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Harmonious passions support cognitive resources

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Abstract Passionate activities can be a source of pleasure and meaning. According to the Dualistic Model of Passion individuals can have either a harmonious or an obsessive passion for an activity. Where harmonious passions provide positive emotional experience, obsessive passions do not. Fredrickson's broaden-and-build theory holds that ongoing positive experience have general and lasting cognitive benefits; accordingly this should accrue more strongly to those reporting harmonious passions. In a survey (N = 141), we examined self-reported attention, executive functioning, and life quality and contrast these by individuals' passion orientation. In a cross-sectional survey we found that harmoniously passionate individuals differed from the obsessively passionate across questionnaire measures of attention, executive functioning, and life quality. We find that these differences correspond well to that which would be predicted on the basis of the broaden-and-build theory, however the observed effects are not large and do not correspond to clinical differences.

Keywords Passion · Activity engagement · Dualistic model of passion · Broaden-and-build theory · Attention

Introduction

Robert Vallerand (Vallerand 2008, 2010; Vallerand et al. 2003) defines passion as a strong inclination towards an activity, love or like for an activity, and much time and energy spent in that activity. Vallerand claims that passionate activities are highly valued compared to other interesting activities, and at the same time, play a central role in an individual's identity (Vallerand et al. 2003; Vallerand and Houliort 2003; Vallerand and Miquelon 2007). For instance, individuals passionate for a sport such as playing basketball, or a musical instrument such as playing guitar, typically identify themselves as "basketball players," and "guitar players" (Vallerand et al. 2003; Vallerand and Miquelon 2007). According to Vallerand et al. (2003), Vallerand 2008, 2010) the activities we are passionate about provide an important source of identity and meaning to the individual's life.

The leading theory of passionate interest in activities is Vallerand's Dualistic Model of Passion (DMP). This model describes the development of passions for activities, the personal and social factors that support it, and the ways in which some passions integrate with other aspects of lives in a positive way. We use this theoretical framework to examine some predictions about the long term cognitive impacts which may result from this process.

Dualistic model of passion

According to the Dualistic Model of Passion (Vallerand 2008, 2010; Vallerand et al. 2003) an individual can develop either a harmonious or an obsessive passion for an activity, both taking a predominant role in an individual's lifestyle. Harmonious passions are in harmony with an individual's lifestyle, not overpowering aspects of the individual's

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identity or their lifestyle. Individuals with a harmonious passion remain in control of their activity, and can choose when to or to not engage in their activity. Obsessive passions, on the other hand, are not in harmony with an individual's lifestyle. Obsessive passions take on a disproportionately large role in an individual's identity and are likely to conflict with other aspects of the individual's life. The DMP proposes that these two types of passions grow out of different values and different forms of motivation.

According to Vallerand et al. (2003), Vallerand (2008, 2010), harmonious passions are fostered in environments that support values of autonomy and intrinsic needs. Autonomous environments give the individual freedom to explore activities of interest and choose which activities are important to them (Deci and Ryan 2000). At the same time, autonomous environments can foster intrinsic motivation (Vallerand and Ratelle 2002). For example, individuals who are intrinsically motivated pursue goals or rewards based on their own inherent needs, and take part in activities out of the mere enjoyment and interest they provide (Hodgins and Knee 2002; Ryan and Deci 2003). In this case, an individual could develop a harmonious passion for an activity out of the mere enjoyment and satisfaction the activities provides (Vallerand 2008, 2010; Vallerand and Ratelle 2002).

On the other hand, obsessive passions are fostered in environments that are controlling and extrinsic in nature (Vallerand 2008, 2010; Vallerand et al. 2003). Controlling environments pressure individuals to pursue only certain activities that are deemed to be important, limiting an individual's exploration of their own interests (Deci and Ryan 2000). Environments that pressure individuals to pursue certain activities are more likely to foster extrinsic motivation (Vallerand and Ratelle 2002). For example, individuals who are extrinsically motivated pursue goals or rewards based on contingencies emphasized in their environment, such as threat of punishment or risks to self-esteem (Hodgins and Knee 2002; Ryan and Deci 2003). Eventually these contingencies become attached to the activity, inhibiting the individual's control over the activity (Vallerand and Ratelle 2002). In this case, an individual could develop an obsessive passion based on intrapersonal and/or interpersonal pressure placed on the activity, and lack of control over the activity (Vallerand 2008, 2010; Vallerand and Ratelle 2002).

