PATTERNS OF PSYCHOLOGICAL VULNERABILITIES AND RESOURCES IN ARTISTS AND NONARTISTS

(WORKING PAPER)

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Patterns of psychological vulnerabilities and resources in artists and non-artists

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Abstract

The present study was inspired by Barron's (1963) description of creative individuals as "occasionally crazier, yet adamantly saner" than the general population. As suggested by this description, we hypothesized that some individuals embody a pattern of both psychological vulnerabilities and resources and that this pattern is more likely to be present in artists than non-artists. We analyzed intra-individual patterns of psychological vulnerabilities (anxiety, depression, stress) and resources (psychological well-being, ego-resilience, hope) and identified distinct clusters of individuals, including those expected from the negative correlation between resources and vulnerabilities (high vulnerabilities, low resources; low vulnerabilities, high resources), and also a cluster including both moderately high vulnerabilities and resources. As hypothesized, the cluster with both vulnerabilities and resources had more artists than non-artists. Exploratory analyses showed that creative achievement is predicted by the interaction of high vulnerabilities and resources and that this effect is significant beyond the predictive power of openness to experience and age.

Key words: psychological vulnerabilities, psychological resources, artists, Barron, cluster analysis

[The creative person] “He is both more primitive and more cultured, more destructive and more constructive, occasionally crazier and yet adamantly saner than the average person.” (Barron, 1963, p. 224)

Artists are commonly described as psychologically vulnerable. Much research focused on the relationship between psychopathology and the arts, finding evidence for a higher incidence of affective disorders in artists (Kaufman, 2014; Taylor, 2017). Similarly, when vulnerability is defined as a continuous variable – trait describing a range of typical emotional experiences – artists emerge as more anxious, moody, emotionally changeable, self-conscious, and vulnerable to stress than their non-artist counterparts (Feist, 1998). However, research also shows that hope is a common theme in narratives of artists with mental illness (Sagan, 2015), that ego-resilience increases after art therapy (Jang & Choi, 2012), that artists are motivated by the sense of purpose and growth (Bridgstock, 2005), and that artists tend to have higher life satisfaction than other professionals (Bille, Fjællegaard, Frey, & Steiner, 2013). These are all attributes of psychological resources.

Barron (1963) provocatively described creative individuals as both saner and more insane than the general population. Barron referred to the observation that people he and his colleagues studied were more likely to have both high scores on measures of psychological vulnerabilities – resembling some clinical populations – and also have psychological resources that enabled them to get better after facing difficulties (e.g., they tended to improve after psychotherapy). This description can be empirically addressed using statistical methods of person-centered analyses. Unlike traditional methods based on inter-individual correlations, person-centered methods examine intra-individual patterns of attributes. Although variables are negatively correlated

across individuals, as is the case with psychological vulnerabilities and resources, it can still be possible that for some individuals the variables co-occur.

In the present study, we first empirically test whether it is possible to identify distinct intra-individual patterns of psychological vulnerabilities and resources. We hypothesize that distinct clusters of individuals will be identified so that some individuals are described by a pattern suggested by the negative correlation between vulnerabilities and resources (low vulnerabilities and high resources; high vulnerabilities and low resources) and that a minority is described by an opposite pattern (high vulnerabilities and high resources). Further, we hypothesize that the pattern showing both psychological resources and vulnerabilities will be more common among artists than non-artists. Finally, we conduct exploratory analyses to test whether the interaction between vulnerabilities and resources predicts creative achievement across the whole sample.

Psychological vulnerabilities in artists

Artists have long been described as psychologically vulnerable. A recent meta-analysis found significant and large effects in the prevalence of most types of mood disorders in those pursuing the arts, compared to those not pursuing the arts (Taylor, 2017). Instead of studying psychopathology (i.e., the presence of a mental disorder), we use continuous variables and use the term psychological vulnerability to denote that we do not examine clinical categories or cutoffs for psychopathology. Defined this way, vulnerability is evident in a meta-analysis of personality traits showing that artists are more anxious and emotionally sensitive, than non-artists (Feist, 1998). These traits are in the domain of neuroticism, which is a common vulnerability for clinical disorders such as anxiety, depression, and substance use (Bienvenu, Samuels, Costa, Reti, Eaton, & Nestadt, 2004; Zimbarg et al., 2016).

Artists are susceptible to experiencing negative emotions and depression. Art students report higher levels of negative mood than their psychology and science counterparts (Haller & Courvoisier, 2010; Papworth et al., 2008) and they show cognitive distortions commonly found in depression (negative, pessimistic, or self-deprecating interpretations of hypothetical situations; Papworth et al., 2008). Furthermore, creativity on an artistic task is the highest when participants receive social rejection and have high biological vulnerability to depression measured by levels of an adrenal steroid (Akinola & Mendes, 2008). Visual artists describe the creative process as including a "combination of pain, anxiety, depression, and anguish" (Glaveanu et al., 2013, p. 10). Higher general negative affectivity and depression was also evident in autobiographies of eminent artists when compared to control group of eminent individuals in the domains of political, military, and social leadership (Walker, Koestner, & Hum, 1995).

Furthermore, artists experience higher levels of trait anxiety and stress than non-artists (Marchant-Haycox & Wilson, 1992; Orejudo, Zarza-Alzugaray, Casanova, Rodríguez-Ledo, & Mazas, 2017; Sheldon, 1994; Vaag, Bjørngaard, & Bjerkeset, 2016). In addition to trait anxiety, in-depth interviews show that artists experience anxiety throughout their working process (Glaveanu et al., 2013), from the point of facing a blank canvas to the anxiety about missed possibilities to anxiety about presenting the finished product.

