*N*	*k*	r^{+}	CI_{r+} 95%	I^2	Q_T	ρ	*SD*	CV, 80% *L*	CV, 80% *U*	Trim and fill procedure k^{a}	Trim and fill procedure r^{+b}
Well/Ill-Being												
Positive Affect												
Harmonious Passion	6005	24	.41[i]	[.36, .46]	82.30%	129.91**	.50	.03	.30	.70	4	.37
Obsessive Passion	6005	24	.18	[.13, .23]	74.73%	91.00**	.20	.02	.04	.36	7	.12†
Negative Affect												
Harmonious Passion	5244	21	-.03	[-.10, .04]	82.18%	112.22**	-.07	.03	-.27	.14	2	-.06
Obsessive Passion	5244	21	.25[j]	[.18, .31]	80.83%	101.35**	.29	.03	.11	.48	0	n.a.
Life Satisfaction												
Harmonious Passion	8333	19	.39[i]	[.27, .51]	97.40%	692.94**	.51	.06	.19	.83	0	n.a.
Obsessive Passion	8333	19	.02	[-.04, .08]	82.44%	102.50**	.02	.02	-.13	.17	0	n.a.
Vitality												
Harmonious Passion	3066	6	.29[i]	[.16, 41]	92.73%	68.77**	.40	.02	.22	.58	0	n.a.
Obsessive Passion	3066	6	.12	[-.06, .29]	95.77%	118.09**	.18	.05	-.09	.45	0	n.a.
Burnout[c]												
Harmonious Passion	5296	15	-.53[i]	[-.59, -.46]	90.73%	151.08**	-.65	.02	-.81	-.49	1	-.55
Obsessive Passion	5296	15	.13	[-.05, .29]	97.41%	540.84**	.34	.13	-.11	.78	0	n.a.
Cognitive-Emotional Engagement[d]												
Harmonious Passion	2202	4	.60[i]	[.52, .68]	84.63%	19.51**	.69	.01	.60	.78	2	.56
Obsessive Passion	2202	4	.09	[-.22, .39]	97.69%	129.98**	-.19	.08	-.55	.17	2	-.24†
Motivation Factors												
Intrinsic Motivation												
Harmonious Passion	4513	8	.57[i]	[.46, .65]	95.19%	145.61**	.59	.02	.39	.78	3	.48†
Obsessive Passion	4513	8	.32	[.17, .46]	96.35%	191.77**	.27	.05	-.02	.56	3	.21†
Identified Regulation												
Harmonious Passion	2760	6	.54[i]	[.43, .63]	91.23%	57.02**	.68	.01	.55	.81	0	n.a.
Obsessive Passion	2760	6	.38	[.22, .51]	94.63%	93.14**	.49	.03	.28	.71	0	n.a.
Introjected Regulation												
Harmonious Passion	2760	6	.37	[.15, .56]	97.14%	174.82**	.43	.07	.10	.76	0	n.a.
Obsessive Passion	2760	6	.50[j]	[.33, .64]	96.25%	133.19**	.62	.04	.39	.86	0	n.a.
External Regulation												

