

# ARE HARMONIOUS AND OBSESSIVE PASSIONS DISTINCT?

by  
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## **Abstract**

Passionate activities can be a source of pleasure and meaning. According to the Dualistic Model of Passion (Vallerand et al., 2003) individuals can have either a harmonious or an obsessive passion for an activity. Where harmonious passions provide positive emotional experience, obsessive passions do not. Using Fredrickson's broaden-and-build theory (2004), it was hypothesized that harmonious passions could have cognitive benefits. By grouping individuals (N=141, M-age=24 years, 89 women) based on their passion orientation, the roles of self-reported optimism, social desirability, social support, attention, executive functioning, and life quality were examined in distinguishing harmonious and obsessive passion. It was demonstrated that harmoniously passionate individuals differed from the obsessively passionate on all measures of attention, executive functioning, and life quality. Where obsessively passionate individuals reported lower attention, executive functioning, and life quality, harmoniously passionate individuals did not. Individuals who were highly passionate differed from less passionate people on optimism. These differences correspond well to that which would be predicted on the basis of the broaden-and-build theory. Taxometric methods were also used to investigate the latent structure of Vallerand's Passion questionnaire. Taxometric methods can test whether a construct is categorical (passion being harmonious or obsessive) or dimensional (only varying in degrees of intensity). Results from taxometric analyses (MAMBAC/MAXCOV) are most consistent with the idea that passion exists in a continuum between its harmonious and obsessive forms.

*Keywords:* Passion, activity engagement, dualistic model of passion, broaden-and-build theory, taxometrics

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## Overview

An exploratory study investigating the passions for an activity was conducted. Individual passions were examined for optimism, social desirability, social support, attention, life quality, and executive functioning. Using individuals' passion scores, this thesis was divided into three sections. Each section presents different results using the same sample of individuals (N=141). In the first section individuals' passion for their preferred leisure activity was measured using Vallerand's passion scale. Individuals were grouped based on their passion orientation (harmonious or obsessive passion) and tested across the series of explored variables. Using the same variables and methodology, the second section also measured individuals' passion for an activity, but grouped individuals differently. Instead of grouping individuals based on the criteria described in Vallerand's dualistic model of passion (DMP), individuals were grouped based on their rates of engagement and emphasis placed on their passionate activity (being either high or low). The differences between the results reported in sections one and two called into question the separation of HP and OP described by Vallerand's DMP. A third section was conducted to test this theoretical account of passion. Using taxometric analysis, it was demonstrated that the concept of passion was not dualistic in nature, and that individuals could exhibit characteristics of both types of passion (harmonious and obsessive passion) described in Vallerand's DMP.

The first section of this thesis begins with a description of activity engagement and the benefits of having a passion. This section provides a theoretical background and understanding of what it means to be passionate for an activity. This section also describes Vallerand's dualistic model of passion (DMP), and its theoretical account of two different types of passion – harmonious and obsessive passion. Vallerand's DMP provides a theoretical account of passion and an empirical method to its study. This model plays a predominant role in this thesis. Another

theory that is very important is Fredrickson's broaden-and-build theory. This section provides a description of Fredrickson's broaden-and-build theory. This theory was used as a theoretical framework to determine if certain types of passion are more beneficial to well-being compared to others.

### **Concept of passion for an activity**

#### **Theoretical background**

Two of the goals of positive psychology are to be able to understand happiness and help individuals attain it (Seligman & Csikszentmihalyi, 2000). According to Seligman (2011), engagement is one of the five essential components to subjective well-being. In this view engagement in an activity that one finds interesting and is likely to bring about positive life experiences and happiness. Evidence to-date suggests that the development of an interest in an activity supports personal growth (Hidi & Renninger, 2006; Krapp, 2003; Silvia, 2006, 2008). If interest is good, then the development of a passion to engage in an activity may be better. The development of passion for at least one activity may be an essential building block in a positive life and the experience of individual happiness.

What is the link between being interested in activities and personal growth? Some activities support positive affective states, such as enjoyment and fascination (Salmela-Aro & Upadyaya, 2012), and fulfillment, by addressing personal meaning. Positive emotional states and fulfillment are not just part of immediate happiness; they also support growth (Fredrickson, 1998, 2004). Growth in turn supports our capacity to become interested and engaged (Thoman, Smith, & Silvia, 2011). When all goes well, this can turn into a virtuous circle (Hunter & Csikszentmihalyi, 2003; Sheldon et al., 2010; Ainley, 2013). One of the primary theoretical

descriptions of this process is given by Fredrickson's broaden and build theory (1998, 2004), which will be reviewed later.

It makes sense that this virtuous circle might be maximized when one is not simply interested in activities, but becomes passionate about them. Individuals that are passionate about an activity are more likely to engage in it and, to the extent that the virtuous circle can be maintained, should derive a maximum psychological benefit. Individuals with a highly engaged passion could be able to sustain both interest and engagement while demonstrating ideal positive growth at the same time.

Passionate engagement in activities is suggested to lead to autonomy, competence and affiliation, which are all said to be a part of intrinsic motivation (Delle Fave et al., 2011). An individual's inner needs and values play an important role in intrinsic motivation. When individuals are intrinsically motivated, they are pursuing goals or rewards based on their own values, rather than values or needs of others – which would be extrinsic motivation (Ryan & Deci, 2000). An individual, who is intrinsically motivated to engage in an activity, does so out of personal interest and enjoyment. When an individual is passionately engaged in an activity, then engagement is suggested to be internally regulated, intrinsically motivated, and best suited to self-fulfillment (Ryan & Deci, 2000). If passionate engagement can promote ideal forms of motivation, then the forms of motivation promoted through a passionate activity could prove to be important in other aspects of an individual's life. A passionate activity can provide adaptability and a skill set beyond one's chosen activity (Ryan & Deci, 2000; Keyes, 2002). Vallerand et al., (2003; Vallerand, 2008, 2010) has devised a theory of passion suggesting that different forms of motivations can lead to different passion orientations – this will be reviewed later.

A passion for any activity can be an important source of eudemonic experiences. Eudemonia is best expressed as a form of happiness that supports long-term goals and continuous engagement and effort (Deci & Ryan, 1985). In contrast to hedonism, individuals who are geared towards eudemonic experiences do not necessarily seek daily or instant gratification for their efforts, but are establishing long-term commitments to their goals in order to discover the meaning and fulfillment found in their pursuits (Deci & Ryan, 1985, 2000; Kasser & Ryan, 2001). In a passionate activity, individuals are not necessarily seeking instant gratification from their activity. Instead, individuals with a passionate activity have chosen a long and enduring commitment to their activity, which is important to eudemonic experiences, and more importantly, to individual happiness. It is these eudemonic experiences attributed to a passionate activity that may lead to human flourishing and positive mental health (Keyes, 2002). On this view, when individuals are highly passionate for an activity, not only will they feel good about their life, but in turn flourish as individuals well.

There is a direct link between passionate engagement in activities, the nature of intrinsic motivation, and the theory of eudemonia (Deci & Ryan, 1985, 2000; Kasser & Ryan, 2001; Phillippe, Vallerand, & Lavigne, 2009b; Ryan & Deci, 2001, 2003; Ryan, Huta, & Deci, 2006; see also Weiss, Westerhof, & Bohlmeijer, 2013). Intrinsic motivation and eudemonia are both important for positive growth and human flourishing (Deci & Ryan, 2000). According to Keyes (2000; Keyes & Ryff, 2002), human flourishing is the pinnacle example of positive mental health. In this case, the highly passionate individual would demonstrate positive growth due to high rates of passionate engagement, and positive mental health that are suggested to accompany intrinsic motivation and eudemonic experiences. If a passionate activity can prove to be an important source to human flourishing, then passionate individuals could be building upon a skill

set applicable to other life domains beyond their chosen activity. For example, the flourishing individual can master work and challenges in their private and social realms, and reap rewards and optimal health in the process (Keyes 2002, 2005, 2006; Keyes & Haidt, 2003; Pinquart & Sorensen, 2009).

### **Dualistic model of passion**

According to Vallerand (2008, 2010) and his colleagues (2003), the difference between a passion and other interesting activities is the value placed on the activity. When an individual places a high degree of value on a given activity, that suggests the activity is a passion. They have a strong inclination towards the activity; they like or love the activity; and they spend much time and energy taking part in the activity. According to some theorists, a passion can provide the necessary ingredients to higher levels of achievement.

Although passionate activities could be an essential building block to a positive healthy lifestyle, according to Vallerand (2008, 2010), not all passionate activities may demonstrate this ideal relationship. How an individual orients towards a specific activity may explain whether the balance between pleasure, engagement and meaning is attainable (Peterson et al., 2005).

According to Vallerand (2008, 2010), the value placed on a passionate activity can take on two distinct forms: either the value placed on the activity is autonomous, or the value placed on the activity is controlled. According to the Dualistic Model of Passion (DMP), developed by Vallerand (2008, 2010), depending on whether the values internalized are autonomous or controlled will change an individual's passionate orientation to be healthy and harmonious or unhealthy and obsessive. According to Vallerand et al. (2003), an individual's social environment also plays a major role in the types of values that are internalized (see also Deci & Ryan, 2000). For example, individuals will internalize values that are enforced within their social

environments. In this case the values internalized will become either autonomous or controlled depending on what is demanded within their social environment (Hodgins & Knee, 2002; Ryan & Deci, 2003). Based on this notion it is suggested that harmonious passions are associated with well-being and psychological health, whereas obsessive passions are not (Carbonneau, Vallerand, Fernet, & Guay, 2008; Castelda, Mattson, MacKillop, Anderson, & Donovanick, 2007; Houliort & Vallerand, 2009; Rousseau, Vallerand, Ratelle, Mageau, & Provencher, 2002).

According to the DMP model, harmonious passions are more suited to an individual's intrinsic needs compared to obsessive passions. For example, it is suggested that harmonious passions are fostered in an environment where individuals feel connected to others and competent at their own abilities. Harmonious passions are also suggested to be more flexible and coherent with an individual's lifestyle (Deci & Ryan, 2000). Obsessive passions on the other hand, are suggested to develop from a lack of intrinsic needs. When individuals feel pressured by their social environment for example, they are more likely to invest more energy and resources into an activity. In some cases individuals may feel uncontrollable urges to take part in their activity. Ryan (1995) suggests these activities become ego-invested and the only source of self-worth for the individual. In this case, obsessive passions tend to be disproportionately incorporated into an individual's lifestyle. Vallerand (2008, 2010) has theoretically separated harmonious and obsessive passion as two unique forms of passion that are internalized differently, and have different effects on activity engagement.

For example, the DMP has demonstrated that harmonious and obsessive passions have distinct emotional states for people who are highly engaged in their activity. Vallerand (2008, 2010; Vallerand, et al., 2003) defined harmonious passion around positive affective states during and after activity engagement, whereas obsessive passion is defined around negative affective

states during activity engagement or when an individual is prevented from engaging in his or her activity. According to Vallerand et al. (2003), affective states differ due to the type of motivation and values the person has come to internalize and place on his or her activity. For example, the autonomous internalization attributed to harmonious passion, is suggested to be more free-flowing and results in more positive experiences. On the other hand, obsessive passions are much more restrictive due to their controlled internalization and hence limit such positive experiences. A person who embodies an obsessive passion over-identifies with his or her activity, due to some internal (intra) or interpersonal pressure and a need to attain satisfaction or self-worth (Hodgins, Yacko, & Gottlieb, 2006; Mageau et al., 2009; Mageau, Carpentier & Vallerand, 2011; Vallerand et al., 2003; Vallerand et al., 2008). For example, an individual's obsessively passionate global self-confidence was more dependent on his or her perceived performance when engaging in the activity. Even when an activity is no longer suitable, due to injury (Rip et al., 2006), or hazardous conditions (Vallerand et al., 2003), obsessively passionate individuals are still likely to engage in their chosen activities.

It is this differentiation between harmonious and obsessive passion that suggests a person who embodies a harmonious passion is more adaptive compared to someone who embodies an obsessive passion. According to the dualistic model of passion (Vallerand, 2010; Vallerand et al., 2003) a passion that is harmonious and not obsessive can help an individual attain crucial psychological needs, such as competence, autonomy, and relatedness (see the Self-Determination Theory; Deci & Ryan, 2000). According to Deci and Ryan (2000), competence, autonomy, and relatedness are essential building blocks to positive adaptation and psychological health. According to this view, a healthy orientation towards a passion could be highly adaptable and a positive influence on one's life. If a passion can serve to attain crucial psychological needs, then



understanding how a passion develops and what variables are related to different passionate orientations could be beneficial.

### **Broaden-and-build theory**

A theory that is important to this study is Fredrickson's broaden-and-build theory. According to Fredrickson (1998, 2001, 2004; Fredrickson & Branigan, 2005), positive emotional states, such as those coming from pleasurable activities, unlock a process that can, in the long-term, improve capacity for attention and help expand the cognitive flexibility necessary for planning. If positive emotional states are important in planning and cognitive flexibility, then perhaps a well-developed passion could be an important source for positive experiences. In this case, engaging in passionate activities can lead to repeating pleasurable experiences, which should lead to a prediction of improved cognitive resources. When considering different passion orientations, the DMP model suggests harmonious passions to exhibit more positive experiences than obsessive passions. For example, individuals who are harmoniously passionate have demonstrated positive emotions during and after passionate engagement (Vallerand et al., 2003).

According to Fredrickson's broaden-and-build theory, harmonious passions could exhibit the type of positive emotions necessary to build and deepen both emotional and cognitive resources. O'Keefe and Linnenbrink-Garcia (2014) have already demonstrated that some activities can replenish self-regulatory resources, when combined with a highly affective state and a high-valued interest. For example, a high affective state and high-valued interest can sustain focus on a given activity for longer durations of time (O'Keefe & Linnenbrink-Garcia, 2014). In the case of passions, individuals who exhibit a harmonious passion could exhibit this ideal relationship between positive experiences and heightened interest to replenish self-regulatory resources.

Research has already demonstrated that harmonious passions are related to higher cognitive states of flow (Vallerand 2010; Csikszentmihalyi, 1990); and these states are most adapted to self-regulation (Muraven, 2012). Therefore, a highly passionate activity may actually sustain and even broaden self-regulatory and attentional capacities as suggested by the broaden-and-build theory. According to O’Keefe and Linnenbrink-Garcia (2014), having a heightened interest in an activity can sustain focus and cognitive resources required by that activity. For example, the highly passionate individual, according to Lipstein and Renninger (2007), would feel completely effortless when repeatedly sustaining their attention towards passionate activities. Interest to engage and re-engage in passionate activities would seem to come naturally. Therefore, the more enduring and long-lasting passionate activities become, the more likely they are to be self-generated by the individual and regulate one’s actions and commitment to such activities in a virtuous circle (Sheldon, 2010; Ainley, 2013).

According to the broaden-and-build theory (Frederickson, 2004), positive emotions help us to grasp a wider scope of our surroundings; helping us to see the ‘big picture.’ It is through the stimulation of novel ideas, actions, and resources that can lead to such adaptive cognitive growth and the ability to flourish (Fredrickson, 2003; Keyes, 2002, 2007). It stands to reason that people reporting high levels of passion, especially harmonious passion, should show some advantages in their capacity to cognitively engage with the world. For example, Vallerand has demonstrated that individuals with a harmonious passion take part in their activity less often than individuals with an obsessive passion, but at longer durations when doing so (Mageau & Vallerand, 2007). Individuals with a harmonious passion are more capable of focusing their attention on the task at hand compared to individuals with an obsessive passion. As demonstrated, harmonious passions are more related to higher states of flow compared to

obsessive passions. Therefore, superior performance would be related to one's high-valued interest for an activity and self-regulation skills (O'Keefe & Linnenbrink-Garca, 2014).

As suggested by the broaden-and-build theory, positive emotions can play an important role in sustaining and even broadening cognitive resources. It is these resources that are important in activity engagement and goal pursuit. If positive emotions can replenish depleted resources, and expand existing ones, then having a passionate activity could prove to be a beneficial outlet to such positive experiences.

This thesis was an exploratory study examining individual passions for an activity. On the basis of Fredrickson's broaden-and-build theory (1998, 2004), several variables were explored to determine which may or may not be related to the way individuals' passion may develop. All things being equal, Frederickson's theory (1998, 2004) was used to determine which variables that predict pleasure when engaging in a passionate activity may be correlated with high HP scores and/or low OP scores. This lends itself to the first section of this thesis.

### **Comparing harmonious and obsessive passions**

The first section investigated the roles of social desirability, social support, optimism, attention, life quality, and executive functioning in distinguishing individuals who report either a harmonious or obsessive passion for an activity, as conceptualized by the DMP model. By lending support from Fredrickson's broaden-and-build theory (1998, 2004) it can be assumed that the positive emotional experiences associated with harmonious passions, may unlock certain processes that can improve behavioral and/or cognitive resources. The opposite can be said about obsessive passions, which provide only negative emotional experiences. The purpose of this section was to see if harmonious passion and/or obsessive passion would be related with any of these variables.

Below is a theoretical explanation as to why each variable – social desirability, social support, optimism, attention, life quality, and executive functioning – was selected for this study. Each variable received its own section comparing it with previous passion literature and other relevant articles. At the end of this literature review, the hypotheses for each variable can be found before entering the methods section.

#### **Social aspects of passion**

Research has found support for the DMP model providing differences between harmonious and obsessive passions involving social interaction and peer support in their selected activity (Donahue, Rip, & Vallerand, 2009; Mageau et al., 2009; Philippe, Vallerand, Andrianarisoa, & Brunel, 2009). Individuals who have a passionate activity that involved the cooperation of others tended to interact differently based on whether their passionate orientation was harmonious or obsessive (Philippe et al., 2009). Individuals who are harmoniously passionate incorporated appropriate social integration within their passionate activity (Mageau et

al., 2009). On the other hand, individuals who demonstrated an obsessive passion for their activity failed to incorporate such interactions with others, and were more competitive.

Obsessively passionate individuals placed more emphasis on their own performance within the activity rather than supporting others. In team-oriented sports, individuals who are harmoniously passionate were more supportive and promoted camaraderie amongst teammates (Donahue, Rip, & Vallerand, 2009). Obsessively passionate individuals placed more self-emphasis on their own performance than promoting others. This suggests that empirical differences between harmonious and obsessive passions may also stem down to individual social skills.

