



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



The effect of passion for activities on fear of COVID-19 and mental health among the Japanese population

Takahiro Kubo^{a,*}, Daichi Sugawara^b, Akihiro Masuyama^c

^a Faculty of Human Sciences, University of Tsukuba, Otsuka 3-29-1, Bunkyo-ku 112-0012, Japan

^b Faculty of Human Sciences, University of Tsukuba, Tennodai 1-1-1, Tsukuba City 305-8752, Japan

^c Faculty of Psychology, Iryo Sosei University, Chuodai-ino 5-5-1, Iwaki City, Fukushima 970-8551, Japan

ARTICLE INFO

Keywords:

Harmonious passion
Obsessive passion
COVID-19
Fear
Mental health

ABSTRACT

As the ongoing pandemic limited the lives of the general population, people engaged in their favorite activities; either in alternative ways or while disregarding the restrictions. These activities and people's engagement in such activities are considered to have a significant impact on mental health. Thus, this study aimed to examine the relationship between two types of passion (harmonious passion and obsessive passion), fear of COVID-19, and mental distress. Thus, a total of 322 Japanese participants completed an online questionnaire. The results showed that harmonious passion (HP) was negatively related to mental distress. Conversely, obsessive passion (OP) was positively related to fear of COVID-19 and mental distress. The fear of COVID-19 had a positive relationship with mental distress. This study evidenced that HP is a protective factor against pandemics as it improves mental health during a pandemic. However, OP is a risk factor as it amplifies fear of COVID-19. Focusing on distinct types of passion may prove effective in improving mental health amidst the pandemic.

1. Introduction

The coronavirus disease - 2019 (COVID-19)¹ was certified as a pandemic in the past year as new cases steadily increased globally, with 400,000 or more new infections occurring every day (World Health Organization, 2021). While preventive behaviors (e.g., wearing masks, physical distancing, washing hands carefully, refraining from going out) protect us from infection, they also change our lives and negatively impact mental health. Under such restrictions, people may engage in their passion activities in alternative ways or, in some cases, by disregarding the restrictions. Our engagement with passionate activities can affect our mental health during a pandemic. The present research examines the relationships among fear of COVID-19, mental health, and passion, as defined by the DMP (Vallerand, 2015; Vallerand et al., 2003).

1.1. Dualistic model of passion

The Dualistic Model of Passion (DMP) (Vallerand, 2015; Vallerand et al., 2003), defines passion as a strong inclination or desire toward a

self-defining activity that one likes (or even loves) and considers important, and in which one invests time and energy. The DMP distinguishes between two types of passions: harmonious and obsessive passion. Harmonious passion (HP) refers to a strong, yet controllable desire to engage in the activity that one loves. The activity is a significant part of their identity but is coherent and well-integrated with other life domains. Individuals do not feel an uncontrollable urge to engage in the passionate activity, but instead freely decide whether to do so.

Contrastingly, obsessive passion (OP) refers to an uncontrollable urge to engage in an activity that one loves. When obsessively passionate, one is egotistically involved in the activity and contingent on factors such as self-esteem and self-worth that fluctuate. Obsessive passion leads to engagement with the cherished activity with a sense of insecurity while perceiving difficulties and challenges as self-threatening. Individuals with OP feel pressured to pursue passionate activity continuously; it is as if they cannot help but engage in it. This rigid engagement can lead to neglecting other life aspects (e.g., family, work, and leisure), thereby creating tensions and conflicts in one's life.

Both HP and OP are associated with a strong commitment to

* Corresponding author.

E-mail address: kubo.takahiro.fn@u.tsukuba.ac.jp (T. Kubo).

¹ **Abbreviations:** COVID-19 - novel coronavirus disease; DMP - Dualistic Model of Passion; HP - harmonious passion; OP - obsessive passion; FCV-19 s - Fear of COVID-19 Scale; DASS - Depression Anxiety Stress Scales; CFI - comparative fit index; TLI - Tucker-Lewis index; RMSEA - root mean square error of approximation; SRMR - standardized root mean squared residual.