Harmonious Passion	3189	7	.18	[-.05, .38]	97.35%	226.66**	.22	.10	-.17	.61	0	n.a.
Obsessive Passion	3189	7	.33[j]	[.07, .55]	98.21%	335.41**	.42	.12	-.01	.86	0	n.a.
Amotivation												
Harmonious Passion	1652	5	-.15	[-.25, -.05]	74.55%	15.72**	-.19	.02	-.32	-.06	0	n.a.
Obsessive Passion	1652	5	.10	[-.02, .22]	81.42%	21.53**	.09	.02	-.07	.24	0	n.a.
Mastery Approach Goal												
Harmonious Passion	1278	5	.42[i]	[.35, .48]	37.35%	6.38	.50	.00	.50	.50	0	n.a.
Obsessive Passion	1278	5	.28	[.13, .42]	84.61%	25.99**	.37	.02	.22	.51	0	n.a.
Performance Approach Goal												
Harmonious Passion	1278	5	.18	[.04, .32]	80.93%	20.98**	.27	.03	.09	.45	0	n.a.
Obsessive Passion	1278	5	.25	[.20, .30]	0.00%	1.93	.31	.00	.31	.31	0	n.a.
Performance Avoidance Goal												
Harmonious Passion	1278	5	.04	[-.06, .14]	61.56%	10.41*	.04	.01	-.06	.14	0	n.a.
Obsessive Passion	1278	5	.23[j]	[.08, .36]	82.06%	22.29**	.17	.03	-.02	.35	3	.08[†]
Psychological Need Satisfaction[e]												
Harmonious Passion	2373	6	.47[i]	[.21, .66]	97.42%	194.00**	.35	.09	-.03	.73	3	.18[†]
Obsessive Passion	2373	6	.23	[.01, .43]	95.77%	118.25**	.04	.07	-.30	.37	3	.00[†]
Cognitive Outcomes												
Concentration												
Harmonious Passion	1908	6	.33[i]	[.27, .38]	45.24%	9.13	.39	.00	.39	.39	0	n.a.
Obsessive Passion	1908	6	.13	[.03, .23]	79.83%	24.78**	.16	.02	.01	.31	0	n.a.
Flow												
Harmonious Passion	2368	7	.51[i]	[.44, .58]	77.42%	26.58**	.63	.01	.56	.71	0	n.a.
Obsessive Passion	2368	7	.18	[.06, .29]	85.32%	40.87**	.29	.02	.11	.46	0	n.a.
Self-esteem												
Harmonious Passion	1253	8	.30[i]	[.20, .39]	69.78%	23.16**	.37	.02	.24	.50	0	n.a.
Obsessive Passion	1253	8	-.12	[-.22, -.03]	63.41%	19.14**	-.13	.02	-.23	.00	1	-.13
Anxiety												
Harmonious Passion	1266	7	-.23	[-.33, -.13]	70.97%	20.67**	-.27	.01	-.40	-.06	0	n.a.
Obsessive Passion	1266	7	.18	[.01, .35]	89.67%	58.08**	.27	.05	.01	.53	0	n.a.
Rumination												
Harmonious Passion	634	4	.04	[-.11, .18]	71.44%	10.50*	.06	.03	-.11	.22	1	-.01
Obsessive Passion	634	4	.40[j]	[.25, .54]	78.21%	13.77**	.46	.02	.33	.59	1	.36
Activity/Life Conflict												
Harmonious Passion	1025	7	-.16	[-.31, -.01]	83.53%	36.42**	-20	.05	-.46	.06	0	n.a.
Obsessive Passion	1025	7	.32[j]	[.20, .43]	76.49%	25.52**	.40	.04	.17	.64	1	.30
Behavioural and Performance												

Deliberate Practice												
Harmonious Passion	711	5	.39	[.27, .49]	64.57%	11.29*	.55	.02	.45	.65	0	n.a.
Obsessive Passion	711	5	.33	[.16, .43]	82.42%	22.75**	.46	.03	.27	.64	0	n.a.
Hours/Week												
Harmonious Passion	6929	13	.08	[.00, .15]	86.14%	86.60**	--	--	--	--	6	-.01†
Obsessive Passion	6929	13	.22[j]	[.14, .30]	90.58%	127.35**	--	--	--	--	0	n.a.
Activity Dependence[f]												
Harmonious Passion	1893	6	.30	[.15, .44]	91.77%	60.72**	.41	.04	.17	.65	0	n.a.
Obsessive Passion	1893	6	.67[j]	[.63, .74]	79.92%	24.90**	.78	.00	.74	.83	0	n.a.
Objective Performance[g]												
Harmonious Passion	1121	6	.10	[.04, .17]	10.45%	5.58	--	--	--	--	0	n.a.
Obsessive Passion	1121	6	.09	[-.07, .25]	82.30%	28.25**	--	--	--	--	0	n.a.
Subjective Performance[h]												
Harmonious Passion	1355	4	.25[i]	[.13, .36]	77.25%	13.18**	--	--	--	--	1	.21
Obsessive Passion	1355	4	.16	[.04, .27]	74.41%	11.72**	--	--	--	--	1	.14