The occupational demands on artists are sources of psychological stress. Artists describe an intense scrutiny and judgement from themselves, audiences/consumers of art, and the arts community (Barker, Soklaridis, Waters, Herr, & Cassidy, 2009). An external source of stress is artists' high job insecurity and unemployment; data from US censuses from 1940 to 2000 show that artists have consistently earned less than other professional workers and were 2-3 times more likely to be unemployed than other professions (Alper & Wassall, 2006). Because of this,

artists report engaging in "survival work" – work of which they are not proud or that is not personally meaningful, but is necessary for economic reasons – which becomes another source of stress (Barker et al., 2009). Negative effects of stress depend on the perception of stressors and evaluations of one's own resources (whether they are seen as a challenge or threat; Folkman, 2013). The next section addresses the research on such psychological resources.

Psychological resources in artists

Artistic activity has also been associated with traits associated with positive outcomes and well-being that can be considered psychological resources. Hope is one of the central themes in interviews with graffiti painters. Awad, Wagoner, and Glaveanu (2017) describe the work of graffiti artist/activists as constructive, future-oriented, and filled with hope, even when they might appear hopeless. Hope also emerged a theme in biographical narratives of artists with mental illness (Sagan, 2015) and interviews with contributors to a senior art exhibition (Fisher & Specht, 1999).

Several aspects of psychological well-being are related to creativity and artistic achievement. Helson and Pals (2001) found that creative achievement was significantly related to personal growth in both its intrapsychic (e.g., tolerance of ambiguity) and psychosocial (e.g., achieving identity integration) components. Creative achievement was measured using the Occupational Creativity Scale (OCS), in which highest ratings were given to those in investigative and artistic professions, with additional points for recognition in one's work. Thus, although this study did not only include artists, artists were among those with high scores on the OCS. Interview studies with artists similarly point to their ability to make meaning and achieve purpose by aiding in the prevention of suffering of future generations (Corley, 2010a, 2010b), as

well as themes of personal growth, autonomy, and competence (Fisher & Specht, 1999; Lindauer, Orwoll, & Kelly, 1997).

Visual art educators describe artists as having the ability to contextualize successes and failures, particularly in the face of work that has much personal investment (Siddins, Daniel, & Johnstone, 2016). This attribute can be described as a trait that Block and Kramen (1996) label ego-resiliency – capacity to successfully adapt to changing demands in one's environment and circumstances. Indeed, art therapy has been shown to increase ego-resiliency in adolescents (Jang & Choi, 2012). In spite of facing difficult job circumstances characterized by high unemployment and low income, artists across 49 countries have higher job satisfaction than non-artists, even after controlling for a host of socioeconomic variables (Bille et al., 2013) and they and remain motivated by the experience of purpose and growth (Bridgstock, 2005).

Toward patterns of psychological vulnerabilities and resources

Psychological vulnerabilities and resources tend to be negative correlated, showing that on the population level higher vulnerabilities, such as depression or anxiety, are related to less psychological well-being (Block & Kramen, 1989; Wood & Joseph, 2010). However, this correlation does not necessarily describe experience for all individuals (Bergman & Magnusson, 1997; Molenaar, 2004; Reizle, 2013). In the psychological literature, most prominently within personality psychology, the term 'types' describes relatively homogeneous groups of individuals, which are characterized by distinct patterns of traits or behavior. Individuals described by a certain type can be identified through cluster analysis methods often called person-centered analyses. Such approaches were used in creativity research to examine domain specificity and different clusters were associated with distinct personality predictors (Ivcevic & Mayer, 2006; Silvia, Kaufman, & Pretz, 2009).

Several lines of research suggest that for some individuals psychological vulnerabilities and resources can co-occur, including research on engagement and burnout, research on the effects of stress, and work on the buffering effects of psychological resources on health. Job demands and resources model (Schafeuli & Taris, 2014) defines burnout as central to the health impairment pathway (vulnerability variable) and engagement central to the well-being pathway (resource variable). Although they are negatively correlated across individuals, person-centered analyses show patterns of engagement and burnout within individuals in which some reflect the pattern predicted by the negative correlation between the variables (high engagement and low burnout, low engagement and high burnout) and also clusters that are similarly high on engagement and burnout (high engagement and high burnout). Similar patterns have also been identified in the context of engagement and burnout at work (Moeller, Ivcevic, White, Menges, & Brackett, 2018) and at school (Salmela-Aro, Moeller, Schneider, Spicer & Lavonen, 2016).

Stress is associated with negative health outcomes when the demands exceed the person's coping abilities, but not when it is deemed controllable using one's personal and social resources (Folkman, 2013; Lazarus & Folkman, 1984). Similarly, psychological resources have a buffering effect on health outcomes, often in groups experiencing substantial challenges. For instance, hope predicts adjustment in patients diagnosed with multiple sclerosis even after controlling for initial adjustment, illness variables, and demographics (Madan & Pakenham, 2014) and trait ego-resilience is associated with less pain-related catastrophizing, controlling for important variables such neuroticism, pain intensity, and age in chronic pain patients (Ong, Zautra, & Reid, 2010).