<https://doi.org/10.1016/j.paid.2021.111358>

Received 11 April 2021; Received in revised form 21 October 2021; Accepted 22 October 2021

Available online 27 October 2021

0191-8869/© 2021 Elsevier Ltd. All rights reserved.

performing an activity (Vallerand et al., 2003). However, each type of passion leads to vastly different consequences. The HP is positively related to attention, concentration, flow during activity engagement, positive influence, high-quality relationships, and good mental health. Meanwhile, OP is positively related to negative influence, conflict, and rumination. Simultaneously, it is either unrelated or negatively related to concentration, positive affect, and poor mental health (see Vallerand, 2015, for a review). These two types of passion may impact mental health differently, in stressful pandemic situations.

1.2. Fear of COVID-19

Fear of COVID-19 is an essential psychological factor in the current pandemic scenario (Masuyama et al., 2020). Fear is an unpleasant emotional state arising spontaneously in the face of danger (de Hoog et al., 2008; Öhman & Mineka, 2001). It is an adaptive defense mechanism that is fundamental for survival and involves several biological preparation processes to respond to potentially threatening events such as pandemics (Ornell et al., 2020). However, if fear becomes chronic or unbalanced, it can be detrimental, leading to various psychological problems (Garcia, 2017). Fear and distorted risk perceptions have been associated with various public mental health concerns, including distress reactions, health risk behaviors, mental health disorders, and perceived poor health (Shigemura et al., 2020). In general public, pregnant women and their spouses, and health care providers, increased fear of COVID-19 can lead to various mental health problems, including psychological distress and trauma (Ahorsu, Imani, et al., 2020; Fitzpatrick et al., 2020; Khattak et al., 2020). Although fear is a limited contributor to people's preventive intentions, we should not ignore its adverse effects on individuals and society (Huang et al., 2020). Past research has indicated that identifying fears along with its severe mental health impact can help predict mental illness (Asselmann et al., 2014).

1.3. Passion, fear of COVID-19 and mental health

In a pandemic, people are exposed to various stresses. Fear of the disease itself is often the primary stress associated with a pandemic. The heightened fear of COVID-19 can impact one's mental health negatively. Therefore, there is a need to gain insight into the protective psychological factors against the negative impact brought about by the ongoing pandemic (Kubo et al., 2021). We believe that one such factor is passion, and, more specifically, the two types of passion mentioned above. Since individuals tend to engage in their favorite activities during a pandemic to abide by the restrictions, the type of passions they experience for those activities could affect their fear of the disease and their mental health.

Depending on the type of passion, an individual's fear of COVID-19 may be diminished or amplified, leading to different consequences on psychological distress. HP, which results from autonomous internalization (Vallerand, 2015), should allow people to perceive ongoing experiences with openness and a desire to interpret them accurately, leading to positive outcomes (Hodgins & Knee, 2002). Contrarily, OP, which results from controlled internalization (Vallerand, 2015), promotes a defensive mode of functioning that results in becoming preoccupied and over-identifying with one's emotions and leads to experiences that pose a threat to the self (Hodgins & Knee, 2002). For example, HP leads to the use of adaptive coping for worry in the domain of sports, while OP leads to the use of maladaptive coping (Verner-Filion et al., 2014). Furthermore, it has been pointed out that in certain stressful situations such as injuries (Rip et al., 2006) and failures (Schellenberg et al., 2016), HP is more likely to lead to adaptive outcomes through accurate perception of the situation, while OP is more likely to lead to maladaptive outcomes through amplification of negative emotions and inappropriate evaluations of the situation. Thus, HP can be expected to promote adaptive perceptions of the fear of infectious diseases and to reduce mental distress, while OP may lead to the maladaptive perception of the fear of

COVID-19, causing mental distress.