Note. r^+ = weighted correlation corrected for sampling error; N = overall sample size; k = number of independent studies; CI = confidence interval; I^2= Higgins and Thompson's (2002) measure of heterogeneity; Q_T = Cochran's (1954) measure of total homogeneity; ρ = weighted correlation corrected for measurement error; *SD* = standard deviation; CV = credibility interval; L = lower bound; U = upper bound; n.a. = not available.

[a] Number of missing studies. [b] Weighted correlation after missing studies imputed using Duval and Tweedie's (2000) trim and fill procedure. [c] Composite of reduced efficacy, depersonalisation/devaluation and exhaustion. [d] Composite of Vigor, Dedication and Absorbsion. [e] Composite of autonomy, competence and relatedness. [f] Includes exercise dependence, workaholism and addiction. [g] Reflects a constellation of actual performance records including others' performance appraisal, grade point average, game scores and coach assessments. [h] Reflects any self-reported performance records. [i] Significantly larger effect compared to obsessive passion as assessed by Hotelling's T, $p < .01$. [j] Significantly larger effect compared to harmonious passion as assessed by Hotelling's T, $p < .01$.

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

Table 3

Results of the Primary Meta-Analysis for Partial Correlations

Measure	*N*	*k*	pr^{+}	CI_{pr+} 95%	I^2	Q_T	ρ	*SD*	CV, 80% *L*	CV, 80% *U*	Trim and fill procedure k^{a}	Trim and fill procedure pr^{+b}
Well/Ill-Being												
Positive Affect												
Harmonious Passion	7240	28	.35	[.30, .41]	84.08%	169.60**	.45	.03	.25	.65	0	n.a.
Obsessive Passion	7240	28	.03	[-.02, .09]	78.80%	127.38**	.03	.02	-.14	.20	9	-.02
Negative Affect												
Harmonious Passion	5796	22	-.12	[-.18, -.08]	75.12%	84.39**	-.17	.02	-.34	-.01	1	-.13
Obsessive Passion	5769	22	.25	[.21, .30]	67.30%	64.23**	.31	.01	.18	.43	0	n.a.
Life Satisfaction												
Harmonious Passion	9283	20	.39	[.27, .49]	97.09%	653.23**	.47	.07	.14	.81	0	n.a.
Obsessive Passion	9283	20	-.05	[-.10, .00]	78.55%	88.58**	-.03	.01	-.17	.10	0	n.a.
Vitality												
Harmonious Passion	2983	6	.23	[.12, .34]	88.05%	41.83**	.33	.02	.19	.48	0	n.a.
Obsessive Passion	2983	6	-.03	[-.19, .13]	94.32%	87.96**	.03	.04	-.21	.26	1	-.06
Burnout[c]												
Harmonious Passion	5296	15	-.44	[-.53, -.35]	94.24%	243.01**	-.47	.04	-.72	-.22	0	n.a.
Obsessive Passion	5296	15	.15	[.09, .22]	81.20%	74.48**	.24	.02	.09	.39	0	n.a.
Cognitive-Emotional Engagement[d]												
Harmonious Passion	2202	4	.50	[.34, .62]	93.41%	45.51**	.59	.02	.43	.75	0	n.a.
Obsessive Passion	2202	4	.07	[-.05, .19]	82.87%	17.51**	.01	.01	-.11	.13	2	-.03†
Motivation Factors												
Intrinsic Motivation												
Harmonious Passion	4513	8	.41	[.37, .46]	63.92%	19.40**	.48	.00	.43	.53	1	.40
Obsessive Passion	4513	8	-.00	[-.08, .08]	83.13%	41.49**	-.04	.00	-.17	.09	4	-.09†
Identified Regulation												
Harmonious Passion	2760	6	.34	[.25, .43]	84.14%	31.53**	.41	.02	.26	.56	0	n.a.
Obsessive Passion	2760	6	.08	[.04, .12]	0.00%	2.77	.10	.00	.10	.10	0	n.a.
Introjected Regulation												
Harmonious Passion	2760	6	.06	[-.02, .13]	69.44%	16.36**	.04	.01	-.05	.14	2	.02
Obsessive Passion	2760	6	.30	[.24, .37]	65.41%	14.46**	.38	.01	.30	.45	0	n.a.
External Regulation												