Collectively, the reviewed research strengthens our hypothesis that it should be possible to identify a group of individuals who show patterns of both psychological vulnerabilities and resources. The question becomes why there would be a relationship between vulnerabilities and

resources and creativity. The diversifying experience model was recently proposed as an integrative framework to explain the association between uncommon life experiences – such as developmental adversity and psychological vulnerabilities or mental illness – and creative accomplishments (Gocłowska, Damian, & Mor, 2018). Diversifying experiences include anything that forces an individual outside of the "normality" defined by the majority culture. Diversifying experiences, such as stress or depression, provide individuals with new perspectives and push them to adapt. The model integrates research on the observed effects of diversifying experiences with the transactional theory of stress (Folkman, 2013; Lazarus & Folkman, 1984). For diversifying experiences to be creativity enhancing, people need to have resources that enable them to respond to the challenges of their circumstances. The model predicts that moderate levels of diversifying experiences are most likely to predict creativity, echoing research on mental health and creativity (Kinney & Richards, 2014) and effects of stressors on creativity (Byron, Kazanchi, & Nazarian, 2010). Although psychological resources have been proposed as moderators in the relationship between diversifying experiences and creativity, this has so far not been empirically tested.

Introduction to the present study

Research questions and hypotheses

Our first research aim is to examine intra-individual patterns of psychological vulnerabilities and resources. We hypothesize that distinct patterns of vulnerabilities and resources can be identified, including patterns of high vulnerabilities and low resources, high resources and low vulnerabilities, but also patterns of resources and vulnerabilities.

Our second research aim is to examine whether there are more artists than non-artists in the group characterized by both relatively high vulnerabilities and resources.

Our third research aim is exploratory in nature and addresses whether the interaction between (moderately high) vulnerabilities and resources predicts creative achievement. Such interaction is predicted by the diversifying experience model, but so far it has not been empirically tested.

Selection of indicators of psychological vulnerabilities and resources

Artistic creativity has been related to affective disorders (Taylor, 2017), suggesting a focus on affective vulnerabilities. Anxiety and depression, as well as susceptibility to stress conceptualized as personality traits load on a single dimension of neuroticism (John, Naumann, & Soto, 2008; Soto & John, 2009; Uliaszek et al., 2009). Neuroticism is a common risk factor for a host of mental disorders (from phobias to generalized anxiety disorder to major depressive disorder; Bienvenu et al., 2004; Zimbarg et al., 2016), as well as a risk factor for physical illness susceptibility (Hampson & Friedman, 2008). Because of this, we chose anxiety, depression, and stress as indicators of psychological vulnerability[1].

There is less consensus about the relevant indicators of psychological resources. Three lines of research were relevant in guiding our choice of indicators, each offering evidence of these variables as resources for psychological and physical health: (1) ego-resilience, (2) psychological well-being, and (3) hope. Ego-resilience predicts flexible change in affective and physiological responses to positive versus negative stimuli (Waugh, Thompson, & Gotlib, 2011), is associated with lower threat appraisal and shorter cardiovascular reactivity (Tugade & Fredrickson, 2004), and protects against the development of depressive symptoms following a traumatic event (Fredrickson, Tugade, Waugh, & Larkin, 2003).

Three decades of research (Ryff, 1989; 2018) show that psychological well-being can be more important in predicting depression than common risk factors, such as illness or disability

(Davison, McCabe, Knight, & Mellor, 2012). Also, psychological well-being is related to markers of physical health (e.g., lower cardiovascular risk, inflammation-related gene expression profiles; Fredrickson et al., 2013; Lindfors & Lundberg, 2002; Ryff, Singer, & Love, 2004). Finally, dispositional hope is a coping resource (Snyder, 1989) that predicts less anxiety and depression, better outcomes after experiencing traumatic events and physical illness, as well as positive outcomes in psychotherapy (Kwon, Birrueta, Faust, & Brown, 2015). Hope also predicts more positive outcomes in the face of illness or negative life experiences, after controlling for a host of relevant variables, such as initial adjustment or symptom severity (Goodman, Disabato, Kashdan, & Machell, 2017; Kashdan et al., 2002; Madan & Pakenham, 2014).

Methods

Participants

Two groups of participants were recruited for the study: visual artists and MTurk workers (participants recruited through the Amazon Mechanical Turk Marketplace for work). We recruited artists from the faculty of the top 55 fine arts schools in the United States, as listed by the US News website in 2017. Artists received emails asking them to participate in the study and directing them to the survey URL hosted on the Qualtrics platform. The recruited artists were working across the domain of visual arts, including ceramics, drawing, painting, sculpture, printmaking, design, crafts, photography, filmmaking, and textile art. Of 2,000 artists solicited electronically, a total of 475 accessed the survey and 309 provided valid data. The artists were between 22 and 78 years of age (M= 48.18, SD= 13.24), 129 identified as men, 175 as women, and 5 listed a different gender identity. Most artists had post-secondary degrees (17.8% had 4-year college degrees, 73.5% had Master's degrees, and 6.8% had doctoral degrees). 78.7% identified as employed, 19.1% as self-employed, and 1.6% as unemployed.

Among the MTurk participants, 415 accessed the link and 343 provided valid data. They were recruited with the following criteria: United States residents, holding a college degree, and no formal education in the arts. The MTurk workers were between 22 and 71 years of age (M= 38.60, SD = 10.38), 170 identified as men, 173 as women. Most held 4-year college degrees or higher (64.7% had 4-year college degrees, 29.2% had Master's degrees, and 4.1% had doctoral degrees). 78.7% identified as employed, 14.9% as self-employed, and 6.4% as unemployed.

Participants were asked to complete their survey in a single session and they received a gift card for their participation.

Measures

Psychological vulnerabilities

Emotional vulnerabilities were assessed with the 21-item version of the Depression, Anxiety, and Stress Scale (Lovibond & Lovibond, 1993). Participants were asked to rate the extent to which they have experienced each symptom over the previous week, on a four-point scale, from "Did not apply to me at all" to "Applied to me very much, or most of the time". Sample items included: depression – "I felt down-hearted and blue", $\alpha = .89$; anxiety – "I felt scared without any good reason", $\alpha = .72$; and stress – "I felt that I was rather touchy", $\alpha = .84$. One item had low correlation with the stress scale total (.126) and it was removed when computing scale scores.