The association between passion and mental health may be explained by the results hypothesized regarding the two types of passion. HP is hypothesized to lead to repeated positive affective experiences in the activity that spill over into one's life in general while preventing the experience of negative affect and psychological conflict (Vallerand, 2012). Meanwhile, OP is hypothesized to minimize the experience of positive affect and psychological well-being and to even facilitate negative affect, conflict with other life activities, and psychological ill-being (Vallerand, 2012). These two types of passions function in opposing ways through activities and can have a completely different impact on mental health. In the context of our work, HP and OP is negatively and positively associated with mental distress, respectively (Forest et al., 2011). Equivalent results can be expected in the context of a pandemic.

1.4. The present research

Based on the DMP (Vallerand et al., 2003), the present research aimed to examine the role of types of passions in the context of fear of COVID-19 and mental health. Therefore, we hypothesized that HP would have no association or a negative association with fear of COVID-19 and with mental distress (Hypothesis 1). Second, we hypothesized that OP will be positively associated with fear of COVID-19 and with mental distress (Hypothesis 2). Third, we hypothesized that fear of COVID-19 will have a positive relationship with mental distress (Hypothesis 3).

2. Materials and methods

2.1. Participants

For this study, we used a Japanese survey dataset from the Resilience to COVID-19 in each region (RE-COVER) project (Sugawara et al., in press). The survey dataset aimed to explore the psychological resilience of mental health during the COVID-19 pandemic. It was conducted on October 20, 2020, using an online survey form hosted by Questant (<https://questant.jp>). The survey recruited participants through the website and targeted the Japanese population over 18 years of age. It included 322 Japanese individuals (147 men, 45.7%; 167 women, 51.9%; 8 unknown, 2.5%) and comprised various psychological measures (e.g., Fear of COVID-19 Scale, Depression Anxiety Stress Scales, and Passion Scale). The participants' mean age was 38.72 years (standard deviation = 9.13; range = 19–66 years). At the time of the survey, there were approximately 93,480 people infected with COVID-19 in Japan and approximately 1676 related deaths. Ethics approval was obtained from our university ethics board before this study began, and all participants provided informed consent. The study design and procedures were in accordance with the principles of the Declaration of Helsinki.

2.2. Measures

2.2.1. Fear of COVID-19 scale

The FCV-19S (Ahorsu, Lin, et al., 2020) was used to assess the fear of COVID-19 among people. In this study, we used the Japanese version of FCV-19S, validated by Masuyama et al. (2020), with sufficient reported reliability. Participants respond to each item on a 4-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). A higher score indicated a greater fear of COVID-19. In this study, the total scores were used in the analysis. All items showed high internal consistency ($\alpha = 0.87$).

2.2.2. Passion scale

The Passion Scale (Marsh et al., 2013; Vallerand, 2015), measures passion for a particular activity. This scale is divided in the following two parts: 1) Two 6-item subscales assessing HP (e.g., "This activity is in

harmony with other activities in my life”) and OP (e.g., “I have difficulties controlling my urge to do this activity”), and 2) Five items assessing the extent to which participants have a passion for the activity; it simply consists of “criterion items” dealing with the definition of passion. Participants were asked to think about their favorite activities and answer the questionnaire. We used the Japanese version of the Passion Scale, validated by Kubo and Sawamiya (2018), with sufficient reported reliability. Items were rated using a scale ranging from 1 (*do not agree at all*) to 7 (*very strongly agree*). In this study, the total scores for each subscale item were used in the analysis. Both factors showed high internal consistency (HP: $\alpha = 0.79$; OP: $\alpha = 0.83$).

2.2.3. DASS-21

The Japanese version of the DASS (Lovibond & Lovibond, 1995), was used to assess multiple aspects of mental health. In previous research, the scale was used to measure general public's mental health under pandemic conditions (Wang et al., 2020). The Japanese scale comprises 21 items of the original DASS and is divided into three subscales: depression, anxiety, and stress (7 items each). Participants respond to each item on a 4-point scale ranging from 1 (*did not apply to me at all*) to 4 (*applied to me very much, or most of the time*). In this study, the total scores for each subscale item were used in the analysis. The higher the score, the greater the psychological distress. The overall scales showed high internal consistency ($\alpha = 0.85$).