The development of passion is driven by engagement with an activity that holds interest, is perceived as meaningful and fits a person's identity (Vallerand 2015, p94). The process is underwritten by personal (Vallerand et al. 2003) and especially social factors (Mageau et al. 2009; Vallerand and Miquelon 2007). At the heart of the process, however, is a recurring cycle in which passion supports, and is supported by engagement in an activity. Broadly, harmonious passions are created when personal autonomy is supported, activities are pleasurable, and the needed resources are available.

Obsessive passions are created when activities are less under personal control, and their demands are excessive or difficult to manage. Obsessive passions for activities offer less pleasure than do harmonious ones (Mageau et al. 2005; Philippe et al. 2009; Ratelle et al. 2004; Vallerand et al. 2003; Vallerand and Houliort 2003; Vallerand and Miquelon 2007).

Based on this distinction between harmonious and obsessive passion, it is suggested that harmonious passions are more beneficial to psychological well-being (Vallerand et al. 2003; Vallerand and Houliort 2003; Vallerand and Miquelon 2007). Harmonious passions are suggested to provide positive affect during and after activity engagement (Mageau et al. 2005; Philippe et al. 2009; Ratelle et al. 2004; Vallerand et al. 2003). It has also been demonstrated that individuals with harmonious passions experience higher levels of concentration when engaged in their activity (Mageau et al. 2005; Philippe et al. 2009; Vallerand et al. 2003). We suggest that the concentration supports performance; this leads to a rewarding virtuous circle that in turn supports the passion for the activity.

Following this logic, people with obsessive passions will have benefitted less from them. However, it is also entirely possible that, notwithstanding research into the DMP, attentional differences may at least partly underlie the type of passion people develop. Consider that research into attention deficit disorder has shown a strong distinction between hyperactivity, in which people show a strong level of impulsiveness, and inattentiveness, where people find it difficult to maintain engagement in a task. Hyperactivity is not necessarily a barrier to passionate engagement; controversially it may even be related to a strong activation of the neurobiology of play (Panksepp 2007). Inattentiveness, leading to low engagement, should make it difficult to develop a harmonious self-directed passion. We would then expect that inattentiveness and difficulties of executive control would be more associated with obsessive passions. This raises the broader question of how passions, harmonious and obsessive, relate to cognition (see also Vallerand 2015, Chapter 6)

Broaden-and-build theory

Fredrickson (1998, 2004) proposed that emotions themselves play a role in cognitive development. Positive emotion broadens the mindset, making us more adaptable, better rewarded, and better able to respond to and learn from situations. Long term engagement in positive experiences leads to a virtuous circle in which people build cognitive resources which in turn helps people deal better with their situations. Passion for activities should make a perfect test case for this. Engaging in the activities that we are harmoniously passionate about leads to repeating pleasurable experiences, which should lead to a prediction of improved cognitive

resources. So passionate engagement in an activity, and especially harmonious passion, should be leading to better attention. In fact, it is already known that people reporting harmonious passions report better concentration (Vallerand et al. 2003; Forest et al. 2011). Similarly, harmonious passion is correlated with higher levels of absorption (e.g. Ho et al. 2011). Passion is also known to be correlated with scores on a flow scale, with harmonious passions showing an advantage (Carpentier et al. 2012; Mageau et al. 2005). And cognitive differences were also relevant a study of passion and work satisfaction (Dubreuil et al. 2014). Many of these findings can, however, also be explained by a positivity bias. What is unknown is the extent to which high harmonious passion scores are associated with generalized improvements in functioning.

The present study

Measures of general attentional resources have been primarily developed by researchers interested in attention-deficit/hyperactivity disorder (ADHD). The Adult ADHD Self-Report Scale short-form screener (ASRS-screener; Kessler et al. 2005), Adult ADHD Quality-of-Life (AAQoL; Brod et al. 2006) and the Behavioral Rating Inventory of Executive Functioning—Adult Version (BRIEF-A; Roth et al. 2005) have all been developed to capture real world attentional problems. The ASRS-screener (Kessler et al. 2005) is a short-form screening measure intended to detect symptoms of hyperactivity and inattentiveness amongst adults.

