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## Short Communication

## Creativity is associated with higher well-being and more positive COVID-19 experience

Marina Fiori<sup>\*</sup>, Silke Fischer, Antje Barabasch

Swiss Federal University for Vocational Education and Training, Zollikofen, Switzerland



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## ABSTRACT

We investigated whether creativity is associated with higher well-being and more positive COVID-19 experience. Participants ( $N = 252$ ) filled out a creativity measure during the COVID-19 pandemic, they rated their positive affect and stress experience in the last month, their satisfaction with life, and indicated the extent to which they perceived COVID-19 as a positive experience. More creative individuals were more satisfied with their lives after controlling for perceived stress and personality. Results of a serial mediation showed that creativity fostered more positive emotions, which lowered perceived stress, which then led to a more positive COVID-19 experience. Findings add to the literature showing the beneficial effects of creativity on well-being, and point to the utility of introducing interventions that would promote creative thinking to improve quality of life and resilience to life adversities.

## 1. Introduction

Creative thinking, or the ability to generate new ideas for solving complex tasks, including practical and life-related issues, is among the skills required for the 21st century (ILO, 2021). Although there is a lack of agreement regarding how to define creativity, in Psychology it is widely accepted that a creative idea should be both novel and useful (Simonton, 2012). Differently from intelligence, which usually refers to analytical skills, creativity refers to generating ideas and behaviors in new or familiar situations. Creative potential is the latent ability of an individual to create something original when given the opportunity (Lubart et al., 2003); this component is distinct from creative achievement, which is the potential reflected in creative behaviors and products (Sordia et al., 2019).

Creativity can be measured in different ways. In the production-based approach individuals are asked to produce creative work, for example by drawing. Resource-based procedures measure characteristics such as divergent thinking, or personality traits related to openness to experience (Lubart et al., 2013). Self-assessment can also be employed to measure an individual's creative self-perception and self-efficacy. This type of assessment is deemed to capture explicit creativity, or past efforts in engaging in creative activities and interest in doing so in the future (McAleer et al., 2020).

## 1.1. Creativity and well-being

Creativity is often considered as an asset in everyday life or at work; findings show that it may also significantly impact health and well-being. Visual art production was associated with stronger connectivity of the frontal and parietal cortices, which then predicted higher psychological resilience 10 weeks later (Bolwerk et al., 2014). In addition, men with higher creativity, as measured with the openness personality factor, live longer: one standard deviation in creativity reduces mortality risk of 12% (Turiano et al., 2012). Creativity was also found to be positively associated with perceived well-being after controlling for the effect of perceived stress and demographic variables in both working adults and undergraduates (Tan et al., 2021).

The first goal of the current study is to replicate the effect of creativity on well-being by accounting not only for the effect of stress, but also of other well-known predictors of well-being, namely personality traits. Indeed, a recent meta-analysis shows that 46% of the observed variance in well-being may be explained by personality traits, in particular neuroticism, extraversion and conscientiousness (Anglim et al., 2020).

<sup>\*</sup> Corresponding author at: Swiss Federal University for Vocational Education and Training, Lausanne, Switzerland.

E-mail address: [marina.fiori@hefp.swiss](mailto:marina.fiori@hefp.swiss) (M. Fiori).

1.2. Creativity and the association with COVID-19 experience: potential mediating mechanisms

The COVID-19 pandemic is an unprecedented event that has affected most individuals on the planet. It is especially in times of uncertainty and crisis that more creative individuals may benefit the most from their ability to come up with new ways to arrange life and work that would help them staying healthy, productive, and resilient. Several studies have pointed out which individual differences may be associated with stronger resilience and better recovery from the pandemic. For example, optimism and humor were associated with higher well-being during the COVID-19 lockdown both directly and indirectly by way of COVID-19 fear and work-family interface (Reizer et al., 2022).