This study did not measure individual social skills per se, but examined the level of peer support identified by individuals. Based on the above evidence, if harmonious passions and obsessive passions differentiate in their degree of social interaction, then perhaps who they choose to identify as a peer or social support could also differentiate. The DMP model suggested that different social environments foster different values, which in turn, directly impact the type of passion the individual develops (Mageau et al., 2009). In this case, perhaps the difference between obsessive passions compared to harmonious passions, is the degree of social support available to the individual. Perhaps obsessively passionate individuals can only identify with a few selected individuals to provide them with specific support.

A similar point can be made between harmonious and obsessive passion in terms of social networks. According to MacLeod and Conway (2005, 2007), those who are more adept in regulating their behavior have larger social networks and more social supports (Prenda & Lachman, 2001). Since harmonious passions are autonomous in nature, and suited towards an individual's intrinsic needs, then it could be suggested that individuals with a harmonious passion would be more adept in regulating their behavior. This in turn would have a direct

impact on the level of peer and social supports identified by harmoniously passionate individuals. Since harmoniously passionate individuals are suggested to demonstrate more prosocial skills during activity engagement, evidence could suggest that harmoniously passionate individuals may have larger social networks compared to obsessively passionate individuals.

By measuring social support, this study not only measured the number of peer supports identified by the individual, but also measured the levels of satisfaction individuals have with those identified peer supports. Perhaps harmoniously passionate individuals will demonstrate not only more social supports, but a higher level of satisfaction with the supports identified. For example, according to the DMP model, harmonious passions do not interfere with other life responsibilities, and when compared to obsessive passions, do not take a disproportionately large role in an individual's life (Vallerand et al., 2003). This would suggest that harmonious passions would be easier to regulate compared to obsessive passions. Since behavior regulation is suggested to play a role in social networking (MacLeod & Conway, 2005, 2007), it could be suggested that harmonious passions could be more in favor of larger social networks and more satisfaction with their social networks as well.

Research demonstrated that individuals who have larger social networks are more likely to demonstrate random acts of kindness (Schwartz, 2010; Schwartz, Keyl, Bode, & Marcum, 2009), better social skills, and healthier forms of social connectedness and lifestyle (Fowler & Christakis, 2008). Also, individuals with larger social networks are more altruistic; allowing the individual to build new ties to new networks that are more likely to model healthier positive behaviours (Schwartz, Quaranto, & Gray, 2013). Larger networks could also lead to more exposure to a variety of activities, and a chance of being involved in a wider array of activities. Similarly, high levels of social functioning may facilitate the development of passion whereas

poor social networks may provide fewer opportunities for passion to develop and less reward from passionate activities. There is some evidence to indicate that the size of a social network for an individual will be somewhat stable over time (MacLeod & Conway, 2005, 2007), and this could implicate the type of passion that individual embodies.

Perhaps the type of social networks an individual has may also assist in the type of passion an individual develops for an activity (see Donahue, Rip, & Vallerand, 2009). For example, Donahue, Rip, and Vallerand (2009) demonstrated that parents, teachers, and coaches can mediate the type of passion an adolescent develops. When an adolescent identifies their passion as obsessive for example, the main support the adolescent identified, such as their parent or coach, also had an obsessive passion for that same activity. According to these results, whatever mentor the adolescent identifies as their main social support can have a direct impact on the orientation of their passion. If the individual was to have a larger social network, then perhaps their passionate development would not be directly influenced by one individual. Rather, a larger social network could help to mediate a passion from becoming obsessive. Logically speaking, a larger social network may reflect flourishing at several levels, such as the development and mediation of a positive healthy passion.

Based on the above evidence, it was hypothesized that larger social networks and higher satisfaction with perceived supports would most be related to individuals with a harmonious passion compared to individuals with an obsessive passion. According to Vallerand (2008, 2010), an individual's social environment plays a major role in the values internalized by the individual (see also Donahue, Rip, & Vallerand, 2009). In turn, the values internalized by the individual will impact the development of passion. If an individual's social environment can model behaviors that directly impact how a passion develops, then larger social networks should

prove to be more beneficial. As previously suggested larger social networks can model healthier behaviors (Fowler & Christakis, 2008). Therefore, there could be differences between obsessive and harmonious passion in terms of social support and satisfaction with those supports.

### **Passion and personality**

Already some links have been made between personality and passion. Using the NEO-PI (McCrae & Costa, 1983), Balon, Lecoq, and Rimé (2013) demonstrated that agreeableness was positively related to harmonious passion and negatively related with obsessive passion.

Agreeableness measures a positive orientation towards others such as cooperation, kindness, and consideration. Agreeableness is considered to be a subordinate personality trait primarily involved in emotional processing. The highly agreeable individual would demonstrate a pro-social and communal orientation towards others. This suggests that harmonious passions resemble a more positive and altruistic attitude that is oriented towards others, whereas obsessive passions demonstrate the complete opposite. Based on this information, it could be suggested that individuals with a harmonious passion could demonstrate ideal social skills while taking part in their passionate activity with others. If harmoniously passionate individuals have larger social networks and report higher satisfaction with their perceived supports, compared to obsessively passionate individuals, then perhaps personality constructs such as agreeableness, do play a mediating role in harmonious passion.

Before further examining constructs of agreeableness, what needs to be examined is the degree to which agreeableness overlaps with social desirability. For example, research has demonstrated that agreeableness on the NEO-PI and various social desirability scales, such as the SDS-17, share a high degree of overlap with one another (Stober, 2001). Social desirability measures the extent to which an individual adheres to social norms (Stober, 2001). An individual



who identifies with social norms may be trying to present themselves in a way they think is socially appropriate or what is expected of them. Since individuals who are harmoniously passionate are deemed to be more prosocial and communal compared to obsessively passionate individuals (Balon, Lecoq, & Rimé, 2013), perhaps there is a potential difference between both forms of passion. Perhaps individuals who are harmoniously passionate are more likely to adhere to social norms, or try to present themselves in a socially desirable way.

The agreeableness found among harmoniously passionate individuals may also be represented as social desirability. For example, previous research (see Kamrath & Scholer, 2011; Locke et al., 2012) suggests that highly agreeable individuals seek to be more communal, positively-biased, and try to perceive themselves and others as more socially desirable. Highly agreeable individuals have a tendency to view others as favoring the same social standards as themselves. When highly agreeable individuals learn that such individuals may not uphold the same social standards as themselves, they still prefer view their behavior as favorable – via rose-coloured glasses (Locke et al., 2012). In this case, by measuring social desirability, it can be determined whether the agreeableness construct that was found for harmonious passion, also extends to social desirability. Perhaps individuals who are harmoniously passionate are not just highly agreeable, but try to present themselves in a way they feel is socially appropriate (example, impression management).

Based on this notion, it was also hypothesized that social desirability would be higher for harmoniously passionate individuals compared to obsessively passionate individuals. If harmoniously passionate individuals present themselves in a socially desirable manner, then new questions would be placed on Balon, Lecoq, and Rimé's (2013) findings. For example, if harmoniously passionate individuals are socially desirable, then to what extent are they

agreeable? Since social desirability and agreeableness share a similar degree of overlap (Stober, 2001), it is important to understand whether harmonious passion is represented within this overlap. By examining social desirability this study can shed more light on Balon, Lecoq, and Rimé's (2013) findings.

### **Passion and attention**

Another aspect to consider is how different focuses of attention can moderate engagement and self-control towards a passion. For example, adult ADHD can be expressed as two extreme forms of attention: inattentiveness and hyperactivity/impulsivity (Kessler et al., 2005). According to Robinson and Aroncia (2009), it is suggested that trait-wise hyperactivity may be a marker for high levels of engagement. Brod et al. (2012) have suggested that adults with hyperactivity reported positive experiences and a hyper-focused engagement in interesting activities. On a similar note, if hyperactivity could lead to high rates of passionate engagement, as suggested by Robinson and Aronica (2009), then perhaps inattentiveness would demonstrate the complete opposite effect – a lack of focus. If high levels of engagement can lead to a heightened focus, then hyperactive individuals may be more likely to develop passionate interests in an activity.

On the other hand, both hyperactivity and inattentiveness could be problematic for self-control. Perhaps extreme forms of attention do not coincide with a balanced lifestyle (Brod et al., 2012). If both forms of attention are disruptive to an individual's lifestyle, then it could be suggested that little self-control would play into either form of attention. In this case, the hyperactive individual who is suggested to demonstrate high rates of engagement would place little emphasis on how they moderate engagement or delegate between activities. If activity

engagement and self-control both impact the development of passion, then extreme differences could be found between hyperactive and inattentive individuals.

In this case both hyperactivity and inattentiveness may demonstrate low levels of self-control. On the other hand when hyperactive individuals have found a passionate interest, perhaps they are able to use their heightened engagement to develop their self-control. The hyperactive individual may demonstrate an extreme example on how higher levels of engagement can replenish cognitive resources, due to this natural inclination to constantly engage in their preferred activity (Fredrickson, 1998, 2004).

Based on this notion, it was hypothesized that attention would differ according to harmonious and obsessive passions. Individuals were measured for any reported deficits in attention, being inattentiveness and hyperactivity/impulsivity (Kessler et al., 2005). For example, it was hypothesized that obsessively passionate individuals would have lower scores in attention compared to harmoniously passionate individuals.

### **Passion and executive functioning**

According to a current literature review by Diamond (2013), core components of executive functioning include working memory, inhibition, and cognitive flexibility. All three components appear to be quite predictive of various outcomes throughout one's life (Blair & Diamond, 2008; Moffitt 2011, 2012). There may be differences in executive functioning between those reporting different kinds of passion. According to the DMP model, differences between harmonious and obsessive passions could reflect different types of motivation and social environments. It is possible, that some of the problems associated with obsessive passions have some similarities with problems of executive functioning. For example, obsessively passionate individuals have been demonstrated to ruminate over their passionate activity and have

uncontrollable urges to always perform in their passionate activity (Carpentier, Mageau, & Vallerand, 2012). Similar to attention, it can be argued that executive functioning may play both a developmental role for passion or reflect the benefits of long standing passions.

If components of executive functioning are reasonably stable, then what is measured today might have some bearing on how a passion may develop. For example, Moffitt (2011, 2012) discovered that children with better inhibitory control grew up to not only be in better physical and mental health, but were also happier adults. Working memory, inhibition, and cognitive flexibility can contribute to motivated behaviors and self-regulatory habits (Blair & Diamond, 2008). Control over these components of executive functioning, or lack of, may impact an individual's disposition towards their passionate activity. In this sense, it could be suggested that one component of executive functioning that could differentiate between harmonious and obsessive passion is inhibitory control. Perhaps obsessively passionate individuals are more impulsive. Therefore, the bearing of core cognitive processes of the individual may suggest the type of passion the individual has come to embody, or how their passion developed in a particular way.

To date, research has not demonstrated a link between components of executive functioning with the positive experiences attributed to passion. For example, the DMP model suggests passions develop based on the value placed on an activity. This value, according to the DMP model, will develop one of two ways, either controlled or autonomous, depending on the values condoned in an individual's social environment (Mageau et al., 2009). Eventually an individual's internalized values will become a source of motivation and impact how they choose to engage in their passionate activity. Various components of executive functioning are known to

act as a catalyst for motivated behavior. Yet how these components of executive functioning impact an individual's orientation towards their passion requires further investigation.

Based on that notion, it was hypothesized that executive functioning would demonstrate differences between harmonious passion and obsessive passion. Where harmonious passion would demonstrate appropriate executive functioning in relation to their activity, obsessive passion will not. Due to the disproportionately large role obsessive passions can take on in an individual's lifestyle (Mageau & Vallerand, 2007) lower levels of functioning with everyday behavior should be evident. Since executive functioning is an umbrella term for various constructs related to behavior, harmonious and obsessive passion would be compared for any potential differences.

### **Quality of life and passion**

An individual's attention and executive function can impact their quality of life (Brod et al., 2006). For example, if an individual's attentional or behavioral resources are limited, this could have consequences for everyday behavior. This could impact the quality of his or her passion and other life avenues. According to Brod et al. (2006) quality of life includes various aspects of an individual's lifestyle such as work performance, educational attainment, emotional adjustment, and relationship or marital adjustment. If an individual was unable to delegate their attention and executive functioning accordingly, then certain aspects of that individual's lifestyle could be neglected. This could have serious implications for one's life quality. Since passions are suggested to play a significant role in an individual's lifestyle, then it is important to understand the role they play in life quality. Perhaps some passions are more suited to a higher life quality than others. By examining an individual's quality of life, it can be determined whether an individual's passion is balanced with other aspects of his or her life.

For example, the DMP posits that obsessive passions can be over-emphasized in an individual's lifestyle, taking on a disproportionately large role (Mageau & Vallerand, 2007). According to the DMP, obsessive passions are likely to conflict with various aspects of an individual's lifestyle because of their rigidity and uncontrollable urges to constantly engage in their passionate activity (Mageau et al., 2005; Seguin-Levesque et al., 2003; Vallerand et al., 2003). It has also been reported that individuals with an obsessive passion rely solely on their passionate activity as a source to their self-worth and self-esteem (Donahue, Rip, & Vallerand, 2009). With this over-emphasis on a passionate activity, various conflicts can arise from having an obsessive passion.

Already researchers have demonstrated that obsessive passions are negatively related to well-being (Philippe et al., 2009; Vallerand, 2008, 2010; Vallerand et al., 2003; Vallerand & Houliort, 2003). For example, when individuals with an obsessive passion are prevented from engaging in their passionate activity, they are more likely to ruminate about their activity (Mageau & Vallerand, 2007). This can impact their ability to absorb themselves in other activities in their lifestyle (Carpentier, Mageau, & Vallerand, 2012). Interestingly, when obsessively passionate individuals do engage in their passionate activity, they reported lower absorption in their activity, compared to harmoniously passionate individuals (Forest et al., 2008; Carpentier, Mageau, & Vallerand, 2012; Philippe et al., 2009).

Based on this evidence, it could be suggested that individuals with an obsessive passion may not control their attention or executive functioning appropriately when it comes to their passionate activity, and hence, impacting their quality of living. Obsessively passionate individuals may over rely on their passionate activity, inhibiting any self-worth attained from

other aspects of their life. Therefore there should be evident differences between obsessive passion and harmonious passion in terms of the individual's quality of life.

The DMP model posits that harmonious passions do not let their activity interfere with other aspects of their life (Vallerand 2008, 2010). Since harmonious passions are the result of an autonomous internalization, individuals can freely choose when or when not to engage in their activity, without impacting their intrinsic needs. According to Vallerand (2008, 2010), harmonious passions are nurtured in environments that support an individual's intrinsic needs and balance between activities. In this sense, it could be suggested that individuals with a harmonious passion may find positive experiences through various modalities in their life, beyond their passionate activity, improving their quality of life. Therefore the internalized values associated with harmonious passion would be more in favor of life quality.

It was hypothesized that a higher quality of life would be demonstrated by harmoniously passionate individuals but not obsessively passionate individuals. Based on the DMP model, differences between harmonious and obsessive passion should be evident for life quality. For example, because obsessive passions are not fostered in an environment that supports autonomy and intrinsic needs, conflict could arise, interrupting life quality. Therefore the internalized values that separate obsessive and harmonious passion could be further demonstrated on their balance between life modalities and quality of living.

### **Passion and optimism**

As mentioned above, optimism may have self-reinforcing links with passion. Optimism, according to Seligman's theory (2002), rests on the interpretation of past events and experience (see also Peterson & Seligman, 1984; Scheier & Carver, 1992). How an individual has come to internalize previous experiences will change how they interpret future events. An individual will

be more likely to attribute positive experiences to future events, if they have made a conscious effort to cite past experiences as positive. Furthermore, when positive experiences are internalized, this could contribute to higher confidence in an individual's abilities (Carver, Scheier, & Segerstrom, 2010; Mann, Hosman, Schaalma, & de Vries, 2004). Therefore, it should be expected that people with high optimism would have an advantage in developing the skills that feed passion; conversely it should also then be expected that pessimism does not drive engagement in activities.

There is some evidence that optimism is higher for people who are harmoniously passionate than obsessively passionate (Carpentier et al., 2012; Mageau & Vallerand, 2007; Vallerand et al., 2003). However, it is difficult to determine the type of optimism that is implicated in harmonious passion based on existing theories of happiness (Carver et al., 2010; Plomin et al., 1992; Schwarzer, 1994). According to some theorists, optimism works almost like a personality trait geared towards events that are more positive than negative (Carver et al., 2010). According to Seligman, optimistic individuals have the ability to view past and future events in a positive manner. In the case of passion, although harmonious passions are deemed to have more positive experiences, whether these experiences are attributed to the passionate activity or are based on other positive experiences is debatable.

What needs to be considered is whether individuals become optimistic due to having a passionate activity, or if optimism has any impact on the development of passion. For example, are the positive affective states exhibited by individuals with a harmonious passion an emotional state or a personality trait? Some theories suggest a dispositional form of optimism that works as a mental framework used to interpret good and bad events (Seligman, 1998). If certain individuals have a mental framework that helps them gravitate towards positive experiences and



deter from negative experiences, then this type of dispositional optimism could impact how different passion orientations are developed (Sweeney, Carroll, & Shepperd, 2006). In this case, it would be important to see if people who have not developed a passion, differ in optimism compared to those who have a passion.

Already there is research to suggest that obsessive passions, just like harmonious passions, have some positive experiences within their passionate activity. For example, Grenier, Lavigne, and Vallerand (as cited in Vallerand, 2010) found obsessively passionate collectors still experienced positive affect under certain circumstances. In this case, harmonious passions are not the only passionate orientation to provide positive experience. If obsessive passions are capable of experiencing some form of positive affect, then further research is required. Perhaps some form of optimism is inherent to both forms of passion just to varying degrees. Therefore investigating the role of dispositional optimism may provide a better understanding of how optimism is incorporated into passion.