Psychological resources

Ego-Resiliency. We administered the 14-item Ego-Resiliency Scale (Block & Kremen, 1996). Items were rated on a six-point scale (e.g., "I quickly get over and recover from being startled", "I would be willing to describe myself as a pretty strong personality"; $\alpha = .87$).

Psychological Well-being. Six components of psychological well-being were measured with 42 items (Ryff, 1989) rated on a six-point scale: self-acceptance (e.g., "In general, I feel confident and positive about myself"; α = .90), environmental mastery (e.g. "I am quite good at managing the many responsibilities of my daily life"; α = .82), positive relations with others (e.g., "I know that I can trust my friends and they know that they can trust me"; α = .82), personal growth (e.g., "I have a sense that I have developed a lot as a person over time"; α = .76), purpose in life (e.g., "I have a sense direction and purpose in life"; α = .79), and autonomy (e.g., "I am not afraid to voice my opinions, even when they are in opposition to the opinions of most people"; α = .76). Five items had low correlations with their respective scale totals (between .004 and .164) and were removed when computing scale scores.

Hope. We administered the 12-item Hope Scale (Snyder, Harris, Anderson, Holleran, & Irving, 1991), which includes two subscales: agency (e.g., "I energetically pursue my goals"; α = .86), and pathways (e.g., "I can think of many ways to get the things in life that are most important to me"; α = .86). Items were rated on a six-point scale.

Personality traits

The relationship between personality traits, especially openness to experience, and creativity is well documented (Feist, 1998; Ivcevic & Mayer, 2009; Kaufman, 2013). Because this effect is so robust, it is important to show that any individual difference variables hypothesized to predict creativity show effects independent of openness to experience. The Big Five personality traits were assessed with the Ten Item Personality Inventory (TIPI; Gosling, Rethfrow, & Swann, 2003), with two items per trait, one keyed for a high and one keyed for a low end of the dimension. Participants responded using a six-point scale, from 1 (strongly disagree) to 6 (strongly agree). Although the TIPI is commonly scored for the Big Five trait

dimensions, here we present results for single items. Preliminary analyses showed low internal consistency for agreeableness (α = .33) and conscientiousness (α = .51).

Creativity

Creativity was measured with the Creative Achievement Questionnaire (CAQ; Carson, Peterson, & Higgins, 2005), which is one of the most widely used self-reported measures of observable, public creative achievements (Silvia, Wigert, Reiter-Palmon, & Kaufman, 2012). The CAQ assesses achievements in ten creative domains. Because the CAQ includes several artistic creativity domains and only single items for scientific and technology creativity domains, we added specific items within humanities and science (health/medical, social, physical, life sciences, humanities) and technology/engineering (mechanical, electrical, chemical, interdisciplinary engineering). The response options were the same as for the global domain of science in the original CAQ. Following Carson et al. (2005), scores were computed for each domain, and all domain scores were then summed to create a total creative achievement score.

Procedure

Participants accessed the measures on the Qualtrics survey platform. After agreeing to take part in the study, they were first presented the CAQ, followed by the measures of vulnerabilities and resources, personality traits, and demographic information at the end.

Interspersed throughout the measures were six attention checks, each asking participants to select a specific response option (e.g., Please select ‘strongly agree’). An a priori decision was made to exclude those participants who fail more than two attention checks. Out of the 481 artists who accessed the link, 162 had more than two incorrect attention checks and out of the 416 MTurk workers who accessed the link, 70 had more than two incorrect attention checks. Among those who provided valid and complete data, in the artist sample 94 missed one attention

check and 24 missed two attention checks. In the MTurk sample, 23 missed one attention check and 3 missed two attention checks.

Results

The results are organized in four sections. We first present preliminary analyses: descriptive statistics and intercorrelations among the study variables for the two samples, followed by a factor analysis of scale scores for vulnerabilities and resources variables. The research questions are addressed by the following three sections. Our first research aim is addressed using cluster analysis of psychological resources and vulnerabilities. In particular, we are testing whether a distinct cluster can be described by both resources and vulnerabilities. The second research aim – whether there are differences in the number of artists and non-artists across the clusters, especially in the resourced/vulnerable cluster, is addressed using a chi-square test. Finally, the third research aim tests whether the interaction between vulnerabilities and resources predicts creative achievement beyond the personality trait of openness to experience.

Table 1 presents descriptive statistics and mean differences between artist and non-artist samples. We expected the artist sample to have higher creative achievement and higher openness to experience (Feist, 1998; Ivcevic & Mayer, 2009; Kaufman, 2013). Both were supported; creative achievement was substantially higher in artists (d = 1.12), they reported being more "open to experiences, complex" (d = .58), and less "conventional, uncreative" (d = .91) than non-artists. Furthermore, artists reported being more "critical, quarrelsome" (d = .56), which is another trait previously identified in a meta-analysis of artists' personality (Fesit, 1998). Artists also reported being more "extraverted, enthusiastic" (d = .58). Although meta-analysis does not show a difference between artists and non-artists in extraversion (Feist, 1998), enthusiasm is akin

to intense interest and passion, which are common in those involved in the arts (eminent creators: Csikszentmihalyi, 1996; adolescents: Fredricks, Alfeld, & Eccles, 2010).