2.3. Data analysis

We evaluated the hypothesized model using structural equation modeling (SEM) using IBM SPSS Statistics 23 (IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.) and IBM SPSS Amos Version 23 (IBM SPSS Amos for Windows, Version 23.0. Armonk, NY: IBM Corp.) with maximum likelihood estimation.

In the case of passion, fear of COVID-19, and mental distress, a parceling approach was employed, given that these latent variables were assessed with many items which could bias the ratio of the sample size to the number of estimated parameters, and in turn lead to less reliable results. We created parcels for the passion construct by aggregating the item with largest loading on a factor with the item with the smallest loading (Little et al., 2002). This procedure is acceptable in the case of the Passion Scale (Tóth-Király et al., 2019). Additionally, using a facet-representative approach (Little et al., 2002), the fear of COVID-19 and mental distress were modeled with each subscale being averaged (given the presence of a higher-order factor). Two indicators were created for fear of COVID-19 based on previous studies in Japan (Masuyama et al., 2020), and three indicators were created for mental distress based on the three subscales of the DASS, namely depression, anxiety, and stress. The following fit indices were given priority in model evaluation: the CFI, TLI, RMSEA, and SRMR. For good model fit, the CFI and TLI should be 0.90 or higher, while the RMSEA and SRMR should be 0.06, or lower (Kline, 2011; Tabachnick & Fidell, 2007).

3. Results

3.1. Preliminary analyses

3.1.1. Passionate vs. non-passionate

The difference between passionate and non-passionate activity has been determined according to the score obtained on the five “criterion items” assessing the degree of passion (Chamarro et al., 2015). Individuals whose mean score on the passion criteria were situated at midpoint or above were classified as passionate (Mageau et al., 2009). In the present study, a total score of 20 or more for passion criteria was considered to be passionate. The descriptive statistics for the passion criterion in all samples were $M = 23.93$, $SD = 6.55$. A total of 239 participants (104 men, 43.5%; 134 women, 56.1%; 1 unknown, 0.4) were considered passionate about their favorite activity (74% of the

total sample). The other 83 individuals did not meet the criteria and were excluded from the analysis.

3.1.2. Passionate activities

We categorized activities mentioned by the participants. According to the classification by previous studies (Balon et al., 2013), a different category had to be added to the ones in order to represent the diversity of our participants' response patterns. The most popular categories were passive leisure, such as watching movies or listening to music; relational activities such as going out with friends or spending time with family; multimedia such as surfing on the Internet or playing video games (Table 1). Table 1 helps us understand the various activities people engaged in and developed a passion for this pandemic.

3.1.3. Descriptive and correlational analyses

Descriptive statistics and correlations of passion, fear of COVID-19, and mental distress are presented in Table 2. HP was negatively associated with mental distress. OP was positively associated with fear of COVID-19 and mental distress. Fear of COVID-19 was positively associated with the mental distress.

3.2. Main analysis

As shown in Fig. 1, all but one of the hypothesized paths reached statistical significance at the $p < .05$ level. Fit indices suggested that the hypothesized model had a good fit to the data ($\chi^2 = 125.725$, $df = 38$, TLI = 0.901, CFI = 0.931, SRMR = 0.065, RMSEA = 0.098). As expected, HP did not relate to fear of COVID-19 ($\beta = 0.00$; *n.s.*) and showed a negative relationship with DASS ($\beta = -0.17$; $p < .01$), thus supporting Hypothesis 1. Further, OP was positively related to fear of COVID-19 ($\beta = 0.28$; $p < .01$) and to mental distress ($\beta = 0.15$; $p < .01$), thereby fully supporting the second hypothesis. Consistent with Hypothesis 3, there was a positive association between fear of COVID-19 and mental distress ($\beta = 0.31$; $p < .01$).

4. Discussion

Our study was conducted in Japan to determine the role of the two types of passion on mental health as individuals are exposed to stress during a pandemic, specifically the fear of COVID-19. Overall, HP for favorite activities was not associated with fear of COVID-19, but it was protective against psychological distress. On the other hand, OP for favorite activities amplified fear of COVID-19 and psychological distress. Furthermore, as expected, fear of COVID-19 was shown to be a risk factor for psychological distress.