It was hypothesized that optimism would be demonstrated by harmoniously passionate individuals but not obsessively passionate individuals. According to the DMP harmonious, passions are more related to positive well-being than obsessive passions (Philippe et al., 2009; Vallerand, 2008, 2010; Vallerand et al., 2003; Vallerand & Houliort, 2003). Also harmonious passions are more associated with positive affect during and after activity engagement, compared to obsessive passions (Mageau & Vallerand, 2007; Vallerand et al., 2003; Vallerand & Houliort, 2003). In this case, there is a possibility that harmonious passions are more related to cognitive mindsets that support different types of optimism. Optimism is more likely to regulate emotions, and create a mental framework that is likely to change how an individual comes to identify with specific or general events (Seligman, 1998). It is also suggested that optimism has more trait-like

qualities. Therefore optimism can be an important determination to continuous engagement in a harmonious passion.

On the other hand, since individuals with obsessive passions rely on their activity as a source of self-worth and self-esteem they are more likely to fluctuate in their emotional affect depending on their performance and engagement in their activity (Donahue, Rip, & Vallerand, 2009). Since obsessive passions are not as stable in emotional affect compared to harmonious passions, then such individuals may not have the cognitive mindsets that would support various types of optimism.

### **Hypotheses**

Section one investigated the roles that optimism, social desirability, social support, attention, life quality, and executive functioning play in distinguishing individuals who report themselves as having, or not having an activity they are passionate about. Individuals were measured based on the DMP model, to determine each individual's passionate orientation towards their selected activity – whether it is a harmonious passion or an obsessive passion.

Based on the above literature review, it was hypothesized that larger social networks and higher satisfaction with perceived supports would be most related to harmoniously passionate individuals compared to obsessively passionate individuals. It was also hypothesized that social desirability would be more related to harmoniously passionate individuals compared to obsessively passionate individuals. Based on the other variables, it was hypothesized that harmoniously passionate individuals would score higher in attention, executive functioning, life quality and optimism, compared to obsessively passionate individuals.

## **Method**

### **Participants**

Participants (N =141) were all volunteers from the Laurentian University community, and received a credit towards a course for their participation. Their mean age was 24 years (SD=9.2; range 17 to 59); 64% were female. Highest reported level of education was high school 48%, college 19%, undergraduate 23%, master's 11%.

### **Procedure**

This study was approved by the Laurentian University Research Ethics Board and was conducted under anonymous and voluntary conditions. All participants completed the survey package in one sitting and under the investigator's supervision.

Participants completed the survey package individually or within a group setting. The order of measures in the survey package was as follows: the Passion scale (Vallerand et al., 2003), IOS scale (Aron, Aaron, & Smollan, 1992), Optimism test (Seligman, 2006), SDS-17 (Stober, 2001), SSQ6 (Sarason, Sarason, Shearin, & Pierce, 1987), ASRS-screener (Kessler et al., 2005), AAQoL (Brod et al., 2006), and the BRIEF-A (Roth et al., 2005). It took approximately 45 minutes for participants to complete the survey package.

## **Measures**

### **Passion scale**

This scale was developed to measure an individual's passionate interest for a chosen activity (Vallerand, 2008, 2010; Vallerand et al., 2003). The participant is asked to think of an activity "that is very dear to your heart," and write down this desired activity, answering all corresponding items that follow based on their mentioned activity. The participant is then asked

to identify how much they love, value, spend time engaging in their activity, and how much they consider this activity as a passion for themselves - based on the 4-item passion criterion.

Vallerand has used this 4-item passion criterion to determine whether an individual is or is not passionate for their mentioned activity. According to Vallerand (2010), there are two methods to this procedure: either the individual scores 4 or greater on the question which asks whether they consider this activity as a passion for themselves; or, the individual must score an average of 4 or greater on all four items of the passion criterion altogether. All 4-items are rated on a 7-point Likert scale (1= Strongly Disagree to 7= Strongly Agree).

After the 4-item criterion, there are an additional 12 items on the passion scale that are divided into two subscales measuring obsessive passion and harmonious passion. An example of an obsessively passionate item is “I have difficulties controlling my urge to do my activity” and an example of a harmoniously passionate item is “The new things that I discover with this activity allow me to appreciate it even more.” Similar to the passion criterion, all items are rated on a 7-point Likert scale (1= Strongly Disagree to 7= Strongly Agree). All items correlate very highly with their respective subscales ( $r = 0.80$  and above) (Vallerand et al., 2003).

According to Vallerand’s research (2008, 2010), and use of the passion scale, an individual’s passion can be easily categorized as either harmonious or obsessive passion, using standardized scores. Also, according to Vallerand et al.’s (2003) validation of the passion scale, a relatively small degree of individuals were identified as non-passionate in their studies (16%). Since Vallerand et al. (2003) had identified such a small number of non-passionate individuals, all analyses conducted in their studies had included this small sample of non-passionate individuals. In this case, non-passionate individuals were measured for their passion orientation,

embodying either harmonious or obsessive passion, with essentially no difference between passionate and non-passionate individuals.

For the purposes of this investigation, the passion scale was used to identify participants' passionate activity and measure their orientation towards this activity. Participants were scored and grouped based on their passionate orientation being either obsessive or harmonious passion.

### **Inclusion of other into self scale (IOS scale)**

The IOS scale (Aron et al., 1992) was developed to measure how much an individual has internalized a highly valued and meaningful activity. Using a single item pictorial diagram, participants are to choose between seven series of paired circles, each overlapping in varying degrees (the next overlapping a bit more than the last), to exemplify their personal emphasis for their chosen activity. This scale was used in Vallerand et al.'s (2003) original development of the passion scale to validate that individuals had come to identify with their passionate activity. Other researchers, who had validated the passion scale in other languages, have also found support for internalized passion using the IOS scale (Parastatidou, Doganis, Theodorakis, & Vlachopoulos, 2012). In line with Vallerand et al. (2003), the IOS scale was used to confirm that the sample of individuals were internalizing their passionate activity in a similar way. This was to validate and confirm that individuals grouped either as harmonious or obsessive passions were internalizing their passionate activity.

### **Optimism scale**

The optimism scale (Seligman, 1998) was developed to measure the extent to which an individual orients themselves towards and internalizes good and bad events. This scale includes 8 subscales that measure permanence (good and bad), pervasiveness (good and bad),

personalization (good and bad) and the stuff of hope (hopeless versus hopeful). Permanence identifies how much an individual feels that good or bad events have a permanent cause. Pervasiveness identifies whether an individual feels that good or bad events are general or specific. Personalization identifies how much an individual internalizes or externalizes these good or bad events. Examples include “You and your spouse (boyfriend/girlfriend) have been fighting a great deal” or “You are asked to head an important project.” For each question two answers are provided – one that is positively framed whereas the other that is negatively framed. Participants are to choose one answer for each question. Total scores for optimism can be calculated by combining the four good subscales, and total scores for pessimism can be calculated by combining the four bad subscales. Seligman’s optimism scale (1998) includes a total of 48-items.

For the purposes of this investigation, only 6 subscales were used, involving permanence, pervasiveness, and personalization (good and bad for a total of 6 subscales). The purpose in measuring the three types of optimism and three types of pessimism was to determine which type of optimism (and perhaps pessimism) drives passion for an activity.

### **Social desirability scale (SDS-17)**

This instrument was developed to measure social desirability (Stober, 2001). Social desirability measures the extent to which an individual is adhering to social norms (Stober, 2001). An individual who identifies with social norms may be trying to present themselves in a way they think is socially appropriate or what is expected of them.

Using 17-items (True or False), the SDS-17 scale is considered to be an updated version of the frequently used MCSDS - the Marlowe-Crowne Social Desirability Scale (Crowne &

Marlowe, 1960). The SDS-17 was highly correlated with the MCSDS, and where age was deemed to affect scores on the MCSDS (greater with age), the influence of age on the SDS-17 was substantially smaller (Stober, 2001). Examples of some questions include “I occasionally speak badly of others behind their back,” or “I always eat a healthy diet.” Some items are reverse scored, but for every item selected, a single score is tallied depending on if the participant answers in a socially desirable manner or not. Participants can score a total of 17 if they perceive themselves as highly socially desirable. Following the recommendations of Stober (2001), item-4 (I have tried illegal drugs [for example, marijuana, cocaine, etc.]) was not included in the analyses of this measure. According to Stober (2001), item-4 is a poor representation of social desirability.

#### **Social support questionnaire (SSQ6 short version)**

This instrument was developed to measure social support. Using only 6-items, this measure is an abbreviation of the original 27-item Social Support Questionnaire (SSQ; Sarason, Levine, Basham, & Sarason, 1983). This measure requires participants to identify individuals (either by initial J.B., or general title – brother, mother, father, coach, etc.) that will provide the necessary support for six different scenarios. Two subscales are measured through this instrument: perceived availability of others (the number of supports a participant can identify) and a satisfaction score. An example question is “Whom could you count on to help you if you had just been fired from your job or expelled from school?” or “Whom can you really count on to distract you from your worries when you feel under stress?” For each question, the participant can name up to 9 individuals (or no individuals/applicable supports) they feel meet the criteria for that question, and then rate their general satisfaction on a single Likert scale (1= dissatisfied to 6=very satisfied) for the individuals they had identified for that question. Here,

participants can receive two scores: one for the number of individuals identified for each question; and two, the reported satisfaction for the individuals they have chosen to identify.

### **Adult ADHD self-report scale (ASRS-Screener)**

This instrument was designed to identify adult-related ADHD, using two subscales measuring inattentiveness and hyperactivity/impulsivity (Kessler et al., 2005). Comprised of only 6-items (derived from the original 18-item version; see Adler et al., 2006) this short screening scale was found to be the most predictive of ADHD diagnoses (Adler et al., 2012; Kessler et al., 2007; Matza, Van Brunt, Cates, & Murray, 2011). For example, in a clinical calibration study Kessler et al. (2005) found the ASRS-screener outperformed the original 18-item version (Adler et al., 2006) when re-interviewing adults diagnosed with ADHD. This measure was demonstrated to have higher internal consistency and concurrent validity compared to the original 18-item version (Adler et al., 2012).

When administered the ASRS-screener, participants are provided with 6 questions and are asked to identify how many times each of the following experiences has occurred over the past 6 months. All items are evaluated on a 5-point Likert Scale (1=Never to 5=Very often). 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?”

Each question on the ASRS-screener has a unique cut-off score (from 3=sometimes to 5=very often), which can be used to identify positive screens of ADHD. For example if participants score greater than 13 on the inattention subscale, and greater than 8 of the hyperactivity/impulsivity subscale, it is suggested that such individuals could be exhibiting signs



of ADHD (see Kessler et al., 2007). For the purposes of this investigation, the ASRS-screener was used to determine how various attention deficits may attribute to various types of passion.

### **Adult ADHD quality of life measure (AAQoL)**

This instrument was developed to measure the impact of ADHD symptoms on life quality (Brod et al., 2005, 2006). Using 29-items, participants rate how much each question applies to them based on the past 6-months. Each item is measured using a 5-point Likert scale (1= Not at all/Never to 5= Extremely/Very often).

This measurement scale contains four distinct domains each varying in its own set of items: life productivity (11 items); psychological health (6 items); life outlook (7 items); and relationships (5 items). The life productivity subscale measures various everyday tasks. Examples of such questions include: “In general, I can...” “Get shopping done,” “Pay attention,” or “Keep my house clean.” The psychological health subscale measures the occurrence and frequency of certain emotional states. Examples of such questions include: “In general, I am...” “Depressed,” “Anxious,” or “Feeling fatigued.” The life outlook subscale measures the individual’s perspective on various topics. Examples of such questions include: “In general...” “Your energy is spent well,” “You feel good about yourself,” or “Able to enjoy time spent with others.” The relationship subscale measures the quality of relationships the individual has with others. Examples of such questions include: “In general...” “People are frustrated with you,” “Tension in relationships,” or “You have not been able to meet the expectations of others.” Some subscales of items are positively-framed and others are negatively-framed. All items on the AAQoL are scored on a 0-100 point scale and averaged. Higher scores on the AAQoL indicate a greater quality of life. Previous research has demonstrated good psychometric properties of this instrument (Brod et al., 2005, 2006; Matza et al., 2011). For example, Brod et al. (2005) found

the AAQoL to have adequate internal consistency for overall structure (0.93) and for the four subscales (ranging between 0.75-0.93).

In regards to the types of passion someone could embody, the AAQoL is used as two total scores 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.

### **Behaviour rating inventory of executive functioning for adults (BRIEF-A)**

This instrument is used to measure 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, clinical scales and overall score, indicate a higher executive dysfunction (65 or greater). Good psychometric properties have been reported for the BRIEF-A (Bridgett et al., 2013; Roth et al., 2005). For example, according to Roth et al (2005), the BRIEF-A has excellent internal consistency for overall structure and the two indexes (ranging between 0.93-0.96). For the purposes of this investigation, each of the nine clinical subscales are used as independent measures in order to identify any apparent difficulties regarding executive functioning with any of the different forms of measured passion.

## Results

### Description of Analysis

Participants' passion scores were considered in two ways. First, participants were classified as either having an obsessive passion (OP) or harmonious passion (HP). Second, participant's harmonious passion and obsessive passion scores were tested directly.

Participants were coded as either harmonious passion (HP) or obsessive passion (OP). Whichever of the two standardized scores on the passion scale was higher was considered to be the participant's passionate orientation (as per Mageau et al., 2009). Participants were grouped as HP or OP and measured for optimism (Optimism test), pessimism (Optimism test), social desirability (SDS-17), social support (SSQ6), attention (ASRS-screener), life score (AAQoL), health score (AAQoL), and executive functioning (BRIEF-A) using MANOVA. Following the initial MANOVA, a series of other MANOVAs were conducted examining the subscales of each test that reached significance.

Second participants' passion scores were measured directly. Participants HP and OP subscale scores were compared to optimism (Optimism test), pessimism (Optimism test), social desirability (SDS-17), social support (SSQ6), attention (ASRS-screener), life score (AAQoL), health score (AAQoL), and executive functioning (BRIEF-A) using Pearson correlations.

The purpose in conducting two different sets of analyses was to determine how individuals would differ when they were grouped based on their passionate orientation, and how passion scores would differ across the entire sample when compared to each variable.

**Harmonious passion (HP) vs. obsessive passion (OP)**

Using Vallerand et al.'s (2003) method, participants were grouped as HP or OP. In this group of participants, approximately half were grouped as OP (N=68) and half were grouped as HP (N=73).

Globally, the multivariate positioning of the HP and OP groups are different, Pillais' Trace = 0.23,  $F(8, 103) = 3.84$ ,  $p = 0.00$ ,  $\eta^2 = 0.23$ . As seen in Table 1 comparing OP and HP on the total scores of each questionnaire, the OP group scored higher than the HP group on social desirability,  $F(1, 110) = 4.28$ ,  $p = 0.04$ ,  $\eta^2 = 0.04$ , attention/ADHD,  $F(1, 110) = 5.18$ ,  $p = 0.03$ ,  $\eta^2 = 0.04$ , and executive functioning,  $F(1, 110) = 7.11$ ,  $p = 0.01$ ,  $\eta^2 = 0.06$  and lower on the AAQoL's life score,  $F(1, 110) = 4.40$ ,  $p = 0.04$ ,  $\eta^2 = 0.04$ . There was no difference on optimism, pessimism, social support, and on the AAQoL's health score.

Based on the significant difference found on the ASRS-Screener score, the two subscales were further analyzed. As seen in Table 2 comparing OP and HP to mean scores on the ASRS-Screener subscales, the OP group scored higher than the HP group on the inattentiveness subscale,  $F(1, 124) = 5.30$ ,  $p = 0.02$ ,  $\eta^2 = 0.04$ . There was no difference on the hyperactivity/impulsivity scale,  $F(1, 124) = 2.11$ ,  $p = .15$ ,  $\eta^2 = 0.02$ .

Based on the 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. As seen in Table 3 comparing OP and HP to mean scores on the AAQoL subscales the OP group scored systematically lower than the HP group on life productivity  $F(1,123) = 9.47$ ,  $p = .00$ ,  $\eta^2 = 0.07$ . There was no difference on life outlook  $F(1,123) = 1.56$ ,  $p = .22$ ,  $\eta^2 = 0.01$ .

As seen in Table 4 comparing OP and HP to mean scores on the BRIEF-A subscales the OP group scored systematically higher than the HP group on task monitor,  $F(1, 122) = 3.98$ ,  $p =$

0.05,  $\eta^2 = 0.03$ ; working memory,  $F(1, 122) = 12.50$ ,  $p = 0.00$ ,  $\eta^2 = 0.09$ ; inhibit,  $F(1, 122) = 4.31$ ,  $p = 0.04$ ,  $\eta^2 = 0.03$ ; initiate,  $F(1, 122) = 3.92$ ,  $p = 0.05$ ,  $\eta^2 = 0.03$ ; plan and organize,  $F(1, 122) = 14.95$ ,  $p = 0.00$ ,  $\eta^2 = 0.05$ ; and self-monitor,  $F(1, 122) = 7.07$ ,  $p = 0.01$ ,  $\eta^2 = 0.06$ . There was no difference for emotional control,  $F(1, 122) = 1.18$ ,  $p = 0.28$ ,  $\eta^2 = 0.01$ ; organization of materials,  $F(1, 122) = 0.08$ ,  $p = 0.90$ ,  $\eta^2 = 0.00$ , and shift,  $F(1, 122) = 3.67$ ,  $p < 0.06$ ,  $\eta^2 = 0.03$ .

Pearson correlations compared the HP and OP scores, across the entire sample, to total scores of each test. This analysis was conducted to validate the first set of analyses that grouped individuals as HP or OP for an activity. If similar results were gathered for this second analysis, then grouping individuals in the first analyses would be considered appropriate.

As seen in Table 5 correlations of OP and HP scores to total scores on each questionnaire demonstrated that HP scores are positively correlated with the life score on the AAQoL, and the OP scores are negatively correlated with the life score on the AAQoL. The OP scores were positively correlated with higher attention deficits and higher difficulties in executive functioning. Results gathered from this analysis support results gathered in the first set of analyses.