Artists reported higher anxiety and stress, with small effect sizes (d = .28 and .38, respectively); no difference was observed for depression. Artists also reported higher resources on all assessed variables except environmental mastery aspect of psychological well-being, which describes a sense of mastery and competence in controlling one's circumstances. The differences were small for most variables: autonomy, self-acceptance, positive relations with others, and hope (both agency and pathways) had d < .50 (between .21 and .48). Moderate effect size differences were observed for purpose in life (d = .57), personal growth (d = .60), and ego-resilience (d = .67).

Table 2 presents correlations among the variables of vulnerabilities and resources in artist and non-artist samples. As expected, variables groups of vulnerabilities and resources were inter-correlated in both samples.

To identify broad dimensions of vulnerabilities and resources, scale scores were analyzed using principal axis factoring with oblique rotation. Two factors with eigenvalues greater than one were identified, one factor of vulnerabilities and one factor of resources (see Table 3). The psychological vulnerabilities measure was computed as a linear combination of depression, anxiety, and stress, and the psychological resources measure was computed as a linear combination of ego-resilience, hope, and psychological well-being subscales.

The first research question of the study was addressed using cluster analysis of psychological vulnerabilities and resources. This analysis asks whether distinct groups of individuals can be identified with different intra-individual patterns of vulnerabilities and resources. We used hierarchical cluster analysis with Ward's method and squared Euclidean

distances to identify groups with minimal within-cluster variance in patterns of resources and vulnerabilities. In a comparison of traditional clustering methods, Kohonen maps, and latent class analysis of data with unknown cluster structure, Eshghi, Haughton, Legrand, Skaletsky, and Woolford (2011) found that traditional cluster analysis results in the most homogeneous clusters and most effectively differentiates among clusters. Ward's method is chosen as the clustering procedure that minimizes the variance within the clusters and is one of the most accurate in validation studies (Aldenderfer & Blashfield, 1984; Blashfield, 1976).

The number of retained clusters was determined based on the criteria of change in fusion coefficients and meaningfulness (see supplementary online materials). Seven clusters were retained and their mean vulnerabilities and resources standardized scores are shown in Figure 1. As can be expected, the largest cluster (Cluster 1; 24.8% of individuals) has average scores on both resources and vulnerabilities. Four clusters included a combination of resources and vulnerabilities suggested by the negative correlation between them – when one is low, the other is high. Cluster 4 (22.7%)is characterized by low vulnerabilities and high resources, and Cluster 2 (21.5%) shows low vulnerabilities and slightly above average resources. Cluster 5 (8%) shows high vulnerabilities and low resources and Cluster 6 (2.9%) shows very high vulnerabilities (more than 3SD above the mean) and low resources, suggesting possible affective disorders. Finally, two clusters show both below average or above average resources and vulnerabilities. Cluster 3 (10.7%) has low resources and slightly below average vulnerabilities. Cluster 7 (9.4%) shows both (moderately) above average resources and vulnerabilities; this is the theoretically hypothesized cluster.

To test whether there were differences in the number of artists and non-artists across all clusters, we conducted a χ^2 test. The test was significant, $\chi^2\,(6) = 96.63$, $p < .001$, and the

examination of the cells in Table 4 shows that there were more artists than non-artists in Clusters 1 and 7, that there was a similar number of artists and non-artists in Clusters 4 and 6, and that there were more non-artists in Clusters 2, 3, and 5. Our second research question concerned differences in Cluster 7 – characterized by both above average resources and vulnerabilities. As hypothesized, there were more artists (16.2%) than non-artists (3.2%) in this cluster.

Relevant for the ongoing debate about mental illness and the arts is the finding that similar number of artists and non-artists could be found in the cluster most likely to show symptoms of affective disorders (extremely high vulnerabilities; Cluster 6; 2.9%), as well in the cluster that can be considered flourishing (Cluster 1; artists: 21.4%, non-artists: 23.9%). Non-artists (12.5%) are more likely than artists (2.9%) to have high vulnerabilities and low resources (Cluster 5), and are more likely to be found in the two clusters with low vulnerability paired either with average or low resources (Clusters 2 and 3).

To test whether creative achievement is predicted by vulnerabilities, resources, and their interaction, we performed a multiple regression analysis. Vulnerabilities and resources significantly predicted creative achievement, $R^2 = .15$, $F(3, 648) = 38.91$, $p < .001$; vulnerabilities: $\beta = .38$, $p < .001$, resources: $\beta = .36$, $p < .001$, and vulnerabilities by resources interaction: $\beta = .17$, $p < .001$. Figure 2 depicts the nature of the vulnerabilities by resources interaction using simple slopes at moderately low (-.5SD) and moderately high (+.5SD) vulnerabilities. The choice of $\pm$.5SD levels was theoretically guided both by predictions of the diversification model (Gocłowska et al., 2018) stating that creativity can benefit from moderately high levels of challenges. At moderately low vulnerabilities, resources made less contribution to creative achievement than at moderately high level of vulnerabilities. Figure 2 shows simple slopes depiction of the observed interaction.

Next, we tested whether this prediction was independent of openness to experience and age (both predictors of creative achievement) by performing a hierarchical multiple regression analysis. We entered the two items assessing openness to experience traits and age in Step 1, and vulnerabilities, resources, and their interaction term in Step 2 (see Table 4 for summary).

Step 1 variables significantly predicted creativity, $\Delta R^2 = .14$, $F(2, 647) = 50.32$, $p < .001$, with both openness traits being significant predictors of creative achievement ("open to experiences, complex": $\beta = .17$, $p < .001$; "conventional, uncreative": $\beta = -.25$, $p < .001$). Step 2 variables significantly added to the prediction of creative achievement, $\Delta R^2 = .08$, $F(2, 644) = 23.46$, $p < .001$. All three variables were significant independent predictors, vulnerabilities: $\beta = .34$, $p < .001$, resources: $\beta = .24$, $p < .001$, and their interaction, $\beta = .17$, $p < .001$.