The present study is an attempt to apply these measures to the prediction that passion, especially harmonious passion, should be correlated with the cognitive resources. All things being equal, Fredrickson's theory provides a justification for why concentration and engagement should be generally better developed in people with harmonious passions, not just, as previously studied, showing cognitive differences in the context of their passion itself. Accordingly, we theorize that individuals reporting harmonious passion will be unlikely to report symptoms related to Adult ADHD, that individuals with an obsessive passion will report more attention-related life problems and that people reporting harmonious passion will be less likely to report difficulties with executive functioning.

Methods

Participants

Participants (N = 141) were all volunteers from the Laurentian University community, and received a course credit

for their participation. Their mean age was 24 (SD = 9.2; range 17–59); 64 % were female. Highest reported level of completed education was high school 48 %, college 19 %, undergraduate 23 %, master's 11 %.

Procedure

This study was approved by the Laurentian University Research Ethics Board. Participants completed all questionnaires in one-sitting and under the first author's supervision.

Measures

Passion scale

This scale was developed to measure an individual's passionate interest for an activity they do most often (Vallerand 2008, 2010; Vallerand et al. 2003). In the first part of the scale, the participant is asked to think of an activity "that was very dear to your heart," and identify how much they love, value, and spend time engaging in this activity. The second part assesses harmonious and obsessive passion using two six-item subscales. An example of an item that measures obsessive passion is "I have difficulties controlling my urge to do my activity." An example of an item that measures harmonious passion is "The new things that I discover with this activity allow me to appreciate it even more." All items are rated on a 7-point Likert scale (1 = Strongly Disagree to 7 = Strongly Agree). According to Vallerand et al.'s (2003) initial development of the passion scale, all items correlate very highly with their respective subscales ($r = 0.80$ and above). For the purposes of this investigation, individuals were grouped as having either a harmonious passion or an obsessive passion based on whichever of their two standardized scores was higher (as per Mageau et al. 2009 and other studies).

Adult ADHD self-report scale (ASRS-screener)

This instrument was designed to identify adult-related ADHD. Two subscales measure inattentiveness and hyperactivity/impulsivity. Adult-related ADHD is a pattern of problematic behavior that includes failure to pay close attention to details and difficulty organizing tasks and activities. Comprised of only 6-items this short screening scale has been found to be predictive of ADHD diagnoses (Adler et al. 2012; Kessler et al. 2007). All items are evaluated on a 5-point Likert Scale (1 = Never to 5 = Very often). Participants are to identify how many times each of the following experiences has occurred over the past 6 months. Examples of some questions include "How often do you have trouble wrapping up the fine

details of a project, once the challenging parts have been done?” or “When you have a task that requires a lot of thought, how often do you avoid or delay getting started?”. The ASRS-Screener was used to determine how symptoms of adult-related ADHD differentiate between harmonious and obsessive passion.

Adult ADHD quality of life measure (AAQoL)

This instrument was developed to measure the impact of ADHD symptoms on life quality. Using 29-items, this instrument measures four distinct domains of life productivity (11 items), psychological health (6 items), life outlook (7 items), and relationships (5 items). All items are measured using a 5-point Likert scale (1 = Not at all/ Never to 5 = Extremely/Very often). Some subscales of items are positively-framed and others are negatively-framed. Examples of positively-framed items include: “In general, I can...” “Get shopping done,” “Pay attention,” or “Keep my house clean.” Examples of negatively framed items include: “In general...” “People are frustrated with you,” “Tension in relationships,” or “You have not been able to meet the expectations of others.” Participants rate how much each question applies to them based on the past 6-months, with higher scores indicating a greater quality of life. In this study, total scores were used by combining life productivity and life outlook to create a life score and combining psychological health and relationships to create a health score. These scores are used to determine how these essential subscales could provide a measure to global aspects of quality living and differentiate between harmonious and obsessive passion.