Harmonious Passion	3189	7	-.03	[-.11, .06]	78.36%	27.72**	-.05	.01	-.18	.07	1	-.05
Obsessive Passion	3189	7	.23	[.09, .36]	93.84%	97.38**	.32	.04	.07	.57	0	n.a.
Amotivation												
Harmonious Passion	1652	5	-.19	[-.29, -.08]	77.88%	18.08**	-.22	.02	-.37	-.08	0	n.a.
Obsessive Passion	1652	5	.16	[.04, .28]	80.72%	20.74**	.15	.02	.00	.31	0	n.a.
Mastery Approach Goal												
Harmonious Passion	1278	5	.31	[.22, .39]	51.83%	8.30*	.34	.01	.24	.44	3	.23†
Obsessive Passion	1278	5	.10	[.00, .19]	58.10%	9.55*	.15	.01	.08	.22	0	n.a.
Performance Approach Goal												
Harmonious Passion	1278	5	.08	[-.04, .20]	73.25%	14.95**	.14	.02	.00	.29	0	n.a.
Obsessive Passion	1278	5	.16	[.11, .21]	0.00%	1.93	.20	.00	.20	.20	2	.14
Performance Avoidance Goal												
Harmonious Passion	1278	5	-.03	[-.10, .04]	20.88%	5.06	-.03	.01	-.04	-.01	0	n.a.
Obsessive Passion	1278	5	.21	[.08, .33]	78.31%	18.44**	.15	.02	-.01	.32	3	.08†
Psychological Need Satisfaction[e]												
Harmonious Passion	2373	6	.35	[.16, .52]	94.96%	99.18**	.33	.05	.06	.61	3	.17†
Obsessive Passion	2373	6	-.02	[-.13, .09]	80.88%	26.16**	-.12	.00	-.26	.02	3	-.10†
Cognitive Outcomes												
Concentration												
Harmonious Passion	2643	8	.26	[.16, .36]	85.90%	49.65**	.34	.02	.16	.52	2	.24
Obsessive Passion	2643	8	.03	[-.09, .14]	88.27%	61.27**	.04	.03	-.17	.25	0	n.a.
Flow												
Harmonious Passion	2907	8	.43	[.34, .51]	84.94%	46.48**	.50	.01	.39	.62	0	n.a.
Obsessive Passion	2907	8	-.02	[-.08, .03]	45.68%	12.89	-.04	.01	-.10	.02	3	-.06
Self-esteem												
Harmonious Passion	1495	9	.33	[.27, .40]	47.08%	15.12	.40	.01	.34	.48	0	n.a.
Obsessive Passion	1495	9	-.18	[-.26, -.09]	64.48%	22.52**	-.18	.02	-.32	-.03	0	n.a.
Anxiety												
Harmonious Passion	1712	8	-.26	[-.38, -.13]	86.28%	51.02**	-.24	.01	-.49	.01	0	n.a.
Obsessive Passion	1712	8	.27	[.13, .40]	88.32%	59.94**	.30	.03	.08	.51	0	n.a.
Rumination												
Harmonious Passion	822	5	-.02	[-.10, .07]	30.17%	5.73	.02	.01	-.06	.03	1	-.04
Obsessive Passion	822	5	.47	[.26, .63]	91.72%	48.32**	.52	.04	.30	.75	2	.34†
Activity/Life Conflict												
Harmonious Passion	1025	7	-.24	[-.34, -.14]	63.48%	16.43*	-.30	.02	-.42	-.18	0	n.a.
Obsessive Passion	1025	7	.37	[.30, .43]	19.91%	7.49	.46	.01	.38	.54	0	n.a.
Behaviour and Performance												