Discussion

The present study identified distinct clusters – groups of individuals – with different intra-individual patterns of psychological vulnerabilities and resources; these included profiles that were expected from the negative correlation observed between resources and vulnerabilities (high vulnerabilities, low resources; low vulnerabilities, high resources), but also a profile indicating presence of both vulnerabilities and resources. As hypothesized, the profile with moderately high vulnerabilities and resources had more artists than non-artists, providing support for Barron's (1963) "occasionally crazier, yet adamantly saner" description. Exploratory analyses showed that the interaction between vulnerabilities and resources predicted creative achievement and that this effect was independent of age and openness to experience. Creative achievement was the highest at moderately high levels of both vulnerabilities and resources.

The present paper was inspired by Barron's (1963) book *Creativity and Psychological Health*. In studies of individuals across artistic domains researchers at the Institute for

Personality Assessment and Research found them to have high scores on clinical scales of the MMPI, suggesting vulnerability for mental illness. However, they also scored high on the Ego-Strength scale, MMPI-derived measure identifying individuals who successfully improve in psychotherapy and are able to rally from adversity (Barron, 1963; Barron, Denman, & Hall, 1972). More recent research examined either psychological vulnerabilities in creative individuals (especially in terms of mental illness; Taylor, 2017) or psychological resources (Forgeard, Mecklenburt, Lacasse, & Jayawickreme, 2014). We are aware of only one study (Fodor, 1995) that examined patterns of vulnerability (high scores on the Schizophrenia and Paranoia MMPI scales) and resources (high scores on the Ego-Strength scale). College students who showed a pattern of both high vulnerabilities and resources performed the best on a problem solving task and had the highest scores on the Remote Associates Test.

Although the vulnerable/resourceful cluster was not the largest by size, it is important both theoretically and practically. Theoretically, the identification of a pattern characterized by vulnerabilities and resources points to the need for developing models and empirically investigating strengths in those who experience vulnerabilities or even symptoms of mental disorders. Recent work in clinical psychology argued that mental illness and mental health are not simple opposites, but should be considered together to better predict important life outcomes (Goodman, Doorley, & Kashdan, 2018; Keyes, 2005).

Furthermore, the identification of the vulnerable/resourceful cluster is important because it calls attention to intra-individual patterns of psychological attributes. The presence of vulnerabilities does not preclude the presence of resources and it is important to know about both to be able to predict outcomes such as creative achievement and successful coping with challenges. Interviews with creative individuals point to them as embodying other attributes that

are negatively correlated in the general population, such as being both introverted and extraverted, having great energy and often being quiet and inactive, being playful and disciplined, or being fantasy-prone and also firmly rooted in reality (Csikszentmihalyi, 1996). Collectively, this suggests a need for more studies of intra-individual patterns of traits in artists and non-artists, as well as creative individuals in other domains.

Regression analyses showed that creative achievement was predicted by psychological vulnerabilities and resources and their interaction, and that these effects were independent from age and openness to experience. This test against openness to experience is important practically and theoretically. Practically, if we are interested in predicting creativity in any domain, we should be able to demonstrate that the effects are independent of openness, as the most reliable individual difference predictor of creativity (Feist, 1998; Ivcevic & Mayer, 2009; Kaufman, 2013). Theoretically, any claim of a previously not examined mechanism should be pitted against openness; it is possible that artists, for instance, are open to both positives and negatives of the world (e.g., depression and well-being; Gutiérrez, Jiménez, Hernández, & Puente, 2005; Keyes, Shmotkin, & Ryff, 2002; Wolfstein & Trull, 1997). Showing prediction beyond openness presents the strictest test of the proposed role of psychological vulnerabilities and resources.

A recently proposed theoretical model offers an explanation of the observed effects. The diversifying experience model presents an integrative framework to explain the relationship between a variety of experiences that put an individual outside of the majority culture that defines normality and put demands on the individual to adapt (Gocłowska et al., 2018). One set of diversifying experiences are mental illness diagnoses or potential symptoms of mental disorders (such as psychological vulnerabilities studied here). In describing conditions under which diversifying experiences can be beneficial for creativity, the model borrows from the

transactional theory of stress in emphasizing the importance of one's ability to use coping resources to respond to stressors (Folkman, 2013; Lazarus & Folkman, 1984). The model thus proposes that there should be skills and traits that moderate the relationship between diversifying experiences and creativity. In this paper we provide the first test of the moderation of resources on the relationship between vulnerabilities and creative achievement.

Limitations and future directions

The present study has its strengths – large sample of professional artists, person-centered analyses, prediction of creative achievement independent of openness to experience – but it also has a set of limitations. We studied a limited set of vulnerabilities and resources. For instance, we aimed to capture general distress which has been related to artistic creativity in previous meta-analyses (Feist, 1998), but we do not intend to claim this study as an exhaustive test of vulnerabilities. A powerful study would include a large set of vulnerability measures and test which aspects of these measures predict creative achievement independently of openness. In this study we decided not to include measures of trait hypomania and schizotypy, for instance, because existing research points to their overlap with openness (Furnham et al., 2008; Miller & Tal, 2007), but believe that more research is necessary to understand these measures and their relationship to artistic (and other) creativity.