Table 1
Classification of passionate activities.

Activities	Types of activities	Percentage of participants
1. Passive leisure	Watching movies and/or series, cinema, watching sports, listening to music, etc.	22.6
2. Relational activities	Going out with friends, having a drink, spending time with family, etc.	13.0
3. Multimedia	Surfing on the Internet, playing video games, etc.	11.7
4. Individual sports	Walking, jogging, strength training, yoga, running, etc.	10.0
5. Reading	Reading novels, etc.	10.0
6. Miscellaneous	Shopping, eating, relaxing alone, etc.	10.0
7. Work/education	Studying, doing work, etc.	5.4
8. Art activities	Knitting, drawing, etc.	5.0
8. Activities with animals	Spending time with pets, playing with dogs and cats, etc.	5.0
9. Cooking	Cooking, baking bread, making sweets, etc.	4.2
10. Active music	Singing, playing piano, etc.	3.3
11. Team sports	Volleyball.	0.4

Table 2
Descriptive statistics and correlations.

		M	SD	N	Skewness	Kurtosis	1	2	3	
1	Harmonious passion	28.40	6.82	239	-0.18	-0.30				
2	Obsessive passion	19.95	8.60	239	0.26	-0.82	0.12			
3	Fear of COVID-19	19.60	5.57	239	0.01	-0.23	0.10	0.15	*	
4	Mental distress	31.67	10.84	239	1.36	1.64	-0.17	**	0.20	**

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

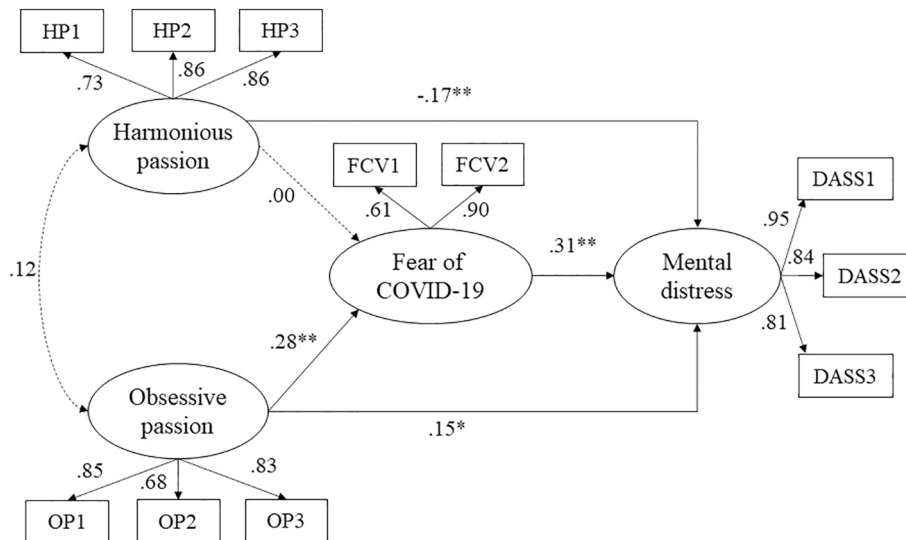


Fig. 1. Standardized relationships between passion varieties, Fear of COVID-19 varieties, and mental distress. * $p < .05$, ** $p < .01$.

The current research contributes to the literature on passion and COVID-19. This study provided new insights into the relationship between passion and fear of COVID-19. In stressful situations such as injury (Rip et al., 2006) or experiences involving failure (Schellenberg et al., 2016), individuals who experience HP are more open to experience, which allows them to try to perceive the stressor accurately (Hodgins & Knee, 2002; Vallerand, 2015). In the light of this, it is possible that those with higher HP did not overestimate their fear of COVID-19 and thus did not show this association. Meanwhile, individuals who experience OP may not be able to cope with stress appropriately because here, stress triggers defensive psychological processes that overestimate the threat to themselves (Hodgins & Knee, 2002; Vallerand, 2015). During a pandemic, this defensive psychological process may have amplified the fear of COVID-19 in people with high OP. In addition, since OP tends to use avoidance coping that amplifies anxiety (Verner-Filion et al., 2014), it is possible that engaging in activities to alleviate the fear of COVID-19 may have augmented this fear.