## **Discussion**

Section one investigated the role of optimism, social desirability, social support, attention, life quality, and executive functioning in individuals grouped as harmoniously passionate (HP) or obsessively passionate (OP). Significant and general differences between individuals grouped as HP and OP were found. Obsessive and harmonious passion groups differed in social desirability on the SDS-17, attention on the ASRS-Screener, executive functioning on the BRIEF-A, and the AAQoL's life score. Individuals grouped as OP scored higher on social desirability, while reporting lower scores in attention and executive functioning.

OP was specifically linked to inattentiveness on the ASRS-Screener and task monitoring, working memory, inhibition, initiation, planning and organizing, and self-monitoring on the BRIEF-A. On the other hand, on the AAQoL's Life Score, individuals grouped as HP reported higher life productivity when compared to individuals grouped as OP. Multivariate tests demonstrated many group differences between harmonious and obsessive passion; most notably the lower scores for attention and executive functioning for individuals grouped as OP.

### **Attention**

The ASRS-screener is intended to capture symptoms of adult ADHD (Kessler et al., 2005). There are 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 & Aronica, 2009). There was no link between hyperactivity scores and passion. Inattentiveness, however, appears to be either a weakness of attention or executive control. It was demonstrated that harmoniously passionate people had lower inattentiveness scores than those identified as obsessively passionate. This is certainly consistent with the hypothesis that harmoniously passionate people have built their resources through regularly engaging in their passion.

Dubreuil, Forest, and Courcy (2014) found that harmonious passions could lead to higher concentration and performance at the work place. They claim that reported harmonious passion and higher levels of concentration are the result of individuals applying their strengths at work.

When individuals are applying their strengths at work, they are creating a positive relationship between their work performance and their ability to adapt to change. This allows the individual to become more proactive within the work environment. In this case, the benefits of applying one's strengths at work are demonstrated in their passion and concentration at work. The results from the ASRS-Screener do support these findings. Individuals grouped as harmoniously passionate did not report higher scores in attention in relation to their passionate activity.

However, there are two other arguments which cannot be addressed by this study's design. First, preexisting differences in attention may well be predictive of who can develop a harmonious passion and who is more likely to develop an obsessive passion. The DMP model proposed by Vallerand (2008; 2010; Vallerand et al., 2003) attributes the development of a particular passion orientation to underlying differences in motivation. This does not preclude a role for attention. Logically, people with poor attention resources may have more trouble developing a passionate interest in something and even more with developing the sort of passion that enriches their lives. Finally, it should be noted that the ASRS measures self-reported symptoms that, in some contexts, may represent difficulties with attention (Kessler et al., 2005). However, Vallerand's (2010) description states "people [with an obsessive passion run] risk [of] experiencing conflicts and other negative affective, cognitive, and behavioral consequences during and after activity engagement" (p. 103) seems to overlap with these symptoms. So it is possible that this relationship is an artifact of a superficial resemblance between these questionnaires. This will be discussed further in the limitations of this study.

### **Executive functioning**

The BRIEF-A is a self-report measure of executive control (Roth et al., 2005). Results demonstrated that people with a harmonious passion orientation scored higher in executive functioning compared to those with an obsessive orientation on task monitoring, working memory, inhibition, initiation, planning and organizing, and self-monitoring

The DMP suggests that obsessive passions can take on a disproportionately large role in an individual's life (Mageau & 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 & 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, Mageau, & Vallerand, 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 a part of the individual's passion (Carpentier, Mageau, & Vallerand, 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, Mageau, & Vallerand, 2012; Mageau & Vallerand, 2007).

The distinction drawn by the DMP is that obsessive passions interfere with people's lives (Vallerand et al., 2003). Results from this study show lower executive functioning for individuals coded as obsessively passionate. However, it is also plausible that the inability to develop a harmonious passion is actually a consequence of underlying problems with executive control.



Although the links between executive functioning and passion scores are relatively small, this was demonstrated across many of the subscales of the BRIEF-A.

### **Life quality**

The AAQoL was used in order to capture the impact of limited cognitive resources on other aspects of an individual's life style. By measuring global aspects of an individual's lifestyle, including life productivity and life outlook, which make up the life score, and relationship quality and psychological health, which make up the health score, the AAQoL provides a measure of an individual's life quality. In this case, it was hypothesized that lower attention or executive functioning would limit an individual's available cognitive resources, having an indirect impact on the individual's quality of life.

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. There was 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.

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 not sensitive enough to show a difference. Although Vallerand's initial research demonstrated neither harmonious nor obsessive passion was related to severe psychological problems, such as anxiety (Vallerand et al., 2003), it is somewhat surprising that no differences were found on the AAQoL's relationship subscales. Previous studies have demonstrated differences between harmonious and obsessive passion in terms of social environments (Donahue et al., 2009; Mageau et al., 2009).

When further examining the two subscales that make up the AAQoL's Life, 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 given by 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 (Fredrickson, 1998, 2004).

### **Social desirability**

The SDS-17 is intended to capture social desirability (Stöber, 2001). The results showed social desirability scores are higher for individuals reporting obsessive passions compared to individuals reporting harmonious passions. From the literature, it appeared as though social desirability would be associated with harmonious passion because it is associated with agreeableness on the NEO-PI (see Balon et al., 2013). Individuals high in agreeableness are deemed to be more pro-social and communal towards others (Balon et al., 2013). Since the SDS-17 has significant overlap with the agreeableness dimension on the NEO-PI (see Stöber, 2001 study 2), it was expected that harmoniously passionate individuals would have elevated SDS scores as well.

Surprisingly, in the present study, individuals with an obsessive passion presented themselves as socially desirable. In the case, obsessively passionate individuals could be presenting an image of themselves that is superficial and not exactly authentic. Since obsessive passions lack camaraderie during sports and competition (see Donahue et al., 2009), then perhaps there is some sort of cognitive dissonance involved as well. Social desirability can reflect ideals

an individual wishes to perceive as a part of themselves, such as impression management (see Stöber, 2001). Although this result was unexpected, it can explain how obsessive passion differs from harmonious passion in particular social settings.

In this case, the agreeableness construct exhibited by harmoniously passionate individuals could be accurate (Balon et al., 2013). Results from this study, provide no further information to elaborate on Balon et al.'s (2013) findings. Based on this notion, other approaches would have to be used to truly separate social desirability from agreeableness in terms of passion. One method to disentangle social desirability and agreeableness is to combine self-report measures with observer ratings (Paulhus, 1994; Stöber, 2001). Since obsessive passions can conflict in team-oriented activities, then a contradiction could be uncovered between self-report measures, and observer ratings.

The individuals grouped as obsessively passionate scored higher on social desirability; this may have implications across all of the measures used. However the difference is not large and, as will be discussed later, does not generalize across the entire sample.

### **Social support**

Overall, no disparity was found for social supports between obsessive and harmonious passion. The SSQ6 provides two measures of social support: the size of an individual's social supports, and the individual's satisfaction with those social supports. According to the results, the size and the satisfaction of an individual's perceived social supports did not differentiate between HP and OP groups.

Research has already demonstrated that an individual's social environment can foster both harmonious and obsessive passions (Donahue et al., 2009; Mageau et al., 2009). Vallerand's

DMP (2008, 2010) suggests an individual's social environment can be a major determinant in the type of passion an individual comes to identify with. For example, the DMP's conceptualization is largely based on Deci and Ryan's Self-Determination Theory (2000), which suggests different social environments influence the values individuals place on interesting activities. In this case, it was hypothesized that the SSQ6 would provide insights between HP and OP groups. On the other hand, this study did not find any link between social support and passion.

### **Optimism**

Results showed that neither optimism nor pessimism differentiated between HP and OP groups. Seligman's optimism scale measures both positive orientations and negative orientations towards various life events. For example, when an individual scores high on one of the three positive attribution styles (permanence good, pervasiveness good, or personalization good), then the individual is suggested to be more likely to orient themselves to positive or good events. The opposite can be said for individuals who score high on one of the three negative attribution styles (permanence bad, pervasiveness bad, or personalization bad), who would be more likely to orient themselves to negative or bad events. Originally, it was hypothesized that individuals grouped as HP would be more optimistic compared to individuals grouped as OP. Vallerand's initial research demonstrated differences between harmonious and obsessive passions in terms of positive and negative affect (Vallerand et al., 2003). This study did not find any link between optimism nor pessimism when comparing individuals grouped as HP or OP.

### **Correlations between harmonious and obsessive passion scores**

Pearson correlations differed between harmonious and obsessive passion scores on the AAQoL's Life Score, attention on the ASRS-Screener, and executive functioning on the BRIEF-A. Where harmonious passion was positive correlated, obsessive passion was negatively

correlated with the AAQoL's Life Score. This would suggest that harmonious passions are more correlated with high life scores on the AAQoL compared to obsessive passions. On the other hand, obsessive passions were positively correlated with attention and executive functioning. Since higher scores in attention on the ASRS-Screener and higher scores executive functioning on the BRIEF-A are considered to be poorer scores compared to scores that are lower, this would suggest that obsessive passions are more correlated with poorer attention and executive functioning when compared to harmonious passions. Harmonious passion was not significantly correlated with attention or executive functioning. Results gathered from this second analysis provide further support to the first set of analyses that found individuals group as HP or OP differed in attention, life quality, and executive functioning.

This second set of analysis differed from the first set of analysis, because participants were not grouped as HP or OP. This set of analysis measured all participants HP and OP scores. The correlations between HP and OP scales scores followed the same pattern on the ASRS-Screener, BRIEF-A, and AAQoL. This suggests that the concepts of harmonious and obsessive passion have some link with attention and executive functioning beyond group membership.

However, when all participants are included no link between social desirability and OP was found. This would call into question the initial finding of a link between OP and social desirability. The difference in the correlational analysis is that all individuals were included. It suggests that there may be a subgroup of OP participants who do have elevated social desirability scores. This suggests that concept of obsessive passion does not have a link with social desirability beyond group membership.

### **Broaden-and-build theory and dualistic model of passion**

According to Fredrickson's broaden-and-build theory (1998, 2004), there are behavioral and cognitive advantages to reoccurring positive emotional states. The more long and enduring positive emotional states become, the more likely they are to broaden behavioral and cognitive resources. For example, when individuals have a pleasurable activity, such as a passion, they are more likely to invest much time and energy engaging in it regularly (Frederickson, 1998, 2004; Vallerand et al., 2003). The stronger the recurring cycle for a passion becomes, the more value and importance will be on the activity (Fredrickson, 1998, 2004; Vallerand 2008, 2010). In this case, a passionate activity could have several advantages for passionate individuals, specifically those with harmonious passions.

Based on the results, individuals reporting harmonious passions do exhibit such advantages. There was an advantage in executive function for individuals reporting a harmonious passion. This result was exactly the sort of prediction that would be stated in the broaden-and-build theory. This pattern of executive function was matched by self-reported higher life quality and productivity. Although the measures used are not diagnostic with respect to serious problems of attention, these findings do suggest that there was in fact a very broad pattern of superior cognitive resources for those reporting harmonious passions.

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 &

Vallerand, 2007), and it is this type of rumination that would limit engagement in other activities (Carpentier, Mageau, & Vallerand, 2012). Results and previous evidence would suggest that obsessive passions do not benefit attention or cognitive resources.

### **Summary**

Section one demonstrated that individuals grouped as obsessively passionate reported lower attention, executive functioning, and life quality. Individuals grouped as harmoniously passionate reported higher scores with attention or executive functioning. These results support the distinctions between HP and OP as concepts and add new insights to Vallerand's DMP model. Originally, the DMP model suggested an individual's social environment and motivation would influence the development of obsessive or harmonious passion. These results also support Fredrickson's broaden-and-build theory (1998, 2004). In line with Fredrickson's theory (1998, 2004), it can be suggested that the positive emotional experiences associated with harmonious passions could benefit an individual's behavioral and cognitive resources, compared to obsessive passions. Based on this study, differences between obsessive and harmonious passions were evident in cognitive resources (Roth et al., 2005).

However, the separation between harmonious passion and obsessive passion was not that clear. Most individuals scored either equally high, or equally low for both the harmonious and obsessive subscales on the passion scale. In this case, there may be other ways to measure individual passions. By using total passion scores, individuals can be grouped based on whether they scored high or low for their passionate activity. This method may better answer some questions that were brought up in the first study.

### **Comparing high and low levels of passion**

Section two reanalyzed the roles of social desirability, social support, optimism, attention, life quality, and executive functioning, but instead of distinguishing between harmonious and obsessive passions, individuals were grouped based on their total scores on the passion scale – being high or low. The purpose in regrouping individuals based on high or low levels of passion was to determine whether being passionate would matter more than the type of passion per se.

Figure 1 shows the z-score's distribution of individuals in this study who completed both the harmonious passion (HP) and obsessive passion (OP) subscales. Using a  $y=x$  line, it can be seen that most participants scored relatively higher on the harmonious subscale compared to the obsessive subscale. What is also evident at first glance is that the majority of people would best be characterized as a blend of both passions rather than as one or the other. However, the DMP model certainly rests on the claim that HP and OP are separate and represent different populations (for an example of such studies see Carbonneau, Vallerand, Fernet, & Guay, 2008; Donahue, Rip, & Vallerand, 2009; Lafrenière, St-Louis, Vallerand, & Donahue, 2012; Philippe, Vallerand, Andrianarisoa, & Brunel, 2009; Philippe, Vallerand, Houliort, Lavigne, & Donahue, 2010). Yet accordingly, to Figure 1 the majority of individuals are grouped in the middle.

The above notwithstanding, the approach Vallerand et al. (2003) used to claim a distinction between the harmoniously and obsessively passionate is not in itself adequate. The conceptual overlap between these categories is substantial. For example, using Vallerand's methods, Grenier, Lavigne, and Vallerand (as cited in Vallerand, 2010) found obsessively passionate collectors still experienced positive affect under certain circumstances. Such results run contrary to Vallerand's DMP, which states harmonious passions are related to well-being and



obsessive passions are not (Philippe et al., 2009; Vallerand, 2008, 2010; Vallerand et al., 2003; Vallerand & Houliort, 2003).

When validating the passion scale, Vallerand et al. (2003) used both exploratory and confirmatory factor analysis to suggest a good fit to the data. All items that loaded onto both obsessive and harmonious passion were removed, creating a 14-item scale (later shortened to a 12-item scale; see Vallerand, 2010). On the other hand, further results demonstrated that both the harmonious and obsessive passion subscales did correlate (Mageau et al., 2005; Ratelle et al., 2004), and therefore Vallerand et al. (2003) used partial correlations to suggest both types of passion were different and unrelated.

Many studies have used Vallerand's methods of partial correlations to control for overlap between obsessive and harmonious passions (e.g., Mageau et al., 2005; Ratelle et al., 2004; Vallerand et al., 2003; Vallerand & Houliort, 2003). Since OP and HP are correlated, partial correlations could explain potential differences between passions. Not only does this obscure the emphasis placed on an individual's passion, but creates two separate and uniquely different explanations for each individual. Yet no studies have combined these two passions to explain how total scores differ between individual passions as a whole.

Fundamentally, most statistical approaches have difficulty discriminating between two groups separated along a single dimension and a division being made of a single group. For example, when using cluster analysis, Wang, Khoo, Liu, and Divaharan (2008) found harmonious and obsessive passions combined into three profiles when measuring individuals passionate for online gaming: there was an average HP/OP profile, a low HP/OP profile, and a high HP/OP profile. As sample sizes increase the marginal fit improvement of a second factor will tend to increase in both cases. So, how to tell the difference between empirical results based

on the extreme ends of homogenous population and those actually capturing two separate populations? Specific modelling approaches (e.g. Bayesian models) can be invoked, but they are at their best when the underlying theory can clearly identify the multivariate position of the hypothetical groups. The DMP is not that specific.

This could suggest what separates a harmonious passion from an obsessive passion is only a matter of where researchers choose to draw a line. For example, Mageau et al. (2009) were able to find apparent differences between obsessive and harmonious passions by using a median split. Although differences could be evident, splitting groups by this method could be considered arbitrary and lacking an objective boundary (Meehl, 1992, 1995; Ruscio, Haslam, & Ruscio, 2006). Although this may serve a purpose for social convention, section two, decided to measure total passion scores for each individual without splitting individuals based on their harmonious and obsessive passion scores.

The purpose in regrouping individuals based on high or low levels of passion was to re-examine how the list of variables would differ between groups. Results from the first section found some correlations changed when individuals were no longer grouped as harmoniously or obsessively passionate, such as social desirability. In this case, individual passions may be measured another way, to determine if the emphasis placed on a passionate activity – via high or low passion – can show any other differences between groups.

The DMP emphasizes conceptual differences between obsessive and harmonious passion, but does not explain the apparent differences between high or low passion. The extremes of an individual's passion, whether they are high or low, are not reported in the literature. Reports that suggest a difference between obsessive and harmonious passion never state how high or low one's passion may be on the continuum; with an exception being Stoeber et al.'s (2011) study.

Although Stoeber et al. (2011) did not measure combined passion, they did measure each individual's passion orientation based on their numerical score. Based on Stoeber et al.'s (2011) results, individuals who scored high in HP compared to individuals who scored low in HP demonstrated differences in the enjoyment and pleasure from their activity. A similar result was found for individuals with high OP and low OP – as individuals with high OP demonstrated almost no enjoyment or pleasure from their activity. Stoeber et al.'s (2011) study provided increment measures of passion with different results at each level of passion. This method of measurement was fairly similar to the technique applied in study two.

By using Vallerand's passion scale, individuals can be measured for their total passion scores and compared on a continuum from low to high, based on how they scored on both the harmonious and obsessive subscales. For example, it has been demonstrated that individuals who are very passionate tend to score high in both subscales making such categorization and splitting of groups difficult to infer (Mageau et al., 2009). The opposite is also true for non-passionate individuals, who tend to score equally low in both subscales (Stenseng, 2008). In this case, total scores can predict highly passionate individuals or low to non-passionate individuals.

### **Broaden-and-build theory**

As suggested by the broaden-and-build theory, positive emotions can play an important role in sustaining and even broadening cognitive resources. It is these resources that are important in activity engagement and goal pursuit. If positive emotions can replenish depleted resources, and expand existing ones, then having a passionate activity could prove to be a beneficial outlet to such positive experiences. In the case of passions, individuals who engage in their activity more often could exhibit this ideal relationship between positive experiences and heightened interest to replenish self-regulatory resources.