Deliberate Practice												
Harmonious Passion	711	5	.25	[.18, .33]	13.97%	4.65	.36	.01	.36	.36	0	n.a.
Obsessive Passion	711	5	.18	[.08, .27]	40.68%	6.74	.25	.01	.21	.29	0	n.a.
Hours/Week												
Harmonious Passion	7187	14	.02	[-.02, .06]	59.36%	31.97**	--	--	--	--	5	-.02
Obsessive Passion	7187	14	.19	[.12, .27]	88.65%	114.53**	--	--	--	--	0	n.a.
Activity Dependence[f]												
Harmonious Passion	1893	6	.05	[.01, .10]	0.00%	3.19	.06	.00	.06	.06	0	n.a.
Obsessive Passion	1893	6	.56	[.48, .63]	80.61%	25.79**	.60	.01	.48	.72	2	.51
Objective Performance[g]												
Harmonious Passion	1121	6	.06	[-.02, .14]	35.11%	7.71	--	--	--	--	0	n.a.
Obsessive Passion	1121	6	.07	[-.08, .23]	81.51%	27.04**	--	--	--	--	3	-.06†
Subjective Performance[h]												
Harmonious Passion	1355	4	.18	[.08, .28]	68.53%	9.53*	--	--	--	--	1	.15
Obsessive Passion	1355	4	.06	[-.03, .14]	56.18%	6.85	--	--	--	--	0	n.a.

Note. pr^{+} = weighted partial correlation corrected for sampling error; N = overall sample size; k = number of independent studies; CI = confidence interval; I^2= Higgins and Thompson's (2002) measure of heterogeneity; Q_T = Cochran's (1954) measure of total homogeneity; ρ = weighted partial correlation corrected for measurement error; *SD* = standard deviation; CV = credibility interval; L = lower bound; U = upper bound; n.a. = not available.

[a] Number of missing studies. [b] Weighted correlation after missing studies imputed using Duval and Tweedie's (2000) trim and fill procedure. [c] Composite of reduced efficacy, depersonalisation/devaluation and exhaustion. [d] Composite of Vigor, Dedication and Absorbsion. [e] Composite of autonomy, competence and relatedness. [f] Includes exercise dependence, workaholism and addiction. [g] Reflects a constellation of actual performance records including others' performance appraisal, grade point average, game scores and coach assessments. [h] Reflects any self-reported performance records.

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

Table 4

Meta-Regression Analysis for Moderation of Partial Correlations by Mean Age and Percentage of Females

Regression coefficients	*b*	*s*	CI*b* 95%	*β*
HP → Life Satisfaction (*k* = 20; pr^+ = .39; model Q [2] = 16.69**; residual Q [17] = 17.01; total Q [19] = 33.70*)				
Constant	-.03	.10	[-.24, .18]	.00
Age	.00	.00	[-.00, .01]	.31
Gender	.00	.00	[.00, .01]	.57*
R^2	.50			
OP → Burnout (*k* = 15; pr^+ = .15; model Q [2] = 9.10*; residual Q [12] = 14.60; total Q [14] = 23.69*)				
Constant	-.06	.08	[-.21, .09]	.00
Age	.01	.00	[.00, .01]	.47*
Gender	.00	.00	[-.00, .00]	.27
R^2	.50			

Note. Inverse weighted regression. Random intercept, fixed slopes model. pr^+ = weighted partial correlation corrected for sampling error; *k* = number of independent studies; *s* = standard error; CI = confidence interval; Q = Cochran's (1954) measure of homogeneity.