Behaviour rating inventory of executive function (BRIEF-A)

This instrument measures dysfunctions in everyday behaviour and daily living (Roth et al. 2005). Using 75-items, participants are to identify how often each behavior has been a problem in the past month, using a 3-point Likert scale (1 = the behaviour is never a problem; to 3 = the behaviour is often a problem). The BRIEF-A measures two broad indices, the behavioural regulation index (BRI), and the metacognition index (MI). Each index is measured using a combination of the 9 subscales: Inhibit, Shift, Emotional Control, and Self-Monitor which make up the BRI index; and Initiate, Working Memory, Plan/Organize, Task Monitor, and Organization of Materials which make up the MI index. Higher scores on the indexes (65 or greater) indicate higher executive dysfunction. Good psychometric properties have been reported for the BRIEF-A

(Bridgett et al. 2013; Roth et al. 2005). For the purposes of this investigation, the BRIEF-A’s nine clinical subscales were used as independent measures in order to identify any difficulties in executive functioning between harmonious and obsessive passion.

According to the BRIEF-A manual (Roth et al. 2005) the emotional control subscale measures the impact of executive control problems emotional self-regulation and expression; task monitoring measures the individual’s ability to assess his or her performance during or after a task, and check for mistakes; organization of materials reflects the orderliness of work and living spaces; working memory measures the ability to hold information in mind in order to complete a task, and maintain focus on an activity; inhibition reflects self control in the face of impulsive behavior; initiation measures the ability to begin a task, without external prompting, and independently generate ideas; shifting measures the ability to move freely from one situation, activity, or aspect of a problem to another as the situation demands, and think flexibly to aid in problem-solving; planning and organizing measures the ability to anticipate future events, set goals, and develop steps ahead of time to carry out a task; and self-monitoring measures the ability to recognize the effect of one’s own behavior on others.

Results

Description of analysis

All participants were grouped based on their passionate orientation (harmonious or obsessive) using the passion scale. Following from the method frequently used by Vallerand, we used standardized scores from each subscale, participants were classified as having either an obsessive passion (OP) or a harmonious passion (HP) according to whichever score was higher. Our planned analysis included using Vallerand’s criteria to separate passionate individuals from non-passionate individuals. However his rules would classify only 10 % of our sample as non-passionate ($N = 14$)—this severely limits the power of potential analyses and, we feel, poorly characterizes the distribution of passion scores. Therefore we included all participants ($N = 141$) within our analysis, and grouped them either as HP or OP.

We first compared HP to OP on the total scores for attention (ASRS-screener), life score (AAQoL), health score (AAQoL), and executive functioning (BRIEF-A) using MANOVA. We follow these results with a series of MANOVAs covering the subscales of each test.

Harmonious passion (HP) versus obsessive passion (OP)

Globally, the multivariate positioning of the HP and OP groups are different across the ASRS-screener, AAQoL, and BRIEF-A; Pillais' Trace = 0.79, $F(4, 130) = 2.801$, $p = 0.029$, $\eta^2 = 0.079$. The OP group showed more problems than the HP group on attention/ADHD, $F(1, 134) = 4.283$, $p = 0.040$, $\eta^2 = 0.031$, and executive functioning, $F(1, 134) = 8.612$, $p = 0.004$, $\eta^2 = 0.061$ and lower life quality on the AAQoL's life score, $F(1, 134) = 7.185$, $p = 0.008$, $\eta^2 = 0.051$. There was no difference between HP and OP on the AAQoL's health score (Please see Table 1).

ASRS-screener

The OP group scored higher than the HP group on the inattentiveness subscale, $F(1, 139) = 5.30$, $p = 0.023$, $\eta^2 = 0.037$. There is no difference on the hyperactivity/impulsivity scale, $F(1, 139) = 0.19$, $p = .658$, $\eta^2 = 0.001$ (Please see Table 2).

AAQoL

Based on a significant difference found on the AAQoL's life score, the two subscales that make up the AAQoL's life score—life productivity and life outlook—were further analyzed. The OP group scored systematically lower than the HP group on life productivity $F(1,138) = 8.054$, $p = .005$, $\eta^2 = 0.056$. The OP group scored only marginally lower than the HP group on life outlook $F(1,138) = 3.262$, $p = .073$, $\eta^2 = 0.023$ (Please see Table 3).