We also provided evidence that passion plays a significant role in maintaining and improving mental health during the pandemic. In our study, HP was associated with lower mental distress and OP with higher mental distress; HP is assumed to amplify relatively positive experiences through favorite activities, while OP is assumed to amplify relatively negative experiences (Vallerand, 2012). This association between passion and mental health has been observed in the work domain as well (Forest et al., 2011). These findings indicate that passion may play a vital role in mental health, even in inconvenient situations such as pandemics. In addition, the fact that a general decline in mental health has been observed in crises emphasizes the need to clarify its protective factors (Kubo et al., 2021). Focusing on the type of passion may lead to an understanding of the individual's mental health state for improvement in the face of major future crises.

An association between fear of COVID-19 and psychological distress

was also found, which supports previous studies (Ahorsu, Imani, et al., 2020; Fitzpatrick et al., 2020; Khattak et al., 2020). This finding indicates that during a pandemic, fear of the disease may be a major stressor that needs to be addressed to avoid a decline in mental health. As with passion, there is a need to identify factors that mitigate the major stress of a pandemic.

Furthermore, regarding obsessive passion, there were both indirect and direct effects on mental health through fear of COVID-19. The indirect impact suggests that people with obsessive passions may be stressed by the fear of infectious diseases, which may deteriorate their mental health. Contrarily, the direct impact was consistent with previous studies (Forest et al., 2011), suggesting that obsessive passion can affect mental distress independently of the pandemic.

5. Limitations

Some limitations of the present study should be noted. First, this was a cross-sectional study. Future research could strengthen the present findings by using a longitudinal design. Second, the data were derived from self-report questionnaires. These findings can be strengthened by the addition of multiple methods of data collection, such as home, classroom, workplace, or laboratory observations. Third, while we conducted our study on diverse age participants and with different passionate activities, caution must be taken when generalizing the results to older participants or those who are passionate about a particular activity.

6. Conclusion

This study sought to examine the relationship between passion (Harmonious and Obsessive), fear of COVID-19, and mental health. The results show that HP negatively related with mental distress, while OP

positively related with fear of COVID-19 and mental distress. The results suggest that during a pandemic, people with high HP can reduce their mental distress through their favorite activities. However, people with high OP perceive a higher fear of COVID-19, and at the same time are more likely to feel mental distress. Therefore, it may be necessary to focus on the type of passions in order to address the fear of COVID-19 and other mental health issues.

Declaration of competing interest

None.

Acknowledgments

We would like to thank Editage (www.editage.com) for English language editing.

Funding

This study was partly supported by Research Support Program to Apply the Wisdom of the University to tackle COVID -19 Related Emergency Problems, University of Tsukuba.

CRedit authorship contribution statement

Study planning: Author 1, 2, 3, Data analysis: Author 1, 2, Writing manuscript: Author 1, Review and editing: Author 2, 3.