By measuring levels of passionate engagement, highly passionate individuals can be compared to individuals who are not as passionate about an activity to determine how engagement and positive experiences could be beneficial to cognitive resources. For example, highly passionate individuals may attain more positive experiences from their passionate activities that help to sustain engagement and replenish cognitive resources. If high levels of passionate engagement can prove to be important to a positive lifestyle, then evident differences could be seen on scores of optimism.

According to the broaden-and-build theory, high rates of positive engagement are important to building upon and replenishing cognitive resources (Fredrickson, 1998, 2004). In this case, it was hypothesized that individuals who were highly passionate for an activity may demonstrate higher forms of optimism that are not evident with individuals who are not as passionate for their selected activity. Optimism is more likely to regulate emotions, and create a mental framework that is likely to change how an individual comes to identify with specific or general events (Seligman, 1998). In this case, highly passionate individuals should demonstrate higher forms of optimism that could potentially benefit emotional and cognitive resources. For example, it could be evident that highly passionate individuals rely upon their positive experiences as a method to moderate self-regulation their behavior. Therefore optimism can be an important determination to continuous engagement in a passionate activity.

### **Hypotheses**

Section two presented an enquiry into the roles that optimism, social desirability, social support, attention, life quality, and executive functioning play in distinguishing high and low levels of passion. Individuals were measured for the emphasis placed on their passionate activity to determine levels of engagement – whether it is a high level of engagement or a low level of

engagement. For example, the more emphasis the individual places on the activity could exemplify higher levels of engagement. If the individual places less emphasis on the activity, this could exemplify low levels of engagement, and a lower degree of passion. Differences observed could reflect benefits of long term passionate engagement and the importance of having such an activity to be highly passionate about. Therefore a passion that is met with high levels of engagement may prove to be the most beneficial to positive growth and psychological well-being.

Although the same group of variables were revisited in section two, hypotheses were only developed for attention, executive functioning, life quality, and optimism. Based on the literature review stated above, it was unclear what role social desirability and social support would serve between high and low passions. It was hypothesized that individuals who are highly passionate would not demonstrate the same abilities with attention, executive functioning, or life quality compared to low or non-passionate individuals. Yet it was also hypothesized that individuals who were highly passionate for an activity would demonstrate higher forms of optimism that would not be evident with individuals who are low or not as passionate for their selected activity.

## **Method**

The same participants, procedures, and measurements were used in both studies one and two of this master's thesis. For a description of all measurements please review set of analysis one of this study.

## Results

Participants' passion scores were considered in two ways. First, participants were classified as high or low in passion. Second, participants' total passion scores were tested directly.

First, by combining HP and OP subscales from the passion scale, total passion scores were calculated for each participant. Participants scores were standardized and categorized as either highly passionate ( $z > .5$ ) or low to non-passionate ( $z < -.5$ ). This technique of calculating total passion scores, excludes the middle 39% of participants ( $N=55$ ) from the original sample ( $N=141$ ). Using the same analysis as the initial study, Participants were classified as high and low in their passionate engagement and compared for optimism (Optimism test), pessimism (Optimism test), social desirability (SDS-17), social support (SSQ6), attention (ASRS-screener), life score (AAQoL), health score (AAQoL), and executive functioning (BRIEF-A) using MANOVA.

Second, participants' total passion scores were tested directly. Total passion scores were compared to optimism (Optimism test), pessimism (Optimism test), social desirability (SDS-17), social support (SSQ6), attention (ASRS-screener), life score (AAQoL), health score (AAQoL), and executive functioning (BRIEF-A) using Pearson correlations.

### **High passion vs. Low passion**

Using the passion scale, participants were grouped as having a high or low passion. In this group of participants ( $N=86$ ), half were grouped as highly passionate ( $N=43$ ) and half were grouped low or non-passionate ( $N=43$ ).

Globally, the multivariate positioning of the high and low passion groups are not different, Pillais' Trace = 0.17,  $F(8, 63) = 1.66$ ,  $p = 0.14$ ,  $\eta^2 = 0.17$ . Table 6 shows high and low passion to total scores on each questionnaire and, demonstrated the high passion group scored higher than the low passion group on optimism,  $F(1,70) = 5.54$ ,  $p = 0.02$ ,  $\eta^2 = 0.07$ . There are no differences for pessimism, social desirability, social support, attention/ADHD, life score, health score, and executive functioning.

As seen in Table 7 comparing high and low passion to mean scores on the optimism subscales demonstrated the high passion group scored systematically higher than the low passion group on personalization good  $F(1,83) = 4.41$ ,  $p = .04$ ,  $\eta^2 = 0.05$ . There is no difference on permanent good  $F(1,83) = 0.34$ ,  $p = .56$ ,  $\eta^2 = 0.00$  or pervasiveness good  $F(1,83) = 2.39$ ,  $p = .126$ ,  $\eta^2 = 0.03$  (please see Table 8).

Pearson correlations compared total passion scores, across the entire sample, to total scores of each test. This analysis was conducted to validate the first set of analyses which grouped individuals with extreme z-scores as high or low passion. If similar results were gathered for this analysis, then the method used to group individuals in the previous analyses would be considered appropriate.

As seen in Table 8 correlations of total passion scores on each questionnaire demonstrated that total passion score was positively correlated with optimism. At the same time, the total passion score was positively correlated with difficulties in executive functioning.

## **Discussion**

No general differences between high and low passion were found, except for significant differences in optimism. Individuals grouped as highly passionate reported higher scores on Seligman's Optimism Scale, particularly on the personalization good subscale.

### **Optimism**

An important finding from this study was that highly passionate individuals were the only group to demonstrate some form of optimism from their passionate activity. Highly passionate individuals' perceived optimism was specifically related to positive personalization. Positive personalization was uniquely associated with high levels of passion, and could explain a lot of about high rates of passionate engagement.

On Seligman's optimism scale, personalization represents two subscales: a positive orientation and a negative orientation. When an individual scores high on the positive orientation, this could suggest that the individual internalizes positive or good events (Seligman, 2000). According to Seligman (2000), when scores are higher on the optimistic subscale compared to the pessimistic subscale of personalization, individuals not only view negative or bad events as occurring outside of themselves, but will internalize positive or good events as something they directly took part in. In the context of a passionate activity it makes sense that this type of personal control could encourage someone to persist with an activity – especially at high rates of engagement. Since this result was only found for highly passionate individuals and not for individuals classified as HP or OP, this further supports the claim that high levels of passionate engagement could be beneficial to psychological well-being.

Compared to Seligman's other subscales – permanence and pervasiveness – personalization good was the only significant result. Further research is required to understand



the type of impact good personalization has for highly passionate individuals. Based on Seligman's theory permanence, pervasiveness, and personalization are three explanatory styles of optimism. Past experiences and attribution style can influence an individual's impression and demeanor to good and bad events. Over time someone can learn to internalize or externalize such events. This is where orientation to such experiences could make an individual more or less optimistic; even pessimistic. In the case of good personalization, positive experiences are internalized and may contribute to a higher confidence in one's abilities (Seligman, 2000). The highly passionate individual may perceive their attitude and influence as having a direct positive impact on others (Seligman, 1998).

Positive personalization does not necessarily suggest a well-rounded individual. This external versus internal orientation of good personalization to bad events can be healthy as long as it is kept in check. According to Seligman (1998), externalizing all bad events can also be illusory. Individuals may fool themselves into believing others are to blame for every bad event that occurs. In extreme situations, the individual may no longer be seeing things as truly objective, but more so with denial or apprehension (Seligman, 1998).

Since personalization good was the only explanatory style to reach significance, such a result has a flipside. It is important to consider that highly passionate individuals could be misinterpreting or overestimating their positive impact. Highly passionate individuals could be compensating too much good over bad. For example, Stenseng, Rise, and Kraft (2010) have shown some individuals approach leisure activities as a method to escape negative self-awareness. Although this result was only found for obsessive passion, it does not necessarily rule out highly passionate individuals. Stenseng, Rise, and Kraft (2010) only compared individuals

based on HP and OP scores – never measuring rates of engagement. Therefore it is unknown, how escapism differentiates between high and low levels of passionate engagement.

On a similar note, future research will have to examine the extent to which positive personalization continues to be associated with one's passionate activity. Does positive personalization change with rates of engagement over time? Depending on how long an individual has been passionate for an activity may change the extent to which an individual continues to have positive personalization in regards to their passion. Perhaps examining passions over various age groups could provide better insights to positive personalization being associated with high rates of passionate engagement.

According to the broaden-and-build theory, positive experiences are suggested to prove psychological health and well-being. Based on results, highly passionate individuals could be demonstrating such benefits. Perhaps a highly passionate activity is a necessary ingredient to a positive health lifestyle.

### **Correlations between high and low passion scores**

This analysis was conducted, to determine how high and low passion scores would compare across variables. As demonstrated, Pearson correlations differed between high and low passion scores in optimism on Seligman's Optimism Scale, and executive functioning on the BRIEF-A. Highly passionate individuals were positively correlated with higher scores on optimism, and on the other hand, lower executive functioning. Results gathered from this analysis support the previous analyses that found individuals grouped as high or low passion differed in optimism, but the result pertaining to lower scores in executive functioning requires further explanation. Since all participants were incorporated in this set of analysis, differences in executive functioning became more evident. On the other hand, to suggest highly passionate

individuals potentially have more problems with executive functioning, may not be the case. Below is a potential theoretical explanation as to why highly passionate individual may score lower in executive functioning.

### **Broaden-and-build theory and high levels of passion**

Fredrickson (1998, 2004) did not specifically address the potential benefits of passionate engagement when creating her broaden-and-build theory. However, the theory is a general one, and, as demonstrated in the results from this study, high rates of passionate engagement should definitely supply a long-term pattern of positive emotions – via optimism. It would be unfair to the theory to judge how it relates to the question of low or non-passionate individuals, since it is unclear whether low or non-passionate individuals might have some of the characteristics that could bring this theory to apply. Accordingly, it can be suggested that this theory would tend to predict an advantage for people who report high rates of passionate engagement within a passionate activity. But what sort of advantage? Is this consistent with the reported findings?

Based on the results from this study, highly passionate individuals have demonstrated that high rates of engagement are important in the embodiment of optimism. Highly passionate individuals demonstrated positive personalization towards their passionate activity. According to the broaden-and-build theory, reoccurring positive experiences can help individuals adaptively grow. A positive attribution style to past experiences and future endeavors will help to further deepen both cognitive and emotional resources. In this case, the positive personalization embodied by highly passionate individuals would provide reoccurring positive experiences every time they took part in their passionate activity.

By taking part in a passionate activity highly passionate individuals not only satisfy their own self-determined needs, but can actually build upon their own emotional and cognitive

resources. As exemplified in Fredrickson's theory (1998, 2004), highly passionate individuals may be building upon their own resources by developing an optimistic outlook about themselves – hence the positive personalization. Since optimism is a key ingredient in the broaden-and-build theory, and only exhibited by highly passionate individuals, then high rates of engagement may prove to be an important predictor to healthy development. Based on the results, high levels of engagement may demonstrate to be the most beneficial compared to other groups measured in this study.

Previous research on activity inhibition and regulatory fit suggests excessive inhibitory control can compromise positive growth. In this set of analyses, highly passionate individuals did not exhibit excessive executive control. Therefore a healthy passion may not entail the complete control over all of an individual's executive functions, but having that freedom to explore one's own motivates and emotions as well.

### **Summary**

Section two demonstrated individuals grouped as highly passionate reported higher optimism compared to individuals grouped as low or non-passionate. This confirmed the initial hypotheses of this study, and as well, seemed to coincide with Fredrickson's broaden-and-build theory (1998, 2004). As the broaden-and-build theory suggests, positive experiences can expand both emotional and cognitive resources. For example, highly passionate individuals did not exhibit lower scores in attention, executive functioning, and life quality, as previously hypothesized. It is possible that high rates of engagement in a positive and enjoyable activity, such as a passion, are more beneficial in developing an individual's emotional and cognitive resources. Although further research would be required to understand the benefits of long-term passionate engagement, these results do suggest that other unique groups can be measured using

Vallerand's passion scale. These results also provide new insights to Vallerand's dualistic model of passion (DMP), since rates of engagement are not considered when measuring individual passions.

When examining the results from studies one and two, it became clear that different results can be attained depending on how an individual's passion was measured. The fact that studies one and two do not entirely lead to the same conclusions really means that the DMP should be put to the test. Study three tested the DMP directly.

### **Taxometric analysis applied to the dualistic model of passion**

Section three, revisited Vallerand's dualistic model of passion in order to test its conceptual structure. To this date, there has been no effort to verify the conceptual structure of passion proposed by the DMP model. Yet when considering both sections one and two, it has been demonstrated that completely different results can be gathered based on how individual passions are measured. In this case, it is important to identify whether the conceptual structure proposed by Vallerand's DMP is accurately depicted using taxometric analysis (Meehl 1992, 1995; Ruscio, Haslam, & Ruscio, 2006). Meehl and colleagues (Meehl & Yonce, 1994, 1996; Waller & Meehl, 1998) developed taxometrics and associated methods to determine if a latent construct (such as passion) is taxonic or dimensional. Meehl (1992, 1995) describes taxa, or a taxon, as something that would fall into its own discrete category (such as biological sex – male or female). There is a definitive boundary that separates a taxon from other taxa, and it is considered to be nonarbitrary and objective (Ruscio, Haslam, & Ruscio, 2006). In contrast, something that is dimensional would only vary in degree or magnitude from something else (such as masculine vs. feminine interest patterns, voice pitch, or height; Meehl 1992, 1995; Ruscio, Haslam, & Ruscio, 2006). Here, there is no definitive boundary that separates members across a dimension, and any attempt at grouping members is considered to be subjective and based more so on social convention rather than naturally occurring (Ruscio, Haslam, & Ruscio, 2006). Practically speaking, if clustering methods were used to look for two groups in a multivariate space, they normally would be found. The more important question, extremely difficult to answer using clustering methods, is whether the points of distinction between those groups is actually meaningful and corresponds to some real difference. Taxometrics were created to evaluate exactly this question.

According to Lenzenweger (2004), taxometrics are best applied when theoretically testing a sound model, such as the DMP. Vallerand's DMP model clearly describes obsessive and harmonious passion as being two separate categories (see Vallerand, 2010). If this is true, then based on the general covariance mixture theorem (GCMT; Meehl, 1973; Meehl, 1995), one can expect that observed covariances between passion scales and variables may serve as fallible indicators of group membership and should vary over their range. On the other hand, if passion is better described as a continuum, then although the observed pattern of covariances may vary they will not reflect group membership.

Conversely, if the type of passion is fundamentally a continuum that would suggest that the DMP is in need of some revision. This would suggest that although there is clear evidence that the harmonious and obsessive passion scales can discriminate something of importance with respect to how passions are lived, the actual conceptual distinction between the two may be less clear. One hypothesis to consider is that the scales actually discriminate between people who have, or do not have, difficulties with organizing, planning and executive functioning as opposed to reflecting a genuine underlying difference in passion. What this could suggest, is that by incorporating a third or fourth variable in combination with the two forms of passion, may demonstrate unique relationship that cannot be explained solely by the two forms of passion.

### **Dualistic model of passion**

According to Vallerand's DMP (2008, 2010), harmonious and obsessive passions are separate and unique. Each form of passion is suggested to derive from different forms of internalized motivation and represent a different set of characteristics. If both types of passion are truly unique, then categorical differences should be evident through statistical analysis. This lends itself to a taxonomic investigation. By conducting taxometric analyses, created by Meehl

(1973, 1995), harmonious and obsessive passions can be compared to determine whether these two forms of passion are categorical or dimensional. To begin a brief reiteration of Vallerand's DMP model will be provided, before explaining taxometric procedures

Vallerand developed the DMP suggesting different social environments can also foster different values and motivation that will be internalized into an individual's passion (Vallerand, 2008, 2010; Vallerand et al., 2003; Vallerand & Houliort, 2003). Where obsessive passions are the result of a controlled internalization, harmonious passions are the result of an autonomous internalization. It is this differentiation that suggests harmonious passions are more beneficial to well-being compared to obsessive passions, because individuals with a harmonious passion can regulate how they engage in their activity. As a result the values and motivations between harmonious and obsessive passion become apparently different (Sheldon, 2002). For example, harmonious passions are defined for their free-flowing engagement and balance with other aspects of an individual's life (Vallerand, 2008, 2010; Vallerand et al., 2003). Since harmonious passions are fostered in environments that promote autonomy, then the individual can remain in control of their activity and can freely choose when or when not to engage in their activity (Deci & Ryan, 2000). In this case, individuals with a harmonious passion engage in an activity only for the benefits and mere enjoyment the activity provides (Hodgins & Knee, 2002). As a result, harmonious passions do not overpower aspects of the individual's identity or their lifestyle (Vallerand et al., 2003).

On the other hand, obsessive passions do not demonstrate the same harmony in an individual's lifestyle (Vallerand 2008, 2010; Vallerand et al., 2003). Because obsessive passions are fostered in environments that are controlling, the individual cannot control their engagement in the activity (Hodgins & Knee, 2002). Controlling environments can place various



contingencies on an activity that the individual will feel pressured to pursue, such as self-worth or self-esteem (Deci & Ryan, 2000). As a result individuals with an obsessive passion experience uncontrollable urges to take in their activity due to the disproportionately large role the activity takes on (Vallerand 2008, 2010; Vallerand et al., 2003).