BRIEF-A

The OP group scored systematically higher than the HP group on task monitoring, $F(1, 135) = 4.583$, $p = 0.034$, $\eta^2 = 0.033$; working memory, $F(1, 135) = 11.918$, $p = 0.001$, $\eta^2 = 0.082$; initiating, $F(1, 135) = 4.626$, $p = 0.033$, $\eta^2 = 0.033$; shifting, $F(1, 135) = 3.955$, $p < 0.049$, $\eta^2 = 0.029$; planning and organizing, $F(1, 135) = 14.747$, $p = 0.00$, $\eta^2 = 0.099$; and self-monitoring, $F(1, 135) = 6.190$, $p = 0.014$, $\eta^2 = 0.044$. The OP group was, at most, marginally higher than the HP group for inhibiting, $F(1, 135) = 3.460$, $p = 0.065$, $\eta^2 = 0.025$. There is no difference for emotional control, $F(1, 135) = 1.811$, $p = 0.181$, $\eta^2 = 0.013$; and organization of materials, $F(1, 135) = 0.053$, $p = 0.818$, $\eta^2 = 0.000$, and (Please see Table 4).

Discussion

The present study examined the link between cognitive resources and passion. According to Fredrickson's broaden-and-build theory (1998, 2004), activities that are frequently a source of positive emotional experience help build an individual's cognitive resources. Accordingly, we predicted that cognitive resources, such as attention and executive functioning, would be better for people with harmonious passions than people with obsessive type passions.

Participants completed Vallerand's passion questionnaire and were then classified as having a primarily harmonious or obsessive orientation (using the procedure from Mageau et al. 2009). These groups were then contrasted on three self-report questionnaire measures of attention resources: the ASRS-screener, the AAQoL, and the BRIEF-A. We found that individuals who were grouped as

Table 1 Comparing OP and HP oriented participants' mean questionnaire total scores

Total Scores	Obsessive Passion		Harmonious Passion		MANOVA	
	M (SD)		M (SD)		F (1,134)	p
ADHD (ASRS-screener)	18.71 (3.60)		17.50 (3.19)		4.283	0.040
Life score (AAQoL)	68.60 (7.95)		72.23 (7.76)		7.185	0.008
Health score (AAQoL)	35.39 (6.46)		36.33 (6.98)		0.665	0.416
Executive functioning (BRIEF-A)	121.65 (20.51)		111.73 (18.77)		8.612	0.004

$N = 135$; η^2 = partial eta squared

For the ASRS and BRIEF higher scores are worse—reflecting more self-recognized difficulties or limitations; for the AAQoL higher scores are better—reflecting higher quality of life

Table 2 Comparing OP and HP to mean scores on ASRS-screener subscales

ASRS-screener Subscales	Obsessive passion M (SD)	Harmonious passion M (SD)	MANOVA		
			F (1,139)	<i>p</i>	<i>n</i> ²
Inattentiveness	11.55 (2.81)	10.52 (2.48)	5.30	0.023	0.037
Hyperactivity/impulsivity	7.17 (1.36)	7.06 (1.56)	0.196	0.658	0.001

N = 140; *n*² = partial eta squared

Table 3 Comparing OP and HP to mean scores on AAQoL subscales

AAQoL Life subscales	Obsessive passion M (SD)	Harmonious passion M (SD)	MANOVA		
			F (1,138)	<i>p</i>	<i>n</i> ²
Life productivity	42.16 (5.50)	44.59 (4.58)	8.054	0.005	0.056
Life outlook	26.41 (3.84)	27.63 (4.10)	3.262	0.073	0.023

N = 139; *n*² = partial eta squared

Table 4 Comparing OP and HP to mean scores on BRIEF-A subscales

BRIEF-A subscales	Obsessive passion M (SD)	Harmonious passion M (SD)	MANOVA		
			F (1,135)	<i>p</i>	<i>n</i> ²
Emotional control	17.64 (4.54)	16.59 (4.48)	1.181	0.181	0.013
Task monitor	10.64 (2.04)	9.88 (2.04)	4.583	0.034	0.033
Organization of materials	12.82 (3.54)	12.97 (3.73)	0.053	0.818	0.000
Working memory	14.18 (3.44)	12.33 (2.80)	11.918	0.001	0.082
Inhibit	14.73 (3.00)	13.77 (2.98)	3.460	0.065	0.025
Initiate	13.71 (3.05)	12.65 (2.72)	4.626	0.033	0.033
Shift	10.45 (2.17)	9.70 (2.18)	3.955	0.049	0.029
Plan and organize	17.03 (3.25)	14.93 (3.11)	14.747	0.000	0.099
Self-monitor	10.42 (2.44)	9.38 (2.46)	6.190	0.014	0.044

N = 136; *n*² = partial eta squared

Brief scores indicate self-reported problems—higher scores are worse

obsessively passionate scored higher on tests sensitive to problems with attention, worse on executive functioning and lower quality of life. This dichotomy between harmonious and obsessive passion is very much consistent

with the DMP (Vallerand 2008, 2010). We argue that it is also consistent with the possibility, raised by the broaden-and-build theory, that the development of harmonious passions does support cognitive development.