Table 4

Subgroup Analysis for Moderation by Domain

Effect	*N*	*k*	pr^+	CI_{pr+} 95%	Q_B
HP → Life Satisfaction (Overall)	8575	20	.32	[.28, .36]	37.44**
HP → Life Satisfaction (Sport, Performing Arts, and Leisure)	3058	10	.25	[.18, .31]	
HP → Life Satisfaction (Work)	4073	7	.58	[.50, .66]	
HP → Life Satisfaction (Education)	1480	3	.29	[.23, .34]	
OP → Life Satisfaction (Overall)	8575	20	-.08	[-.11, -.05]	7.64*
OP → Life Satisfaction (Sport, Performing Arts, and Leisure)	3058	10	-.10	[-.15, -.04]	
OP → Life Satisfaction (Work)	4073	7	-.06	[-.06, .10]	
OP → Life Satisfaction (Education)	1480	3	-.15	[-.16, -.05]	
HP → Vitality (Overall)	3254	7	.32	[.28, .36]	10.17**
HP → Vitality (Sport, Performing Arts, and Leisure)	1597	6	.08	[-.13, .28]	
HP → Vitality (Work)	439	1	.41	[.32, .48]	
HP → Vitality (Education)	1218	1	.31	[.26, .36]	
OP → Burnout (Overall)	5236	15	.13	[.09, .17]	18.98**
OP → Burnout (Sport, Performing Arts, and Leisure)	1298	6	.07	[.01, .13]	
OP → Burnout (Work)	3895	8	.24	[.17, .30]	
OP → Burnout (Education)	103	1	-.11	[-.29, .09]	
HP → Flow (Overall)	2907	8	.44	[.40, .48]	7.26*
HP → Flow (Sport, Performing Arts, and Leisure)	1074	1	.46	[.41, .50]	
HP → Flow (Work)	967	4	.50	[.41, .58]	
HP → Flow (Education)	866	3	.32	[.21, .42]	
OP → Flow (Overall)	2907	8	-.04	[-.07, .00]	9.64**
OP → Flow (Sport, Performing Arts, and Leisure)	1074	1	-.10	[-.16, -.04]	
OP → Flow (Work)	967	4	.04	[-.03, .10]	
OP → Flow (Education)	866	3	-.04	[-.11, .04]	
OP → Rumination (Overall)	822	5	.55	[.48, .61]	20.40**
OP → Rumination (Sport, Performing Arts, and Leisure)	188	1	.70	[.62, .77]	
OP → Rumination (Work)	172	3	.38	[.16, .57]	
OP → Rumination (Education)	462	1	.41	[.27, .52]	
HP → Objective Performance (Overall)	1121	6	.08	[.02, .14]	6.18*
HP → Objective Performance (Sport, Performing Arts, and Leisure)	434	4	-.01	[-.11, .08]	
HP → Objective Performance (Work)	557	1	.14	[.14, .06]	
HP → Objective Performance (Education)	130	1	.14	[-.03, .31]	
OP → Objective Performance (Overall)	1121	6	-.03	[-.10, .04]	6.06*
OP → Objective Performance (Sport, Performing Arts, and Leisure)	434	4	.13	[-.05, .31]	
OP → Objective Performance (Work)	557	1	-.09	[-.17, -.01]	
OP → Objective Performance (Education)	130	1	.07	[-.11, .24]	

Note. pr^+ = weighted partial correlation corrected for sampling error; *N* = overall sample size; *k* = number of independent studies; CI = confidence interval; Q = Cochran's (1954) measure of homogeneity.