As suggested in the DMP, the root differences between harmonious and obsessive passion, is that people reporting a harmonious passion experience more positive states during and after their preferred activity than do those people reporting an obsessive passion (Mageau & Vallerand, 2007; Vallerand, 2008, 2010; Vallerand et al., 2003; Vallerand & Houliort, 2003). Vallerand's preliminary studies that demonstrated individuals with harmonious passions experience positive affect and individuals with obsessive passions experience negative affect have been replicated in numerous others studies (e.g., Carbonneau, Vallerand, Fernet, & Guay, 2008; Carpentier, Mageau, & Vallerand, 2012; Mageau et al., 2005; Philippe, Vallerand, Andrianarisoa, & Brunel, 2009; Ratelle et al., 2004; Rousseau, Vallerand, Ratelle, Mageau, & Provencher, 2002; Vallerand & Houliort, 2003; Vallerand et al., 2003; Vallerand, Rousseau, Grouzet, Dumais, & Grenier, 2006; Vallerand et al., 2007; Vallerand et al., 2008). This dichotomy between harmonious and obsessive passions has been replicated in various life domains, such as school (Carbonneau et al., 2008), work (Vallerand & Houliort, 2003), sports (Phillipe et al., 2009), and leisure activities (Phillipe, Vallerand, & Lavigne, 2009). Based on the provided evidence, it is clear that many researchers have endorsed the idea that there are two separate forms of passion, and that each form of passion is represented by its own distinct set of characteristics.

### **Dimensionality between harmonious and obsessive passion**

The above notwithstanding, the approach Vallerand et al. (2003) used to claim a distinction between the harmoniously and obsessively passionate is not in itself adequate. The conceptual overlap between these categories is substantial. For example, using Vallerand's methods, Grenier, Lavigne, and Vallerand (as cited in Vallerand, 2010) found obsessively passionate collectors still experienced positive affect under certain circumstances. When validating the passion scale, Vallerand et al. (2003) used both exploratory and confirmatory factor analysis to suggest a good fit to the data. All items that loaded onto both obsessive and harmonious passion were removed, creating a 14-item scale (later shortened to a 12-item scale; see Vallerand, 2010). On the other hand, further results demonstrated that both the harmonious and obsessive passion subscales highly correlate, and therefore Vallerand et al. (2003) used partial correlations to suggest both types of passion were different and unrelated.

Fundamentally, most statistical approaches have difficulty discriminating between two groups separated along a single dimension and a division being made of a single group. For example, when using cluster analysis, Wang, Khoo, Liu, and Divaharan (2008) found harmonious and obsessive passions combined into three profiles when measuring individuals' passion for online gaming: there was an average HP/OP profile, a low HP/OP profile, and a high HP/OP profile. As sample sizes increase the marginal fit improvement of a second factor will tend to increase in both cases. So, how to tell the difference between empirical results based on the extreme ends of homogenous population and those actually capturing two separate populations? Specific modelling approaches (e.g. Bayesian models) can be invoked, but they are at their best when the underlying theory can clearly identify the multivariate position of the hypothetical groups. The DMP is not that specific.

This could suggest what separates a harmonious passion from an obsessive passion is only a matter of where researchers choose to draw a line. For example, Mageau et al. (2009) were able to find apparent differences between obsessive and harmonious passions by using a median split. Although differences could be evident, splitting groups on this method could be considered arbitrary and lacking an objective boundary (Meehl, 1992, 1995; Ruscio, Haslam, & Ruscio, 2006). Although this may serve a purpose for social convention, the following study seeks to understand how definitive of a boundary lies between harmonious and obsessive passions.

### **Taxometrics**

As previously suggested, both harmonious and obsessive passions can demonstrate positive affect at some point during activity engagement, blurring any clear distinction between passions. What this could suggest is that some overlap may exist between harmonious and obsessive passions. If obsessive passion and harmonious passion share overlap with one another, then perhaps both forms of passion lie on a single dimension, and represent extreme ends of the same continuum. In order to explore this question further, certain statistical procedures can be used. For example, Meehl and colleagues (Meehl, Yonce, 1994; Waller & Meehl, 1998) developed Taxometric analysis to determine whether any given variables are uniquely different, demonstrating a latent structure, or are representing a similar phenomenon on the same continuum, demonstrating a dimensional structure. To best understand any apparent differences between obsessive and harmonious passion, taxometrics will be further explored. In this case, taxometrics can identify whether two unique forms of passion exist, or if both types of passion are expressing passion on a single continuum.

## **Hypotheses**

Section three presents a taxometric analysis of passion – testing the DMP’s theoretical structure. As previously suggested, there is no known study that has made an effort to verify the conceptual structure of passion proposed by the DMP model. Vallerand (2010) cites harmonious and obsessive passion as separate and unique. If both types of passion are truly unique, then categorical differences should be evident through taxometric analysis.

Based on the varying results reported in studies one and two, it was hypothesized that taxometric analysis would reveal the DMP to be more dimensional than categorical in structure. Although the DMP model makes a clear distinction between harmonious and obsessive passions, stating harmonious passions are more beneficial to well-being than obsessive passions, the second analysis in this thesis document did not support these claims. In study two it was demonstrated that high rates of engagement were more important to well-being than passionate orientation per se. In this case, taxometrics would reveal a structure that contrasts the conceptual account of the DMP.

## **Method**

Taxometric data analysis was undertaken using R software (R Core Team, 2013) and Ruscio’s program coding (2014). Three taxometric procedures were used to identify any latent structures between obsessive and harmonious passion: Mean Above Minus Below A Cut (MAMBAC) and Maximum Eigenvalue/Maximum Covariance (MAXEIG/MAXCOV). The MAMBAC procedure was used to compare harmonious passion and obsessive passion to find potential difference between the two variables. The MAMBAC procedure searches for scores that maximize the difference between provided groups (for further explanation see Meehl & Yonce, 1994; Ruscio et al., 2006). If a difference in scores is uncovered, then a latent structure

may exist. In the case of passion, a latent structure between harmonious and obsessive passion would suggest potential difference between groups. Since the MAMBAC procedure only requires two indicators to properly function, obsessive passion and harmonious passion can be compared for potential taxonomy.

This study also used the Maximum Eigenvalue/Maximum Covariance (MAXEIG/MAXOV) procedures to identify any latent structure between passion and attention (using the ASRS-screener). The MAXEIG/MAXCOV procedures were used to compare total passion, harmonious passion, obsessive passion, inattentiveness, and hyperactivity/impulsivity to find any potential latent structure for passion. Where the MAXEIG procedure uses plotted eigenvalues to find potential group difference, the MAXCOV procedure uses the covariance between plotted eigenvalues to find potential group difference. However both the MAXEIG/MAXCOV techniques require at least three indicators to function properly. Therefore measuring passion in relation to attention could reveal a form of passion that is distinctively unique. All three taxometric procedures (MAMBAC, MAXEIG/MAXCOV) provide similar results, displaying the distribution of a population either as dimensional or categorical.

Taxometric analysis was the most appropriate procedure to use, as other statistical procedures may not have provided as clear of a result. For example, an exploratory factor analysis (EFA) or confirmatory factor analysis (CFA) would provide less useful results - because it is difficult to distinguish between two separate factors and a single factor measured over two partially separable groups. Also, a Bayesian approach would be best if the DMP theory, or other results, could provide a more precise description of exactly how the two groups can best be discriminated using two scales that are somewhat correlated. The taxometric method will provide a valid and robust indicator of any latent structure between passions.

## Results

Taxometric data analysis was undertaken using R software (R Core Team, 2013) and Ruscio's program coding (2014). Three sorts of taxometric analysis were conducted: the Mean Above Minus Below A Cut (MAMBAC) and the Maximum Eigenvalue/Maximum Covariance (MAXEIG/MAXCOV). The MAMBAC procedure was used to search for scores that maximize the difference between obsessive and harmonious passion. Greater difference in maximized scores could reveal a potential taxonomy for passion. The MAXEIG/MAXCOV procedures were used to examine whether different locations of a distribution between passion and attention would reveal any unique taxonomy. The scores on the ASRS-screener were used since a significant relation was found. All three taxometric procedures were used to determine whether passion is best represented as categorical in structure or dimensional in structure.

If the DMP's conceptual structure is accurate, then an evident peak should be graphed between harmonious and obsessive passion for all three taxometric procedures. According to taxometric analysis, when a population is divided into two or more groups and generates a peak, there is suggested to be a categorical difference. For example, using the MAMBAC procedure, calculating harmonious and obsessive passion could reveal to a peak difference if both groups of passion are different. This would validate the DMP model. On the other hand, if the two groups of passion are homogeneous, and dimensional in structure, then the plotted graph will be uniform across the two indicators. This would suggest that harmonious and obsessive passion are not necessarily different, but lie on the same continuum of passion.

Like the MAMBAC procedure, the MAXEIG/MAXCOV procedures could yield similar results for passion. For example if there are categorical differences between passion and attention, then a peak difference will be evident – demonstrating a unique taxon between passion

and attention. If a peak is presented, then there is suggested to be a strong covariance among indicators. Larger eigenvalues are suggested to reveal greater intercorrelations, particularly where the peak is presented on the graph. In this case, a categorical difference between passion and attention could reveal something about passion that was not described in the DMP model. It could reveal another passionate orientation different and separate from obsessive and harmonious passion. On the other hand, if passion and attention are homogeneous, then the plotted graph will be flat and smooth. When the characteristics of a population are dimensional the measured covariance in a MAXCOV, or the measured eigenvalues in a MAXEIG would be rather weak.

### **MAMBAC procedure**

Figure 2 illustrates the result of the MAMBAC procedure accompanied by simulated comparison data showing pure categorical and dimensional data. At each point on the OP scale is plotted the difference in HP scores for all participants below this OP cut-off point and those above it. Visually, the figure on the left side shows no evidence suggesting an optimal cut-off score to distinguish between harmonious and obsessive passion. It is concluded that there is no apparent evidence for two groups defined on the harmonious and obsessive passion subscales.

On the other hand, the MAMBAC procedure resulted in a CCFI value of 0.57. According to recent papers (Ruscio & Walters, 2009; Ruscio, Walters, Marcus, & Kaczetow, 2010) the probability of identifying a valid structure is much lower when the CCFI value is close to 0.50. Since a CCFI value between .40 and .60 should be interpreted with caution, it is important to acknowledge that caution is warranted in this case. Accordingly, another taxometric analysis addressed the problem differently.

**MAXCOV procedure**

For the MAXCOV procedure, the passion scale and the ASRS-screener were used, and participants were measured on their obsessive and harmonious passion subscale scores, and as well their inattentiveness and hyperactivity scores. The Maximum Covariance (MAXCOV) procedure was used to plot the eigenvalues of the covariance vectors between passion and attention. The variables included in the analysis were total passion, harmonious passion, obsessive passion, inattentiveness, and hyperactivity/impulsivity. Figure 3 shows the obtained result next to the simulated data showing a clear dimensional (flat) and categorical (peaked) structure (for further explanation see Meehl & Yonce, 1994; Ruscio et al., 2006). Based on the simulated data, it is evident that structure between passion and attention is flat and dimensional rather than categorical.

The MAXCOV procedure resulted in a CCFI value of 0.54, which again suggests that the results would need to be interpreted with caution if a categorical separation between the groups was found. Based on visual inspection, the five indicators between passion and attention – obsessive passion, harmonious passion, total passion, hyperactivity/impulsivity, and inattentiveness – produce an overall line that is relatively flat, suggesting no categorical separation between groups. It can be concluded that there is no evidence for a unique taxon based on passion and attention.

**Discussion**

Section three statistically analyzed the conceptual structure of Vallerand's dualistic model of passion. Using the passion scale participants were measured on both their harmonious and obsessive passion scores for both the MAMBAC and MAXCOV procedures. In addition participants' attention was also included in the MAXCOV procedure as well. Based on the



results it was demonstrated that dichotomy between harmonious and obsessive passion is far from clear. Taxometric results demonstrated the distinctions between harmonious and obsessive passion are more continuous than categorical.

### **Taxometric properties to passion**

Overall, taxometric analyses demonstrate evidence for a dimensional latent structure to passion. Based on the results, Vallerand's (2010) typology between harmonious and obsessive passion does not represent two separate groups, but one overall population, existing on the same continuum. In this case, harmonious and obsessive passions represent individuals on extreme ends of the same continuum, varying only in their level of intensity and activity engagement. Based on this evidence, any apparent differences suggested to exist between harmonious and obsessive passion are best viewed as dimensional rather than categorical in nature. Results from the MAMBAC and MAXCOV analysis supported this dimensional structure to passion. For example, neither the MAMBAC nor the MAXCOV procedures showed any middle peaks in their graphs. If a peak was evident, then two separate groups would be suggested to be identified. Based on the provided graphs, there was no evidence of a categorical structure to passion.

The taxometric approach has provided valuable insights that can be applied to Vallerand's DMP model (2003, 2008, 2010). The DMP proposes individuals as either harmonious or obsessive towards their passionate activities. On the other hand, taxometric analysis has demonstrated that both forms of passion are more in conjunction with another than they are separate. In this case, classifying individuals as solely harmonious or obsessive does not truly capture an individual's orientation towards their chosen activity. Even measuring these two forms of passion separately would not accurately capture group differences between individuals. According to the results, both forms of passion make up an individual's orientation towards their

activity, just in varying degrees. Therefore, to suggest someone is truly obsessive and another person as truly harmonious would only represent extreme cases on the same continuum because both forms of passion are internalized in the activities the individual takes part in.

Since taxometric analysis is the ideal statistical approach when distinguishing between dimensional or categorical structures, strong empirical evidence for a specific structure – in this case, the dimensional structure to passion – can help with future conceptualization and more accurate classification (Ruscio & Rusico, 2004). The theory proposed by the DMP, distinguishing between harmonious and obsessive passion, conceptualized passion as two separate forms both internalized differently (Vallerand, 2008, 2010). Although motivational factors can orient individuals towards their chosen activities differently, the suggestion that they can be measured differently would not be accurate. According to the results, harmonious and obsessive passions are more dimensional than separate, contrary to what has been suggested or previously reported.

In light of this evidence, the theory behind the DMP would best be understood by revising its conceptualization. It could be suggested that both forms of passion make up an individual's orientation towards their chosen activity in varying ways, or formulate new constructs to passion altogether. In this case, new classifications of passion would better suffice the attempt of grouping individuals according to their passion orientation.

This study provides evidence contrary to Vallerand's DMP (2003, 2008, 2010). Although the DMP has gathered much evidence to support differences between obsessive and harmonious passion (for e.g., see Carbonneau, Vallerand, Fernet, & Guay, 2008; Carpentier, Mageau, & Vallerand, 2012; Rousseau, Vallerand, Ratelle, Mageau, & Provencher, 2002; Vallerand & Houliort, 2003; Vallerand et al., 2003; Vallerand, Rousseau, Grouzet, Dumais, & Grenier, 2006;

Vallerand et al., 2007; Vallerand et al., 2008), results from section three suggest these differences exist on the same continuum. Previous studies measured differences between obsessive and harmonious passion using partial correlations. By controlling for overlap between both forms of passion, these studies found differences between groups. Based on taxometric results, not only are harmonious and obsessive passion highly correlated but lie on the same continuum. Although partial correlations can be used to differentiate between harmonious and obsessive passion, results from section three suggest that partial correlations are at most, measuring extreme ends on the passion continuum.

Previous evidence that has run contrary to the DMP, (Grenier et al., as cited in Vallerand, 2010) further supports these taxometric results and the dimensionality of passion. Because passion is dimensional, individuals are more likely to embody varying traits of both types of passion. For example, Grenier et al. (as cited in Vallerand, 2010) found obsessively passionate individuals to still experience positive affect during their chosen activity. This further suggests that such individuals are not truly obsessive in their passion, but more so embodying obsessive and harmonious traits to varying degrees. Section two also discovered a similar relationship when it found highly passionate individuals embodying high levels of both harmonious and obsessive passion demonstrating optimism for their passionate activity. This further supports that passion is dimensional rather than categorical in nature.

Therefore comparing harmonious and obsessive passion is really a matter of comparing individuals on either side of the same continuum. This does not suggest that obsessive and harmonious passions do not exist, but that they exist in varying intensities on the same continuum. Perhaps the dedication and intensity an individual commits towards their chosen activity could explain where they land on the passion continuum. Also, to change an individual's

orientation towards their chosen activity would require the individual to endorse their activity in new ways in order to change their balance between both forms of passion, and where they land on the passion continuum. Moreover, individuals would then embody both harmonious and obsessive passion, but in varying degrees.

### **Summary**

Section three demonstrated the dichotomy between harmonious and obsessive passion is far from clear. Taxometric results demonstrated the distinctions between harmonious and obsessive passion are more continuous than categorical. This would suggest that the DMP is in need of some revision. Vallerand's DMP suggests harmonious and obsessive passions are characteristically different. Based on taxometric results, HP and OP are not separate groups but exist on the same continuum.

### **General Discussion**

This Master's thesis was an exploratory study that consisted of three sections. Using a survey package, consisting of various self-report measures – including social desirability, social support, optimism, attention, life quality, and executive functioning – individuals were measured and compared based on their passion scores. In the first set of analysis, individual passions for an activity were measured using Vallerand's Dualistic Model of Passion (DMP) – being either harmoniously or obsessively passionate.

This study was one of the first to demonstrate a link between passion, attention, and executive functioning. It was demonstrated that individuals grouped as obsessively passionate scored lower on attention, executive functioning, and life quality. Individuals grouped as harmoniously passionate reported higher scores on attention, executive functioning and life quality. These results add new insights to Vallerand's DMP model. Originally, the DMP model suggested an individual's social environment and motivation would influence the development of obsessive or harmonious passion. Based on this study, differences between obsessive and harmonious passion are also evident in cognitive and behavioral resources.

Using Fredrickson's broaden-and-build theory (1998, 2004), it could be suggested that some passions may be more likely to support cognitive resources than other passions. Based on the results from study one, these benefits may be limited to harmonious passions. However, it should be noted that the effect sizes for experiment one were small, suggesting any differences between harmonious and obsessive passion were not substantial.

In the second section, the same list of variables and methodology were used but individuals were grouped differently. When conducting the first part of this study, it was noticed that the separation between harmonious passion and obsessive passion was not that clear. Most

individuals scored either equally high, or equally low on both the harmonious and obsessive subscales on the passion scale. Therefore, instead of grouping individuals based on the criteria described in Vallerand's DMP, individuals were regrouped based on their total scores of passion – being high or low.