References

- Ahorsu, D. K., Imani, V., Lin, C. Y., Timpka, T., Broström, A., Updegraff, J. A., & Pakpour, A. H. (2020). Associations between fear of COVID-19, mental health, and preventive behaviours across pregnant women and husbands: An actor-partner interdependence modelling. *International Journal of Mental Health and Addiction*, 1–15. <https://doi.org/10.1007/s11469-020-00340-x>
- Ahorsu, D. K., Lin, C. Y., Imani, V., Saffari, M., Griffiths, M. D., & Pakpour, A. H. (2020). The fear of COVID-19 scale: Development and initial validation. *International Journal of Mental Health and Addiction*, 1–9. <https://doi.org/10.1007/s11469-020-00270-8>
- Asselmann, E., Wittchen, H. U., Lieb, R., Höfler, M., & Beesdo-Baum, K. (2014). Associations of fearful spells and panic attacks with incident anxiety, depressive, and substance use disorders: A 10-year prospective-longitudinal community study of adolescents and young adults. *Journal of Psychiatric Research*, 55, 8–14. <https://doi.org/10.1016/j.jpsychires.2014.04.001>
- Balon, S., Lecoq, J., & Rimé, B. (2013). Passion and personality: Is passionate behaviour a function of personality? *European Review of Applied Psychology*, 63(1), 59–65. <https://doi.org/10.1016/j.erap.2012.06.001>
- Chamarro, A., Penelo, E., Fornieles, A., Oberst, U., Vallerand, R. J., & Fernández-Castro, J. (2015). Psychometric properties of the Spanish version of the passion scale. *Psicothema*, 27(4), 402–409. <https://doi.org/10.7334/psicothema2015.80>
- de Hoog, N., Stroebe, W., & de Wit, J. B. F. (2008). The processing of fear-arousing communications: How biased processing leads to persuasion. *Social Influence*, 3(2), 84–113. <https://doi.org/10.1080/15534510802185836>
- Fitzpatrick, K. M., Harris, C., & Drawve, G. (2020). Fear of COVID-19 and the mental health consequences in America. *Psychological Trauma: Theory, Research, Practice and Policy*, 12(Suppl. 1), S17–S21. <https://doi.org/10.1037/tra0000924>
- Forest, J., Mageau, G. A., Sarrazin, C., & Morin, E. M. (2011). 'Work is my passion': The different affective, behavioral, and cognitive consequences of harmonious and obsessive passion toward work. *Canadian Journal of Administrative Sciences/revue Canadienne des sciences de l'administration*, 28(1), 27–40. <https://doi.org/10.1002/cjas.170>
- García, R. (2017). Neurobiology of fear and specific phobias. *Learning and Memory*, 24(9), 462–471. <https://doi.org/10.1101/lm.044115.116>
- Hodgins, H. S., & Kneeb, C. R. (2002). The integrating self and conscious experience. In E. L. Deci, & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 87–100). University of Rochester Press.
- Huang, F., Ding, H., Liu, Z., Wu, P., Zhu, M., Li, A., & Zhu, T. (2020). How fear and collectivism influence public's preventive intention towards COVID-19 infection: A study based on big data from the social media. *BMC Public Health*, 20(1), 1707. <https://doi.org/10.1186/s12889-020-09674-6>
- Khattak, S. R., Saeed, I., Rehman, S. U., & Fayaz, M. (2020). Impact of fear of COVID-19 pandemic on the mental health of nurses in Pakistan. *Journal of Loss and Trauma*, 1–15. <https://doi.org/10.1080/15325024.2020.1814580>
- Kline, R. B. (2011). *Methodology in the social sciences. Principles and practice of structural equation modeling* (3rd ed.). New York: Guilford Press.
- Kubo, T., & Sawamiya, Y. (2018). Reliability and validity of the Japanese version of the passion scale. *Japanese Journal of Psychology*, 89(5), 490–499. <https://doi.org/10.4992/jjpsy.89.17205>
- Kubo, T., Sugawara, D., & Masuyama, A. (2021). The effect of ego-resiliency and COVID-19-related stress on mental health among the Japanese population. *Personality and Individual Differences*, 175, Article 110702. <https://doi.org/10.1016/j.paid.2021.110702>
- Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling*, 9, 151–173. <https://doi.org/10.1207/s15328007sem0902.1>
- Lovibond, S. H., & Lovibond, P. F. (1995). *Manual for the depression anxiety stress scales* (2nd ed.). Sydney: Psychology Foundation.