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

Table 5

Subgroup Analysis for Moderation by Culture

Effect	*N*	*k*	pr^+	CI_{pr+} 95%	Q_B
OP → Negative Affect (Overall)	6041	23	.27	[.23, .31]	3.76*
OP → Negative Affect (Collectivist)	751	2	.35	[.26, .43]	
OP → Negative Affect (Individualist)	5290	21	.25	[.20, .30]	
HP → Life Satisfaction (Overall)	8575	20	.52	[.47, .57]	8.84**
HP → Life Satisfaction (Collectivist)	557	1	.57	[.57, .62]	
HP → Life Satisfaction (Individualist)	8018	19	.38	[.25, .49]	
OP → Life Satisfaction (Overall)	8575	20	-.02	[-.06, .03]	9.34**
OP → Life Satisfaction (Collectivist)	557	1	.09	[.01, .18]	
OP → Life Satisfaction (Individualist)	8018	19	-.06	[-.11, -.01]	
OP → Vitality (Overall)	3254	7	.11	[.04, .18]	7.58**
OP → Vitality (Collectivist)	645	1	.16	[.08, .23]	
OP → Vitality (Individualist)	2609	6	-.11	[-.27, .07]	
HP → Amotivation (Overall)	1652	5	-.17	[-.22, -.12]	12.33**
HP → Amotivation (Collectivist)	766	2	-.08	[-.15, -.01]	
HP → Amotivation (Individualist)	886	3	-.26	[-.34, -.19]	
OP → Amotivation (Overall)	1652	5	.07	[.01, .14]	5.46*
OP → Amotivation (Collectivist)	766	2	.04	[-.03, .11]	
OP → Amotivation (Individualist)	886	3	.25	[.09, .40]	
HP → Mastery Approach Goal (Overall)	1278	5	.29	[.23, .34]	5.76*
HP → Mastery Approach Goal (Collectivist)	645	1	.22	[.15, .30]	
HP → Mastery Approach Goal (Individualist)	633	4	.35	[.28, .41]	
OP → Mastery Approach Goal (Overall)	1278	5	.13	[.07, .18]	5.91*
OP → Mastery Approach Goal (Collectivist)	645	1	.19	[.11, .26]	
OP → Mastery Approach Goal (Individualist)	633	4	.05	[-.03, .13]	
OP → Performance Avoidance Goal (Overall)	1278	5	.14	[.08, .19]	17.32**
OP → Performance Avoidance Goal (Collectivist)	645	1	.02	[-.05, .10]	
OP → Performance Avoidance Goal (Individualist)	633	4	.25	[.18, .32]	
HP → Activity/Life Conflict (Overall)	1025	7	-.23	[-.31, -.15]	4.54*
HP → Activity/Life Conflict (Collectivist)	206	2	-.40	[-.54, -.23]	
HP → Activity/Life Conflict (Individualist)	819	5	-.19	[-.31, -.15]	
HP → Hours/Week (Overall)	7854	17	.05	[.01, .09]	5.15*
HP → Hours/Week (Collectivist)	299	1	.17	[.06, .28]	
HP → Hours/Week (Individualist)	7555	16	.03	[-.01, .07]	
OP → Hours/Week (Overall)	7854	17	.16	[.10, .22]	4.32*
OP → Hours/Week (Collectivist)	299	1	.06	[-.06, .17]	
OP → Hours/Week (Individualist)	7555	16	.20	[.13, .26]	
OP → Objective Performance (Overall)	1121	6	-.04	[-.11, .04]	6.06*
OP → Objective Performance (Collectivist)	557	1	-.09	[-.17, -.01]	
OP → Objective Performance (Individualist)	564	5	.12	[-.02, .26]	

Note. We used Hofstede's (2001) cultural values framework to classify studies as individualist or collectivist. pr^+ = weighted partial correlation corrected for sampling error; *N* = overall sample size; *k* = number of independent studies; CI = confidence interval; Q_B = Cochran's (1954) measure of between-group homogeneity.

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