The second goal of this study is to investigate creativity as an individual difference associated with more positive COVID-19 experience. We analyzed the role of two mechanisms that might play a role in explaining this association: positive affect and perceived stress. We know that creativity may induce positive affect as a consequence: individuals who find creative solutions report to be proud, relieved, and happy for their achievements (Amabile et al., 2005). Being creative may also lead to perceiving a situation as less stressful, for example because individuals are engaging in activities that make them feel more capable to cope with the stressful situation (e.g., Tan et al., 2021). Hence, positive affect and stress may be conceived as the mediating mechanisms through which creativity exerts positive effects on the COVID-19 experience.

1.3. The present study

We aimed to: 1) test whether creativity is associated with subjective well-being, controlling for perceived stress and personality; and 2) investigate whether creativity may lead to more positive COVID-19 experience by way of two mediating mechanisms: positive affect and perceived stress. We expected that individuals with higher creativity would have higher satisfaction with life, controlling for their level of stress and their personality traits (Hypothesis 1). We also expected that both positive affect (Hypothesis 2a) and perceived stress (Hypothesis 2b) would mediate the relationship between creativity and the COVID-19 experience. In addition, we tested the hypothesis of a serial mediation in which higher creativity would be associated with more positive affect, which would then lower perceived stress, finally leading to a more positive outlook on the COVID-19 experience (Hypothesis 2c).

2. Method

2.1. Participants and procedure

Participants were 252 French speaking adults (age range 18–76). The sample size employed appeared sufficient to achieve 0.80 power in a mediation model with medium-low effect sizes for the *a* and *b* path (Fritz & MacKinnon, 2007). Mean age was *M* = 39.89, *SD* = 13.71. The composition of the sample was: 67.5% females, 32.1% males; 0.4% did not report any answer. Their professional status was: 9.9% students, 63.1% employed, 9.9% unemployed and 17.1% retired. The data were collected in April 2021 during the COVID-19 lockdown through an online survey distributed by Qualtrics, a platform for recruitment of participants. Participants were remunerated 7.30 euros for their participation, including Qualtrics service fee.

2.2. Measures

We employed the Innovativeness Scale to measure creativity. This 13-item scale measures self-perceptions related to being innovative (Zhou & George, 2001). Participants indicate on a 5-point Likert scale how much each item, such as “I often have new and innovative ideas”, applies to them. Cronbach's alpha was 0.93. The Positive and Negative

Table 1 Mean, standard deviation (SD) and correlations of the study variables.

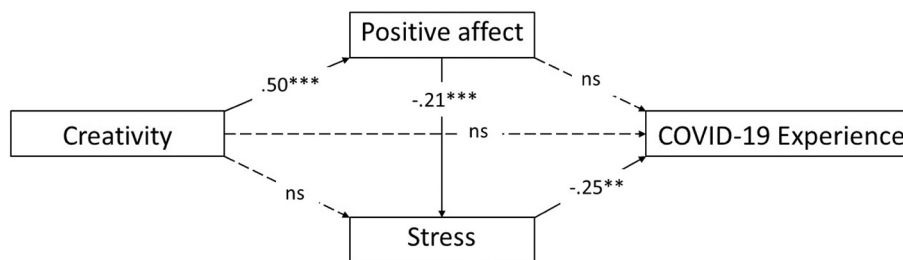
	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age	39.89	13.71	1												
2. Sex	1.68	0.48	-0.16*	1											
3. Creativity	3.37	0.72	0.11	-0.11	1										
4. Positive affect	3.10	0.65	0.07	-0.08	0.60**	1									
5. Negative affect	2.21	0.71	-0.28**	0.15*	-0.13*	-0.15*	1								
6. Satisfaction with life	4.29	1.29	0.14*	-0.11	0.32**	0.43**	-0.36**	1							
7. Stress	13.66	3.87	-0.24**	0.19**	-0.23**	-0.35**	0.67**	-0.60**	1						
8. COVID_experience	1.29	0.76	-0.01	-0.08	0.05	0.12	-0.16*	0.05	-0.23**	1					
9. Extraversion	3.83	1.32	0.18**	0.11	0.38**	0.38**	-0.18*	0.27**	-0.24**	-0.05	1				
10. Agreeableness	5.08	1.02	0.14*	0.10	0.12	0.15*	-0.28**	0.01	-0.17**	-0.18**	0.18**	1			
11. Conscientiousness	5.61	1.08	0.11	0.06	0.12	0.19**	-0.21**	0.13*	-0.20**	0.07	0.35**	1			
12. Emotional stability	4.21	1.26	0.14*	-0.21**	0.26**	0.28**	-0.50**	0.32**	-0.53**	0.20**	0.38**	0.33**	1		
13. Openness	4.89	1.18	-0.05	0.03	0.52**	0.33**	-0.08	0.02	-0.04	0.32**	0.13*	0.14*	0.13*	1	