This study was one of the first to demonstrate a link between level of passion and optimism. Individuals grouped as highly passionate reported higher positive personalization compared to individuals grouped as low or non-passionate. These results suggest that other unique groups can be measured using Vallerand's passion scale. Since Vallerand's dualistic model of passion (DMP) does not consider rates of passion – being high or low – when measuring individuals' passions, this could be important for future research. For example, Vallerand's DMP suggests that harmonious and obsessive passions vary in their internal processes. Where obsessive passions are derived from internal processes that are controlling and rigid, harmonious passions are derived from internal processes that are autonomous and free. Yet based on the results from section two, it is possible that positive personalization could also work as an internal process that supports higher levels of passionate engagement.

Results from section two also coincide with Fredrickson's broaden-and-build theory (1998, 2004). As demonstrated, highly passionate individuals were the only group to report a form of optimism that could support continuous engagement in an activity. It is possible that high rates of engagement in a positive and enjoyable activity, such as a passion, are more beneficial in developing an individual's emotional and cognitive resources. Yet, similar to study one, it should be noted that the effect sizes for experiment two were also small, suggesting any differences between high and low passion were not substantial.

In section three, the conceptual structure of Vallerand's DMP was tested using taxometric analyses. Due to different results being reported in studies one and two, Vallerand's DMP was put to the test. Using taxometric analysis, it was demonstrated that the concept of passion was not dualistic in nature, and that individuals could exhibit characteristics of both harmonious and obsessive passion, as described in Vallerand's DMP. This would suggest that the DMP is in need of some revision. Vallerand's DMP suggests harmonious and obsessive passions are characteristically different, representing two different groups of passion. Yet taxometrics showed that harmonious and obsessive passion are not characteristically different and represent the same group of individuals.

Taxometrics demonstrated that there was only one group of individuals, not two, and that harmonious and obsessive passions represented ends on the same linear continuum. What this suggests is that each individual exhibits both harmonious and obsessive passion traits, just in varying degrees along this continuum. Without separate groups, this would suggest that categorizing individuals based on the DMP may be incorrect.

In summary, this thesis consisted of three studies that measured individual passions in various ways. It was demonstrated in experiments one and two that the passion scale can provide varying results depending on how individuals were grouped. For example, grouping individuals based on their type of passion or degree of passion can provide different results. This could mean that there are various factors that can play into an individual's passion and whether it is beneficial or not. Based on the results from experiments one and two, it was important to test the DMP in order to determine whether obsessive or harmonious passions were separate groups. As demonstrated harmonious and obsessive passion are not separate groups but exist on the same continuum. Although this study does not call into question the attributes associated with

harmonious and obsessive passion, this study does suggest that categorizing individuals based on the DMP's criterion may not fully explain an individual's passion. It is important to consider other variables when measuring an individual's passion in order to determine if it is beneficial to well-being or not.

### **Limitations**

Since this study measured and grouped individuals based on their passionate activity, there could be limitations with the measures and criterion used to evaluate one's passion. Each individual's passion was evaluated using the passion scale and criteria established by Vallerand (2008, 2010; Vallerand et al., 2003). However, according to the criteria, a strong majority of the sample in this study would be classified as passionate. This may reflect a bias caused by the recruitment for this study. Perhaps a lot of young adults have an activity they are passionate about. However, it may also reflect other biases – for example, if participants are less passionate than they have reported then it is possible that effects are being underestimated for this study. For example, in the development of the passion scale, Vallerand et al.'s (2003) found the majority of individuals in their study were passionate for their mentioned activity. In this case, the passion scale may be too lenient in its passion criteria. Equally, if passionate interests were overestimated in this study, then the amount of passionate interest in future studies may well find much stronger differences.

Vallerand's 4-item passion criterion is also called into question, due to rarely being reported in the literature. When this 4-item criterion was reported in the literature, no significant difference was reported when including or removing these supposed non-passionate individuals from passionate individuals in the analysis (Vallerand et al., 2003). When using Vallerand's 4-item criterion only 10% of our sample was classified as non-passionate (N=14). Vallerand's 4-



item passion criterion may serve very little purpose in analyzing whether someone is passionate or not.

Another potential limitation with the passion scale was in the second study, where the scale was used to measure total passion scores and group individuals as high or low. Since the passion scale was created to characterize types of passion, being harmonious and obsessive, and not necessarily to measure the amount of passion, high or low, this could be problematic. On the other hand, in a previous study, Wang, Khoo, Liu, and Divaharan (2008) conducted a cluster analysis on the passion scale and found harmonious and obsessive passions combined into three profiles when measuring individuals passionate for online gaming: there was an average HP/OP profile, a low HP/OP profile, and a high HP/OP profile. In this case, dichotomizing individuals as high or low passion could be justified, although the passion scale was initially used for another purpose.

Another limitation for this study is how some of the other measures were used. For example, the ASRS, AAQOL, and BRIEF-A were used 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 they were used to place people on a continuum of non-clinical problems, it is important not to overstate the importance of the differences observed between some groups. For example, lower scores with attention, executive functioning, and life quality with obsessively passionate individuals should not be interpreted to mean that individuals with an obsessive passion have clinically significant problems. The ASRS, which is used as a screening tool for adult ADHD has specific clinical cut-off scores. Individuals grouped as obsessive passion did not meet those cut-off scores, and were only measured for overall attention differences.

Also, due to the relatively low effect sizes for all of the significant results, it cannot be determined that the measures used in this study truly identified what developments are required for a passion to take hold or the other way around. For example, highly passionate individuals demonstrated a unique form of optimism (personalization good), but the effect size was relatively small. Individuals high in HP and OP have never reported to exhibit any form of optimism, or demonstrated lower executive functioning.

Finally, an important limitation to consider is that some of the results for executive functioning may be a marker for a busier lifestyle. In this case some of the observed differences between groups could be an artifact of the means of measurement. For example, obsessively passionate individuals reported lower scores with attention and executive functioning. On the other hand, these results could just be a self-reflection of a busier lifestyle. Therefore the ability to balance life avenues with an individual's passionate activity may be easier for those who do not take part in their activity regularly or on a day-to-day basis.

### **Future study**

This study has provided insights to passion that require further investigation and validation. For example, one element future research is to consider, is the meaning individuals place on their passionate activity. According to the work by Battista and Almond (1973), meaning and the commitment to that meaning can be attributed to any kind of belief system, separate to what the nature of that meaning is associated to. In this framework, someone who is passionate about a sport such as 'basketball' is placing some sort of belief system onto this activity, simply beyond the nature of the sport. By further understanding the meaning individuals place on their passionate activities can help understand whether certain goals or seeking of life achievements help with long and enduring engagement in a chosen activity.

Already research has identified common factors that help purport personal meaning: relations/intimacy, generativity/transcendentivity, religion/spirituality, and achievements/work (Ebersole, 1998; Emmons, 1999, 2003; Wong, 1998). Based on how individuals' life goals come to resemble or lie with one of these categories enables such purpose and meaning (McKnight & Kashdan, 2009). In this case, this framework can help understand how certain passions develop and whether those passions lead to different passionate orientations, depending on personal meaning.

Future research could also consider other ways to measuring individual passions. Although this study used Vallerand's criterion to measure passion, other researchers have developed their own techniques when measuring passion. For example, Weiss et al. (2013) developed the happiness-route to endorse the promotion of passion in disenfranchised youth. Similar to Vallerand's DMP, Weiss et al.'s (2013) happiness-route lends its support from Ryan and Deci's self-determination theory (2000). Based on Weiss et al.'s (2013) approach, individuals are to identify their passion using 'anticipatory regret'. Using a one-to-one interview method, the participant is asked questions in order to brainstorm a variety of relevant activities. Through a process of elimination and personal significance, the participant is to decide upon a passionate activity with the following concluding statement "In a couple of years, which activity would you particularly regret when not carrying it out?" The participant is given the freedom and final decision to judge whether they feel the activity they have chosen is most relevant and if they intrinsically motivated to maintain the activity. Based on some of the other methods used to measure passion, perhaps this study could have benefited from expanding the passion criterion used before classifying individuals based on their passion.

Also, due to potential artifacts highlighted using the BRIEF-A, a good follow-up to this study would be to use laboratory tasks to determine how individual passions differ in executive functioning. The questionnaires used to examine real world attention dynamics (ASRS-Screener and the BRIEF-A) were developed as validated screening tools for clinical problems. Their use with a broad population may not be fully accurate. These results will need to be re-evaluated using more specific laboratory testing of attention, planning and executive functioning. Laboratory tasks will be more sensitive for differences between groups, especially since non-clinical populations will be used.

According to Toplak, West, and Stanovich (2013) where rating scales, such as the BRIEF-A, are broad in their measurement of executive functioning, performance-based measures, such as the Wisconsin card sorting task (WCST), are suggested to be more narrow and specific in their measurement of executive functioning. In this case, the results from this study, which found differences between harmonious and obsessive passion on the BRIEF-A (Roth et al., 2005) may further demonstrate more specific difficulties between harmonious and obsessive passion on the WCST. In this case, the WCST, which is suggested to be a good measure of executive functioning (Andrewes, 2001; Greve, Stickle, Love, Bianchini, Stanford, 2005; Heaton, Chelune, Talley, Kay, and Curtiss, 1993; Lezak, Howieson, and Loring, 2004), may help to understand how specific an individual's difficulties with executive functioning are in relation to their passion.

Future research could further investigate the relationship between passion and the broaden-and-build theory, using longitudinal methods. Some of the most profound results from this study demonstrated that individuals grouped as harmoniously passionate reported higher scores with attention and executive functioning, and that highly passionate individuals were most

optimistic. It seems that both passion orientations were beneficial to some degree. By expanding research on these groups, it can be determined the extent to which these passionate orientations do fall in line with the broaden-and-build theory. For example, if optimism was supporting cognitive resources for highly passionate individuals then executive control could continue to develop as long as the individual has maintained appropriate levels of engagement in his or her passion. Therefore an individual who maintains a lifelong passion should demonstrate optimal functionality as proposed by the broaden-and-build theory. Therefore longitudinal studies could provide some unique insights.

### **Conclusion**

The present study measured a series of variables while grouping individuals based on different passionate orientations. Results demonstrated evident differences between harmonious and obsessive passion; and as well between high and low passion. Where obsessive passions reported lower scores with attention, executive functioning, and life quality, and higher social desirability, harmonious passions did not. Also where highly passionate individuals were most optimistic, low or non-passionate individuals were not. Highly passionate individuals, who scored high in both harmonious and obsessive passion, were the only group in this study report optimism with their selected activity. Based on the advantages reported for harmonious and highly passionate individuals, it is possible that such passionate orientations may coincide with the broaden-and-build theory. These enjoyable activities could help to expand emotional and cognitive resources.

The present study also conducted a taxometric analysis to test the theoretical structure of passion. As demonstrated, passion was dimensional in structure. It was proposed that harmonious and obsessive passion make up this continuum and lie on extreme ends of the scale.

Depending on an individual's rate of engagement would depend on where they land on this passion continuum. It was found that these differences may provide future developments of the DMP because they potentially capture an important explanation for how these passions differ. In addition, these differences may be even more general than what would have been predicted.

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## List of Tables and Figures

Table 1. Comparing OP and HP on total scores of each questionnaire

Total Scores	Obsessive Passion	Harmonious Passion	MANOVA's		
	M ( <i>SD</i> )	M ( <i>SD</i> )	F (1,110)	<i>P</i>	<i>n</i> <sup>2</sup>
Optimism (Optimism Test)	12.11 (2.81)	11.53 (2.75)	1.20	0.28	0.01
Pessimism (Optimism Test)	10.92 (2.52)	10.90 (2.81)	0.01	0.95	0.00
Social Desirability (SDS-17)	8.80 (3.00)	7.62 (3.02)	4.28	0.04	0.04
Social Support (SSQ6)	53.00 (14.41)	56.80 (13.05)	2.12	0.15	0.02
ADHD (ASRS-Screener)	19.00 (3.73)	17.43 (3.26)	5.11	0.03	0.04
Life Score (AAQoL)	69.30 (7.80)	72.40 (7.80)	4.40	0.04	0.04
Health Score (AAQoL)	35.72 (6.30)	35.80 (7.00)	0.01	0.97	0.00
Executive Functioning (BRIEF-A)	121.52 (21.01)	111.55 (18.52)	7.11	0.01	0.06

Note. N=112; *n*<sup>2</sup>= Partial Eta Squared

**Table 2. Comparing OP and HP to mean scores on the ASRS-Screener subscales**

ASRS-Screener Subscales	Obsessive Passion	Harmonious Passion	MANOVA's		
	M (SD)	M (SD)	F (1,124)	<i>P</i>	<i>n</i> <sup>2</sup>
Inattentiveness	11.60 (3.00)	10.48 (2.51)	5.30	0.02	0.04
Hyperactivity / Impulsivity	7.40 (1.24)	7.02 (1.54)	2.11	0.15	0.02

Note. N=126; *n*<sup>2</sup>= Partial Eta Squared

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

AAQoL Life Subscales	Obsessive Passion	Harmonious Passion	MANOVA's		
	M (SD)	M (SD)	F (1,123)	<i>P</i>	<i>n</i> <sup>2</sup>
Life Productivity	42.10 (5.51)	45.00 (4.50)	9.47	<0.01	0.07
Life Outlook	27.00 (3.70)	28.00 (4.00)	1.56	0.22	0.01

Note. N=125; *n*<sup>2</sup>= Partial Eta Squared

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

BRIEF-A Subscales	Obsessive Passion	Harmonious Passion	MANOVA's		
	M ( <i>SD</i> )	M ( <i>SD</i> )	F (1,122)	<i>P</i>	<i>n</i> <sup>2</sup>
Emotional Control	17.50 (4.60)	16.60 (4.60)	1.18	0.28	0.01
Task Monitor	10.60 (2.03)	10.00 (2.10)	3.98	0.05	0.03
Organization of Materials	12.63 (3.60)	12.70 (3.66)	0.02	0.90	0.00
Working Memory	14.21 (3.52)	12.20 (3.00)	12.50	0.00	0.09
Inhibit	15.00 (3.00)	13.70 (3.04)	4.31	0.04	0.03
Initiate	13.63 (3.05)	12.60 (2.80)	3.92	0.05	0.03
Shift	10.42 (2.10)	9.70 (2.22)	3.67	0.06	0.03
Plan & Organize	17.02 (3.25)	14.80 (3.14)	14.95	0.00	0.11
Self-Monitor	10.50 (2.50)	9.30 (2.40)	7.07	<0.01	0.06

Note. N=72; *n*<sup>2</sup>= Partial Eta Squared



**Table 5. Correlations of OP and HP on each questionnaire**

	OP	HP
OP	—	.19*
HP	.19*	—
Optimism (Optimism Test)	.08	.13
Pessimism (Optimism Test)	.00	-.09
Social Desirability (SDS-17)	.12	-.11
Social Support (SSQ6)	-.12	.12
ADHD (ASRS-Screener)	.25**	-.08
Life Score (AAQoL)	-.22**	.21*
Health Score (AAQoL)	-.11	.03
Executive Functioning (BRIEF-A)	.31**	-.08

\*. Correlation is significant at the 0.05 level (2-tailed).

\*\* . Correlation is significant at the 0.01 level (2-tailed).

**Table 6. Comparing high and low passion to total scores on each questionnaire**

Total Scores	Low Passion	High Passion	MANOVA's		
	M (SD)	M (SD)	F (1,70)	P	$n^2$
Optimism (Optimism Test)	10.60 (2.38)	11.97 (2.51)	5.54	0.02	0.07
Pessimism (Optimism Test)	11.15 (3.40)	10.82 (2.62)	0.28	0.64	0.00
Social Desirability (SDS-17)	7.67 (2.78)	8.69 (2.79)	2.42	0.12	0.03
Social Support (SSQ6)	53.70 (13.86)	54.38 (15.89)	0.04	0.85	0.00
ADHD (ASRS-Screener)	17.90 (2.96)	18.41 (3.97)	0.36	0.55	0.01
Life Score (AAQoL)	70.57 (8.61)	70.20 (8.19)	0.04	0.85	0.00
Health Score (AAQoL)	35.81 (6.40)	35.23 (6.21)	0.16	0.69	0.00
Executive Functioning (BRIEF-A)	115.79 (19.49)	122.82 (21.11)	2.13	0.15	0.03

Note. N=72;  $n^2$ = Partial Eta Squared

**Table 7. Comparing high and low passion to mean scores on optimism subscales**

Optimism Subscales	Low passion	High passion	MANOVA's		
	M (SD)	M (SD)	F (1,83)	<i>P</i>	<i>n</i> <sup>2</sup>
Permanent Good	4.28 (1.28)	4.45 (1.45)	0.34	0.56	0.00
Pervasiveness Good	4.02 (1.44)	4.48 (1.25)	2.39	0.13	0.03
Personalization Good	2.56 (1.11)	3.07 (1.13)	4.41	0.04	0.05