Future studies should recruit samples of creative individuals from different domains, including at least the arts and sciences and ideally also other domains of creativity (e.g., engineering, entrepreneurship). It is possible that the relevant vulnerabilities and resources can be different across domains. There is evidence that artistic creativity is related to emotional sensitivity, which is the reason we selected such indicators in the present study, but scientific creativity might have different set of vulnerabilities (e.g., narcissism-related; Feist, 1994).

Another limitation of the present study is the nature of the non-artist comparison group. We employed a sample of MTurk workers that was somewhat younger and less well educated than the sample of artists. We acknowledge that these demographic differences might be important (and certainly warrant being examined in future research). Based on previous research showing the importance of educational attainment for psychological well-being (Ryff, 2018), we recruited MTurk participants with at least a college degree. Also, the average age in the MTurk sample was 38.6, very close to 38.1 as the median age of the US population in 2017 according to the Census data. Furthermore, MTurk workers are commonly employed in psychological studies and appear to produce equivalent data to those assessed in person or when participants are recruited through social media sites (Casler, Bickel, & Hackett, 2013; Paolacci & Chandler, 2014; Ramsey, Thompson, McKenzie, & Rosenbaum, 2016). Finally, there is no reason to believe that this sample would be biased on the measures of interest in this study.

Artists in this study were recruited from the faculty of university art departments. These artists thus might be both more highly educated and have more job security than artists as a whole. As such, future research should include a more diverse sample of artists or explicitly recruit artists who differ on their level of job security, which could be a source of life stress (Ferrie, Shipley, Stansfeld, & Marmot, 2002). Multiple non-artist comparison groups might also be useful, including a representative sample of the general population, as well as samples matched with artists on relevant variables, such as job security or education. While the nature of our artist sample limits the generalizability of the study, work in behavioral economics shows that in spite of their lower job security and other professional stressors, artists tend to have higher life satisfaction than other professionals (Bille et al., 2013). This research suggests that the results in our study showing high resources in artists were not simply an artifact of our sample.

In considering implications of the present research, a direction for future work emerges. The intra-individual pattern of (relatively) high vulnerabilities and resources in some artists suggests a possibility of their greater resilience. Resilience can be defined in two distinct ways, as a trait or as a dynamic process of response to adversity (Harms, Brady, Wood, & Silard, 2018). According to the trait definition, resilience is a personal attribute enabling an individual to emerge unscathed from adversity, while according to the second definition resilience can only be observed as an individual trajectory after a potentially damaging event. Here, we explicitly assessed trait resilience (Block & Kremen, 1996). Previous research also shows that all of the psychological resources examined in this study could play a trait resilience function. For instance, in longitudinal studies pre-event ego-resilience predicted fewer depressive symptoms following the 9/11 attacks (Fredrickson et al., 2003), hope predicted adjustment in multiple sclerosis patients (Madan & Pakenham, 2014), and psychological well-being protected against the ill effects of lower socioeconomic status on biological markers of health (Tsenkova, Love, Singer, & Ryff, 2007).

When resilience is defined as a dynamic process of responding to and bouncing back from potentially damaging life events (Harms et al., 2018), it can be examined only through longitudinal studies. Initial assessments can establish patterns of psychological vulnerabilities and resources similar to those in the present study and subsequent waves can assess experiences of adverse life events (e.g., mental illness, injuries), as well as short-term reactions to these events and longer-term measures of physical and psychological functioning. This research can then answer whether those described by different patterns of resources and vulnerabilities have different likelihood of successfully bouncing back from potentially harmful events.

Intra-individual analyses enable us to move beyond the either/or questions, such as: Are

artists more prone to psychological vulnerability and even mental illness *or* is participation in the arts associated with psychological benefits and well-being? The best answer might be both, at least for some people. The question thus becomes what patterns of vulnerabilities and resources are characteristic of artists (compared to non-artists) and whether similar patterns of vulnerabilities and resources can be found in creative individuals across domains (e.g., scientists, architects). This research could suggest a need for theoretical accounts of personality, mental health, and artistic creativity to include both inter-individual difference variables (e.g., openness to experiences and its facets; Kaufman, 2013) and intra-individual patterns of variables (i.e., addressing differences in groups of individuals).

Footnotes

[1]Other psychological vulnerabilities have been related to creativity and specifically relevant to the artistic domain, most prominently psychoticism, schizotypy, and trait hypomania. A recent meta-analysis of the relationship between creativity and psychoticism shows a large effect size, but only for certain measures of both constructs (Acar & Runco, 2012), suggesting the need for additional research before new questions are addressed. Similarly, schizotypy has been related to creativity, including artistic creativity, but this relationship is limited to specific facets of schizopyty (Acar & Sen, 2013; Batey & Furnham, 2008; Holt, 2018) and studies that control for personality traits suggest that the relationship is due to the overlap with the third variable, openness to experience (Miller & Tal, 2007). Finally, hypomanic trait is related to both measures of creative potential (such as divergent thinking) and creative behavior (Furnham, Batey, Anand, & Manfield, 2008; Schuldberg, 1990). However, the relationship between creative behavior (including artistic activities) and hypomanic trait ceases to be significant when controlling for Big Five personality traits (Furnham et al., 2008).