The ASRS-screener is intended to capture symptoms of adult ADHD (Kessler et al. 2005). We consider three arguments why such symptoms might be differentially associated with harmonious and obsessive passions. First, as hypothesized by Fredrickson (1998, 2004), the mechanism of growth associated with positive experiences should tend to favour people with harmonious passion orientations. The ASRS provides two scores: hyperactivity and inattentiveness (Kessler et al. 2005). Hyperactivity is not associated with a lack of cognitive resources per se; people with hyperactivity can, in some situations, outperform people without it in highly engaging situations (Robinson and Aronica 2009). We did not find a link between hyperactivity scores and passion. Inattentiveness, however, appears to be either a weakness of attention or executive control. We found that harmoniously passionate people had lower inattentiveness scores than those identified as obsessively passionate.

As with the ASRS, it was hypothesized that individuals with a harmonious passion would report a higher quality of life on the AAQoL than those with an obsessive passion. We found differences on the AAQoL's Life Score, but not on the AAQoL's Health Score. The difference in the AAQoL's Life Score is again perfectly consistent with the idea that harmonious passions may help build resources, or, equally, that they reflect the advantages of someone with more resources when they develop a passion. There may be several reasons why the AAQoL's Health Score, which measures psychological health and relationships, does not show the same pattern. One possibility would be that the measure is less sensitive.

When further examining the two subscales that make up the AAQoL's Life Score (life productivity and life outlook), results demonstrated that individuals grouped as harmoniously passionate reported a higher life productivity compared to individuals grouped as obsessively passionate. Harmoniously passionate individuals reported themselves as having more available cognitive resources in order to feel productive in various aspects of their life. This is again consistent with the descriptions of harmonious and obsessive passions according to the DMP (Vallerand 2008, 2010; Vallerand et al. 2003), and equally consistent with the idea that a harmonious passion may help people build those resources.

The BRIEF-A is a self-report measure of executive control (Roth et al. 2005). We found that people with a harmonious passion orientation reported fewer problems than those with an obsessive orientation on task monitoring, working memory, initiation, shifting, planning and organizing, and self-monitoring. However, it is important to note that the scores were generally far below any clinical thresholds and that the difference between the groups would not be expected to be clinically meaningful.

The DMP suggests that obsessive passions can take on a disproportionately large role in an individual's life (Mageau and Vallerand 2007; Vallerand 2008, 2010; Vallerand et al. 2003). Obsessively passionate individuals report great difficulty balancing their activity with other aspects of their day-to-day life (Mageau and Vallerand 2007). Whether or not an individual with an obsessive passion is taking part in their activity, they are still likely to spend a considerable amount of time thinking about their activity (Carpentier et al. 2012; Vallerand 2010). Research has already demonstrated that individuals with an obsessive passion are more likely to experience a negative anticipatory effect before taking part in their activity (Ratelle et al. 2009, as cited in Vallerand 2010). This negative anticipatory effect was reported to impair levels of concentration on other life tasks that were not apart of the individual's passion (Carpentier et al. 2012; Ratelle et al. 2009; as cited in Vallerand 2010). On a similar note, when individuals with an obsessive passion are prevented from engaging in their activity, they are more likely to negatively ruminate over their activity as well (Carpentier et al. 2012; Mageau and Vallerand 2007; Mageau et al. 2005).

The distinction drawn by the DMP is that obsessive passions interfere with people's lives (Vallerand et al. 2003). Our results are certainly consistent with this. However, it is also plausible that the inability to develop a harmonious passion is actually a consequence of underlying limitations of executive control. Although the links between executive functioning and passion scores are relatively small, it is striking that we found them over so many of the subscales of the BRIEF-A (Roth et al. 2005). Since this is not a longitudinal study there is no mechanism for disentangling the roles of executive control in the development of passion and the potential impacts of passion on the development of executive control. Nevertheless, we think that future research on passion should be alert to the possibility that the consequences associated with obsessive passions are actually reflecting underlying problems of executive control.