- Mageau, G. A., Vallerand, R. J., Charest, J., Salvy, S. J., Lacaille, N., Bouffard, T., & Koestner, R. (2009). On the development of harmonious and obsessive passion: The role of autonomy support, activity specialization, and identification with the activity. *Journal of Personality*, 77(3), 601–646. <https://doi.org/10.1111/j.1467-6494.2009.00559.x>
- Marsh, H. W., Vallerand, R. J., Lafrenière, M. A., Parker, P., Morin, A. J. S., Carbonneau, N., & Paquet, Y. (2013). Passion: Does one scale fit all? Construct validity of two-factor passion scale and psychometric invariance over different activities and languages. *Psychological Assessment*, 25(3), 796–809. <https://doi.org/10.1037/a0032573>
- Masuyama, A., Shinkawa, H., & Kubo, T. (2020). Validation and psychometric properties of the Japanese version of the fear of COVID-19 scale among adolescents. *International Journal of Mental Health and Addiction*, 1–11. <https://doi.org/10.1007/s11469-020-00368-z>
- Öhman, A., & Mineka, S. (2001). Fears, phobias, and preparedness: Toward an evolved module of fear and fear learning. *Psychological Review*, 108(3), 483–522. <https://doi.org/10.1037/0033-295X.108.3.483>
- Ornell, F., Schuch, J. B., Sordi, A. O., & Kessler, F. H. P. (2020). 'Pandemic fear' and COVID-19: Mental health burden and strategies. *Revista Brasileira de Psiquiatria*, 42(3), 232–235. <https://doi.org/10.1590/1516-4446-2020-0008>
- Rip, B., Fortin, S., & Vallerand, R. J. (2006). The relationship between passion and injury in dance students. *Journal of Dance Medicine and Science*, 10(1–2), 14–20.
- Schellenberg, B. J., Bailis, D. S., & Mosewich, A. D. (2016). You have passion, but do you have self-compassion? Harmonious passion, obsessive passion, and responses to passion-related failure. *Personality and Individual Differences*, 99, 278–285. <https://doi.org/10.1016/j.paid.2016.05.003>
- Shigemura, J., Ursano, R. J., Morganstein, J. C., Kurosawa, M., & Benedek, D. M. (2020). Public responses to the novel 2019 coronavirus (2019-nCoV) in Japan: Mental health consequences and target populations. *Psychiatry and Clinical Neurosciences*, 74(4), 281–282. <https://doi.org/10.1111/pcn.12988>
- Sugawara, D., Gu Y., Masuyama, A., Ng Y., Evone, P.Y.M., Arifrah, R., ..., Tee, E.Y.J. (in press). RE-COVER project: Survey on resilience, mental health, and fear of Covid-19 in four countries. BMC Research Notes.
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston, MA: Allyn & Bacon/Pearson Education.
- Tóth-Király, I., Bóthe, B., Márki, A. N., Rigó, A., & Orosz, G. (2019). Two sides of the same coin: The differentiating role of need satisfaction and frustration in passion for screen-based activities. *European Journal of Social Psychology*, 49(6), 1190–1205. <https://doi.org/10.1002/ejsp.2588>
- Vallerand, R. J. (2012). The role of passion in sustainable psychological well-being. *Psychology of Well-Being: Theory, Research and Practice*, 2(1), 1–21. <https://doi.org/10.1186/2211-1522-2-1>
- Vallerand, R. J. (2015). Series in positive psychology. In *The psychology of passion: A dualistic model*. <https://doi.org/10.1093/acprof:oso/9780199777600.001.0001>
- Vallerand, R. J., Blanchard, C., Mageau, G. A., Koestner, R., Ratelle, C., Léonard, M., & Marsolais, J. (2003). Les passions de l'âme: On obsessive and harmonious passion. *Journal of Personality and Social Psychology*, 85(4), 756–767. <https://doi.org/10.1037/0022-3514.85.4.756>
- Verner-Filion, J., Vallerand, R. J., Donahue, E. G., Moreau, E., Martin, A., & Mageau, G. A. (2014). Passion, coping, and anxiety in sport: The interplay between key motivation and self-regulatory processes. *International Journal of Sport Psychology*, 45(6), 516–537. <https://psycnet.apa.org/record/2015-16617-002>
- Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. (2020). Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *International Journal of Environmental Research and Public Health*, 17(5), 1729. <https://doi.org/10.3390/ijerph17051729>
- World Health Organization. (2021). Coronavirus disease (COVID-2019) situation reports. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports>. (Accessed 14 March 2021).