Note: \* *p* < .05, \*\* *p* < .01.

**Table 2**

Hierarchical regression (N = 252): the contribution of control variables (Block 1) and of creativity (Block2) to satisfaction with life scale.

		B	Std. error	$\beta$	t	p	95.0% confidence interval for B	
							Lower bound	Upper bound
Block 1	Age	-0.002	0.006	-0.024	-0.438	0.662	-0.013	0.008
	Sex	-0.069	0.161	-0.024	-0.431	0.667	-0.386	0.248
	Extraversion	0.178	0.061	0.168	2.912	0.004	0.057	0.298
	Agreeableness	-0.092	0.081	-0.067	-1.131	0.259	-0.252	0.068
	Conscientiousness	0.059	0.073	0.047	0.818	0.414	-0.084	0.202
	Emotional stability	0.006	0.076	0.006	0.084	0.934	-0.143	0.156
	Openness	-0.063	0.065	-0.053	-0.965	0.336	-0.191	0.065
	Stress	-0.197	0.023	-0.549	-8.642	<0.001	-0.242	-0.152
Block 2	Age	-0.004	0.005	-0.035	-0.655	0.513	-0.014	0.007
	Sex	0.005	0.157	0.002	0.034	0.973	-0.304	0.315
	Extraversion	0.122	0.061	0.115	2.013	0.045	0.003	0.242
	Agreeableness	-0.086	0.079	-0.063	-1.084	0.279	-0.241	0.07
	Conscientiousness	0.061	0.07	0.048	0.873	0.383	-0.077	0.2
	Emotional stability	-0.022	0.074	-0.02	-0.301	0.764	-0.168	0.124
	Openness	-0.194	0.071	-0.164	-2.727	0.007	-0.334	-0.054
	Stress	-0.189	0.022	-0.528	-8.53	<0.001	-0.233	-0.146
	Creativity	0.479	0.12	0.249	3.993	<0.001	0.243	0.716
R <sup>2</sup> block 1		0.38						
$\Delta$ R <sup>2</sup> block 2		0.04						



**Fig. 1.** Results of the serial mediation analysis. Standardized coefficients are reported.

Affect Schedule (PANAS; Watson et al., 1988) was employed to measure positive affect. This scale includes a list of 20 feelings and emotions, half positive and half negative, which describe how the person was feeling over the last month. Cronbach's alpha was 0.86 for positive, and 0.88 for negative emotions. The Satisfaction With Life Scale (SWLS, Diener et al., 1985) is a 5 items scale that measures overall evaluation of one's life and is often employed as a general indicator of well-being. Items include: "In most ways my life is close to ideal". Cronbach alpha was 0.91. To measure stress, we employed the short 5-items version of the Perceived Stress Scale (Cohen et al., 1983), which includes questions such as "In the last month, how often have you felt nervous and stressed?". Cronbach's alpha was 0.83. To measure the COVID-19 experience, we selected 9 items from the scale Event Characteristics Questionnaire (Luhmann et al., 2020) and contextualized them to the COVID-19 experience. The items reflected the perception of how negative or positive the COVID-19 experience was, such as "the COVID-19 arrival was a negative event". Cronbach's alpha was 0.86. The overall score, after reverse coding, reflected COVID experience as more negative (lower scores) or more positive (higher scores). Finally, we employed the Ten Item Personality Inventory (TIPI) to measure personality traits, in particular the French validated version (Storme et al., 2016) with two items for each trait. Participants indicate how they consider themselves on a list of adjectives. Test-retest reliability ranged between 0.62 and 0.77 (Gosling et al., 2003).