Broaden-and-build theory

Fredrickson did not specifically address the distinction between harmonious and obsessive passions when creating her broaden-and-build theory (1998, 2004). However, the theory is a general one, and, as conceived by the DMP, harmonious passions should definitely supply a long-term pattern of positive emotions. It would be unfair to the theory to judge how it relates to the question of obsessive passions, since it is unclear that obsessive passions do not have some of the characteristics that might bring this theory to apply. We can suggest that this theory would tend to predict an advantage for people with harmonious passions.

But what sort of advantage? Is this consistent with our actual findings?

We would suggest that first and foremost, our finding of an advantage in executive function for people reporting harmonious passion is exactly the sort of prediction that the theory should make. The pattern of superior executive function was matched by self-reported higher life quality and productivity. Although our measures are not diagnostic with respect to serious problems of attention, and self-reported behavior difficulties are indirect measures of resources per se, our findings suggest that there is in fact a very broad pattern of superior cognitive resources for those reporting harmonious passions. Equally that the size of the effect is quite small.

According to Fredrickson (1998, 2004), a long-term pattern of negative emotions could actually reduce the development of resources. Obsessive passions are distinct in that they correlate with negative affect during activity engagement and beyond the activity itself (Mageau et al. 2005; Vallerand et al. 2003). Individuals with an obsessive passion are more likely to ruminate over their passionate activity when prevented from engaging in it (Mageau and Vallerand 2007), and it is this type of rumination that would limit engagement in other activities (Carpentier et al. 2012; Mageau et al. 2005). Our results and previous evidence would suggest that obsessive passions do not benefit attention or cognitive resources.

Limitations

This study does not involve a longitudinal study of the actual affect of people whose general development and passion is also being measured. So the role attributed to emotion can only be adduced indirectly. Although we consider the development of harmonious passion, with its consistent empirical links to positive emotion, a natural experiment for evaluating Fredrickson's theory, in no way can we rule out or even address the many other possibilities. Emotion is clearly, at best, only one of many factors in cognitive development. It is also plausible that it may play a mediating role or is only a marker of other, more important factors. We consider the present evidence to be interesting in that it offers some support for Fredrickson's theory and potentially adds to the general literature about the passionate interest and its implications.

The data are generated from a single cross sectional survey of university students; it can be argued that most, or all of them, have good attentional capacities. This in turn restricts the range of attention related abilities observed. It is also not possible to properly address this point since it is not clear that the measures used are so stable that they could be taken to represent any trace of the situation when people were first developing their passions.

There is a reasonable concern that self-report questionnaire measures of attention and executive control are not equivalent to laboratory testing of these concepts. This problem is complex. The gold standard tests, such as the n-back test, do not themselves directly measure the real-world impact of difficulties with executive control—although predictions can certainly be made when serious impairments are found. Unfortunately, questionnaire measures obviously capture our attitudes and sensitivity to problems as much as they can capture actual cognitive limitations. It should also be recognized that we use the ASRS, AAQOL, and BRIEF-A out of their original context. These scales were created and validated on their ability to detect significant problems with attention and executive function. To the extent that we are largely using them to place people on a continuum of non-clinical problems, it is important not to overstate the importance of the differences observed between our two groups. We find a difference larger than is likely due to chance between HP and OP participants. This average sample difference should not be interpreted to mean that OP participants have clinically significant problems.

Conclusion

There are theoretical and logical reasons to suppose that people with a harmonious passion for an activity will have better cognitive resources than those with an obsessive style of passion. We found a broad but small difference over self-reported problems with attention, attention related quality of life, and several domains of executive control. Future research should tackle whether or not the observed differences can be found with laboratory cognition tasks (see Bridekirk's Thesis for a pilot effort) and whether these differences are causal, in the sense of altering the trajectory of development of a passionate interest, or reflect the positive benefits of harmonious passion. The broad differences observed also highlight some factors missing from current theories and models of passionate engagement. The associations we find between passion scores and self-reported inattentiveness, maladaptive functioning, and self-regulation potentially extend the scope of the dual-model of passion.

Compliance with ethical standards

Conflict of interest The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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