Note. N=85; *n*<sup>2</sup>= Partial Eta Squared

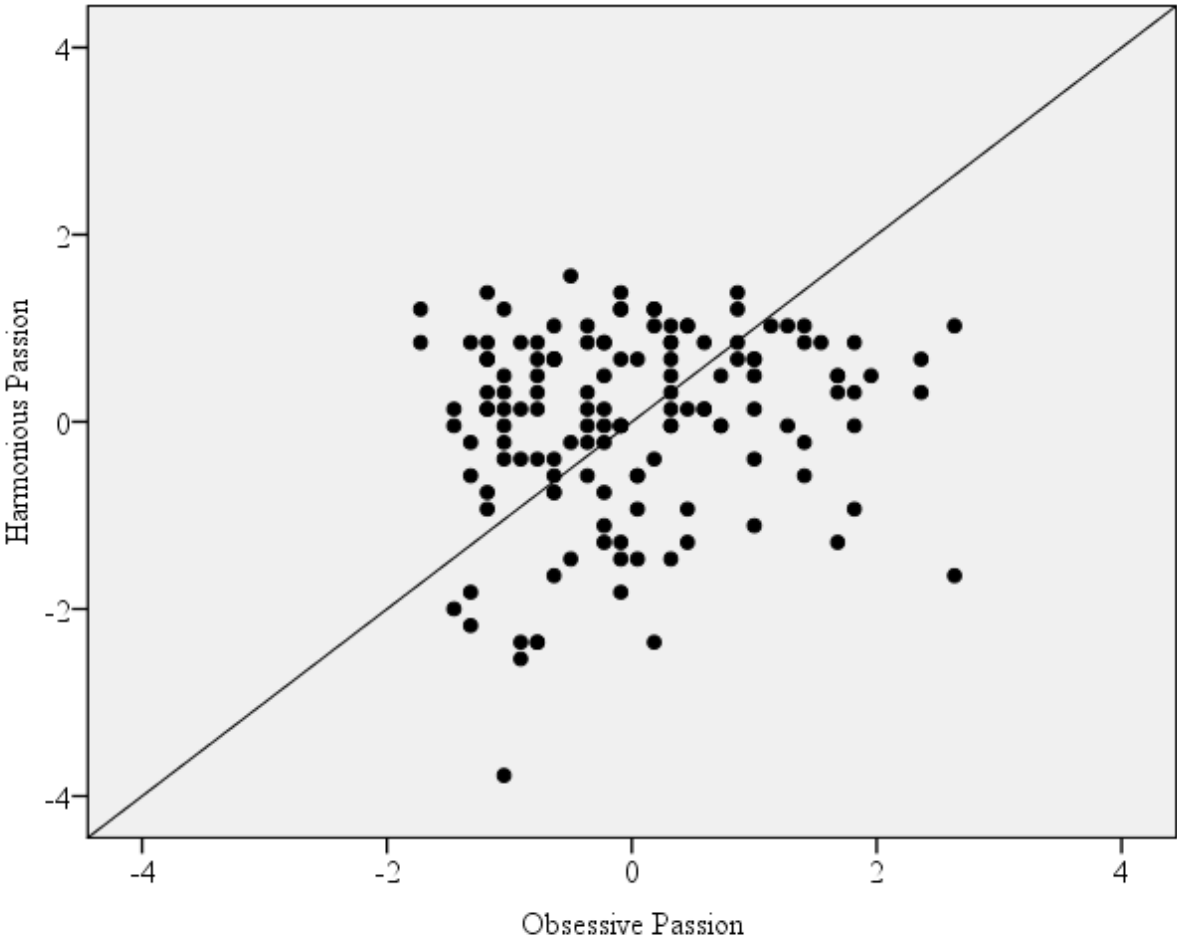
**Table 8. Correlations of total passion scores on each questionnaire**

	High Passion / Low Passion
High Passion / Low Passion	—
Optimism (Optimism Test)	.22*
Pessimism (Optimism Test)	-.07
Social Desirability (SDS-17)	.09
Social Support (SSQ6)	.04
ADHD (ASRS-Screener)	.11
Life Score (AAQoL)	-.00
Health Score (AAQoL)	-.07
Executive Functioning (BRIEF-A)	.23*

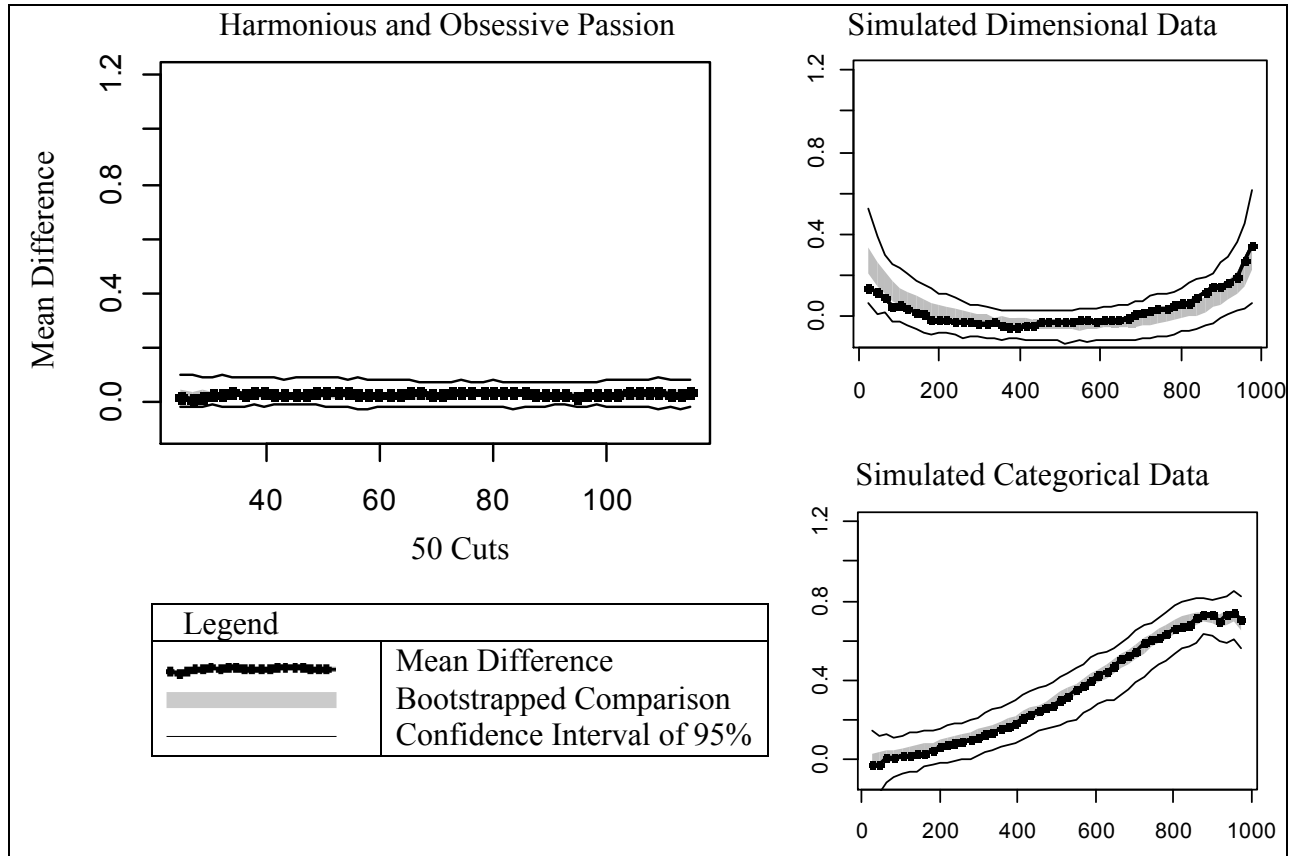
\*. Correlation is significant at the 0.05 level (2-tailed).

\*\*. Correlation is significant at the 0.01 level (2-tailed).

Figure 1. Distribution of harmonious and obsessive passion standardized scores

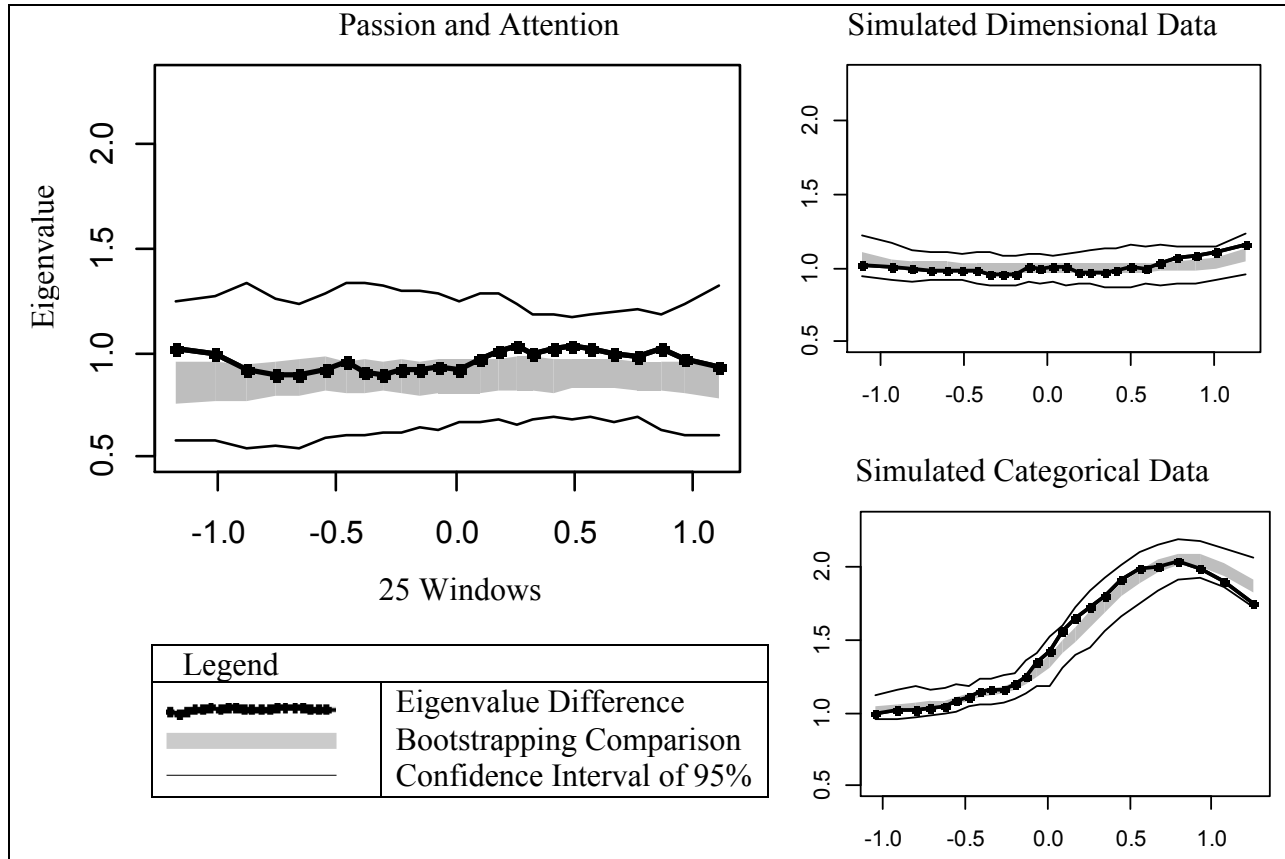


**Figure 2. MAMBAC: comparing harmonious and obsessive passion**



Legend: On the left is the average MAMBAC CURVE comparing harmonious and obsessive passion; its CCFI value is 0.57. On the top right is a simulated exemplar dataset representing ‘true’ dimensional data with a CCFI value of 0.40 and on the bottom right is a simulated exemplar dataset representing ‘true’ categorical data with a CCFI value of 0.95.

**Figure 3. MAXCOV: using the relationships between passion and attention**



On the left is the average MAXCOV CURVE with total passion on the x-axis; its CCFI value is 0.41. On the top right is a simulated exemplar dataset representing ‘true’ dimensional data with a CCFI value of 0.20 and the bottom right a simulated exemplar dataset representing ‘true’ categorical data with a CCFI value of 0.86.

**Appendix A. Recruitment letter**

## Recruitment Letter: Passion in relation to Individual Lifestyles, Self-Regulation, and Activity Engagement.

My name is Jonathan Bridekirk, and I am an Experimental Graduate Psychology student at Laurentian University. My thesis supervisors are Dr. Bruce Oddson & Dr. Josee Turcotte. I am doing research on daily lifestyle, self-regulation, and activity engagement. The purpose of this study is to complete a survey package detailing specific information on one's lifestyle, such as activities one enjoys or takes part in, and related factors such as social networking, interpersonal relationships, organization, time management, and perception of certain day-to-day habits. The survey package requires 45 minutes to be completed. Please consider if this would be of interest to you.

Details: The survey package will contain a series of questionnaires that will take a total of 45 minutes to complete. It is required that you complete all questions and provide necessary information in best portrayal of yourself and about the activities you engage and participate in. Please answer all questions in the electronic word document, in an honest and sincere manner. These questionnaires will focus on your daily lifestyle, self-regulation, and activity engagement.

Your participation in this study is strictly voluntary and you will be able to withdraw at any time, without any penalty. Anonymity and confidentiality are assured as all of your identifying information will be removed from all the data that you provide. The information will be available to the researcher only. All research material collected will be kept in a securely locked location.

If you are interested in participating, please feel free to complete a survey and e-mail your final copy to [jp\\_bridekirk@laurentian.ca](mailto:jp_bridekirk@laurentian.ca); Or if you wish to receive a survey, you can write a confidential e-mail to me, and I will send you a survey to complete. If you have any additional comments or concerns please e-mail. If you participate you will be able to receive a summary of the results of the study as well as be eligible to win a 20\$ gift card from Tim Horton's.



**Appendix B. Recruitment poster**

## Participants NEEDED for research

My name is Jonathan Bridekirk, and I am an Experimental Graduate Psychology student at Laurentian University. The purpose of this study is to complete a survey package detailing specific information on one's lifestyle, such as activities one enjoys or takes part in, and related factors such as social networking, interpersonal relationships, organization, time management, and perception of certain day-to-day habits. The survey package requires 45 minutes to be completed. Please consider if this would be of interest to you.

If you interesting in participating, please write a confidential e-mail with your name and email address in an email to Jonathan Bridekirk at

[jp\\_bridekirk@laurentian.ca](mailto:jp_bridekirk@laurentian.ca).

You may also submit your contact information to the psychology department by writing your name and email address c/o Jonathan Bridekirk. I will send you a confirmation e-mail and will provide you additional information. If you have any additional comments or concerns please e-mail. If you participate you will be able to receive a summary of the results of the study as well as be eligible to win a 20\$ gift card from Tim Horton's.

---

## Participants REQUIS pour la recherche:

Mon nom est Jonathan Bridekirk, et je suis un étudiant licencié expérimental de psychologie à l'université de Laurentian. Le but de cette étude est d'accomplir un paquet d'enquête détaillant l'information spécifique sur son mode de vie, tel que les activités une apprécie ou participe dedans, et des facteurs relatifs tels que la mise en réseau sociale, les relations interpersonnelles, l'organisation, la gestion du temps, et la perception de certaines habitudes de jour en jour. Le paquet d'enquête a besoin de 45 minutes pour être fini. Veuillez considérer si ce serait d'intérêt à vous.

Si vous intéressant à la participation, écrivez svp un email confidentiel avec votre nom et adresse e-mail dans un email à Jonathan Bridekirk chez [jp\\_bridekirk@laurentian.ca](mailto:jp_bridekirk@laurentian.ca).

Vous pouvez également soumettre votre information de contact au service de psychologie en écrivant votre nom et adresse e-mail c/o Jonathan Bridekirk. Je t'enverrai un email de confirmation et te fournirai des informations supplémentaires. Si vous avez tous les commentaires ou soucis supplémentaires satisfont l'email.

**Si vous participez vous pourrez recevoir un résumé des résultats de l'étude aussi bien qu'être éligible pour gagner un chèque-cadeau 20\$ de Tim Horton.**

**Appendix C. Participant consent form****Passion in relation to Daily Lifestyle, Self-Regulation, and Activity Engagement****Participant Consent Form**

I, \_\_\_\_\_, am interested in participating in a survey study on Daily Lifestyle, Self-Regulation, and Activity Engagement by Jonathan Bridekirk, an Experimental Psychology Graduate student at Laurentian University, supervised by Dr. Bruce Oddson & Dr. Josée Turcotte. The purpose of this study is to complete a survey package detailing specific information on one's lifestyle, in regards to myself, an activity I consider to be a passion for me, my interpersonal relationships, and related factors. By participating in this study, I understand this information can be beneficial to studying the multifaceted relationship between a person and his/her passionate activity, and how other factors such as social support and networking can impact one another and formulate someone to live a specific way.

I understand that my participation will consist of a 45 minute session to complete questionnaires and provide the necessary information. I will be asked to complete each questionnaire in a sincere manner, to best reflect myself and my aspirations, as well as my daily routine, and how I conduct myself on a day-to-day basis. I understand these questionnaires will take approximately 45 minutes to complete. I understand that my name will not be attached to these questionnaires and any of the information that I provide will remain strictly confidential. Furthermore, the questionnaires will be kept locked in the researcher's office and only the researchers will have access to them. The information I provide in the survey package will be stored up to 8 years in a locked safe in Dr. Oddson's and/or Dr. Turcotte's office.

I understand I will be participating for the purpose of research, and there is a possibility this participation could occur in a small group setting. In this situation I will agree to participate within this setting, and I understand the confidentiality of myself and others is required. And the confidentiality is required to protect anonymity of all participants.

I understand that I will be asked to fill out psychological questionnaires that require details of myself and a reflection of my thoughts, opinions and activities. I have received assurance from the researchers that every attempt will be made to minimize the impact of unpleasant feelings that may arise throughout the study. If this type of reflection may cause any unpleasant feelings, or if I have any concerns during or after the study, I may receive further support from Laurentian counselling services at (705) 673-6506.

My participation is strictly voluntary and I am free to withdraw from the study at any moment or refuse to participate without any penalty. Although it would be preferable that I answer all of the questions, if I am uncomfortable with any particular question or wish not to respond to a question, then I may refuse to answer the question.

I may contact Dr. Bruce Oddson by e-mail [boddson@laurentian.ca](mailto:boddson@laurentian.ca) or phone, (705) 675-1151 at ext: 1017; and Josée Turcotte by e-mail [jturcotte@laurentian.ca](mailto:jturcotte@laurentian.ca) or phone (705) 675-1151 ext: 4238, or the Research Ethics Officer, Laurentian University Research Office, telephone: 705-675-1151 ext 2436 or toll free at 1-800-461-4030 or email [ethics@laurentian.ca](mailto:ethics@laurentian.ca) for information.

Participant's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Researcher's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

I wish to receive a summary of the results of this study which will be available in May of 2013 at the following email address:

\_\_\_\_\_

THANK YOU FOR YOUR PARTICIPATION.

Jonathan Bridekirk (B.A. Honors)  
Experimental Psychology Graduate Student  
Laurentian University

**Appendix D. Participant demographics**

Demographics:

ID #: \_\_\_\_\_ (don't worry about the ID#)

Today's Date (DD/MM/YY): \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_ /

Gender:  Male  Female Age: \_\_\_\_\_

Date of Birth (DD/MM/YY): \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_ /

Years of Education: \_\_\_\_\_ (Elementary + High school + Post-Secondary)

Level of Education:

Less than High School  High School  College Undergraduate Degree  Master's Degree  Doctorate Other