**3. Results**

Correlations (Table 1) show that individuals who consider themselves as more creative are more extraverted, emotionally stable, and open to experience.

To test the association between creativity and satisfaction with life

(SWLS), we conducted a hierarchical regression (Table 2) in which we first regressed the control variables (age, sex, the Big Five personality traits and perceived stress) on SWLS and then included in a second block self-perceived creativity. The model in block one was significant,  $F(7, 244) = 22.45, p < .001$ . Individuals higher in extraversion and with lower perceived stress reported higher levels of satisfaction with life. The model in block two was also significant,  $F(8, 243) = 22.00, p < .001$ . Creativity predicted higher satisfaction with life after controlling for age, sex, stress, and personality. Although stress, openness and extraversion were also significant predictors, creativity by itself added 4% of unique variance to satisfaction with life, confirming hypothesis 1.

We tested the mediation hypotheses by using the Process Macro by Hayes (2012) and employing personality traits, age and sex as covariates (Supplementary materials S1). The 95% bias-corrected confidence intervals (CIs) were generated employing 10,000 bootstrapping samples. The first regression model (Supplementary materials S1a) testing the association between creativity and positive affect was significant,  $F(7, 244) = 20.3, p < .001, R^2 = 0.40$ . Creativity was the only significant predictor together with the control variable extraversion. The second model testing the association of creativity with perceived stress was also significant (Supplementary materials S1b),  $F(8, 243) = 16.79, p < .001, R^2 = 0.39$ ; creativity was not a significant predictor, but positive affect was. Among the controls agreeableness, emotional stability and age were also significant. The third model (Supplementary materials S1c), included creativity, positive affect and stress as predictors of more positive COVID-19 experience. The overall model was significant,  $F(9, 242) = 3.13, p < .01, R^2 = 0.12$ , with, among the focal predictors, only stress being significant, along with the control variable agreeableness. The results concerning the indirect effects (Supplementary materials S1d) show that neither positive affect nor stress mediated the relationship between creativity and COVID-19 experience, not supporting

hypotheses 2a and 2b. Results support instead hypothesis 2c concerning a serial mediation (Fig. 1): creativity was associated with higher positive affect, which reduced perceived stress, leading to more positive COVID-19 experience. Indeed, the bias-corrected bootstrap confidence interval for the indirect effect creativity→positive affect→stress→COVID-19 experience ( $ab = 0.25$ ) was above zero (0.04 to 0.52).

#### 4. Discussion and conclusions

This study tested the association between creativity, satisfaction with life and more positive COVID-19 experience. More creative individuals were more satisfied with their lives even after accounting for perceived stress and the Big Five personality traits. The positive effect of creativity may be explained by the fact that creative individuals are more ingenious in finding solutions for overcoming life difficulties, which may then make their life experience more interesting and satisfying. Further analysis shows that creativity influenced not only general perceptions of well-being, but also how individuals reacted to a concrete and pervasive experience such as that of the pandemic. However, this effect was indirect and mediated by positive affect, which in turn reduced self-perceived stress, and led to more positive evaluations of the COVID-19 experience, confirming the conceptualization of creativity as an activator of positive consequences.

Results of the current study should be considered in light of a few limitations. First, the study was cross-sectional and no causality relationships may be inferred from results. Future studies might consider using a longitudinal design for establishing causality among variables. In addition, all variables were recorded as self-report measures, which might have inflated their reciprocal association.

Results of this study adds to the literature showing the beneficial effects of creativity on well-being and health (e.g., Tan et al., 2021) and point to the utility of introducing interventions that would foster creative thinking in solving daily hassles to improve quality of life and resilience to life adversities.

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#### CRedit authorship contribution statement

Marina Fiori: conceptualization, data collection, data analysis, writing; Silke Fischer: conceptualization, review & editing; Antje Barbasch: conceptualization, review & editing.

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