Table 1

Descriptive statistics and mean differences in study variables for artist and non-artist samples

	Artists		Non-artists				
	M	SD	M	SD	*t*	*p*	*d*
Psychological vulnerabilities							
Depression	.81	.95	.77	1.12	.49	.624	.04
Anxiety	.86	.75	.65	.75	3.67	< .001	.28
Stress	1.48	1.08	1.06	1.15	4.79	< .001	.38
Psychological resources							
Psychological well-being							
Autonomy	4.54	.67	4.38	.83	2.79	.005	.21
Self-acceptance	4.54	.81	4.29	1.13	3.33	.001	.25
Environmental mastery	4.20	.77	4.27	1.06	.37	.370	.07
Personal growth	5.15	.60	4.71	.84	7.85	< .001	.60
Purpose in life	5.07	.70	4.59	.97	7.28	< .001	.57
Positive relationships	4.90	.69	4.50	.95	6.16	< .001	.48
Hope							
Agency	4.95	.72	4.60	.95	5.34	< .001	.41
Pathways	4.96	.75	4.71	.87	3.98	< .001	.31
Ego-resilience	4.53	.54	4.12	.68	8.53	< .001	.67
Creative achievement	38.30	21.26	15.38	19.58	14.32	< .001	1.12
Personality traits							
Extraverted, enthusiastic	4.19	1.42	3.32	1.60	7.40	< .001	.58
Reserved, quiet	3.44	1.53	4.09	1.54	5.38	< .001	.42
Sympathetic, warm	5.11	.88	4.64	1.20	5.69	< .001	.45
Critical, quarrelsome	3.22	1.40	2.43	1.42	7.19	< .001	.56
Dependable, self-disciplined	5.26	.93	4.96	1.07	3.82	< .001	.30
Disorganized, careless	2.56	1.39	2.23	1.31	3.07	.002	.22
Anxious, easily upset	3.03	1.46	2.59	1.54	3.73	< .001	.29
Calm, emotionally stable	4.53	1.15	4.76	1.15	2.50	.013	.20
Open to experiences, complex	5.32	.85	4.73	1.16	7.37	< .001	.58

Conventional, uncreative	1.45	.84	2.52	1.44	11.80	< .001	.91

Table 2

Correlations among variables of psychological resources and vulnerabilities for artist and non-artist samples

	1	2	3	4	5	6	7	8	9	10	11	12
1. Depression	-	.67***	.75***	-.50***	-.70***	-.71***	-.48***	-.57***	-.53***	-.61***	-.47***	-.54***
2. Anxiety	.66***	-	.72***	-.41***	-.51***	-.54***	-.36***	-.38***	-.38***	-.46***	-.29***	-.38***
3. Stress	.70***	.73***	-	-.43***	-.52***	-.54***	-.36***	-.39***	-.38***	-.45***	-.30***	-.39***
4. Autonomy	-.25***	-.20***	-.29***	-	.72***	.72***	.62***	.68***	.52***	.67***	.64***	.59***
5. Self-acceptance	-.54***	-.24***	-.35***	.46***	-	.87***	.69***	.82***	.71***	.85***	.64***	.62***
6. Env mastery	-.58***	-.38***	-.49***	.45***	.72***	-	.65***	.76***	.70***	.79***	.61***	.59***
7. Personal growth	-.28***	-.09	-.16**	.42***	.50***	.43***	-	.73***	.63***	.67***	.62***	.66***
8. Purpose in life	-.34***	-.07	-.14*	.32***	.53***	.47***	.52***	-	.67***	.79***	.64***	.57***
9. Positive relations	-.25***	-.16**	-.16**	.37***	.43***	.45***	.45***	.43***	-	.66***	.58***	.62***
10. Agency	-.34***	-.10	-.18**	.34***	.69***	.56***	.47***	.51***	.38***	-	.72***	.65***
11. Pathways	-.23***	-.06	-.12*	.37***	.48***	.36***	.46***	.40***	.38***	.70***	-	.61***
12. Ego-resilience	-.25***	-.18**	-.24***	.54***	.48***	.46***	.59***	.47***	.52***	.45***	.46***	-

Note. Below the diagonal: artists; above the diagonal: non-artists. Psychological variabilities: variables 1-3; psychological resources: variables 4-12.

*$p < .05$; **$p < .01$; ***$p < .001$.

Table 3

Pattern matrix for a principal axis analysis of scales of vulnerabilities and resources

	Vulnerabilities	Resources
Depression	.717	-.260
Anxiety	.834	.051
Stress	.903	.051
Autonomy	-.108	.658
Self-acceptance	-.207	.782
Environmental mastery	-.369	.623
Personal growth	.094	.828
Purpose in life	.046	.842
Positive relations with others	-.003	.733
Hope: Agency	-.018	.849
Hope: Pathways	.092	.775
Ego-resilience	.031	.761

Table 4

Number of individuals per cluster and artist and non-artist samples

			1	2	3	4	5	6	7
Sample	Artists	Count	107	54	14	66	9	9	50
		% within sample	34.60	17.50	4.50	21.40	2.90	2.90	16.20
	Non-artists	Count	55	86	56	82	43	10	11
		% within sample	16.00	25.10	16.30	23.90	12.50	2.90	3.20
Total		Count	162	140	70	148	52	19	61
		% of Total	24.80	21.50	10.70	22.70	8.00	2.90	9.40

Table 5

Multiple regression predicting creative achievement

	β	Lower bound B	Upper bound B	ΔR^2	Δp
Step 1				.16	<.001
Openness to new experiences, complex	.16	1.68	5.34		
Conventional, uncreative	-.22	-5.53	-2.54		
Age	.16	.16	.43		
Step 2				.08	<.001
Openness to new experiences, complex	.14	1.24	4.97		
Conventional, uncreative	-.16	-4.39	-1.44		
Age	.16	.17	.43		
Vulnerabilities	.34	6.63	11.13		
Resources	.17	2.28	7.60		
Vulnerabilities x resources	.19	2.49	6.10		
Final model	$R^2 = .24$				
	F (6, 637) = 33.29***				

Note. All $\beta < .001$.

Figure 1

Mean scores on psychological vulnerabilities and resources for seven identified clusters

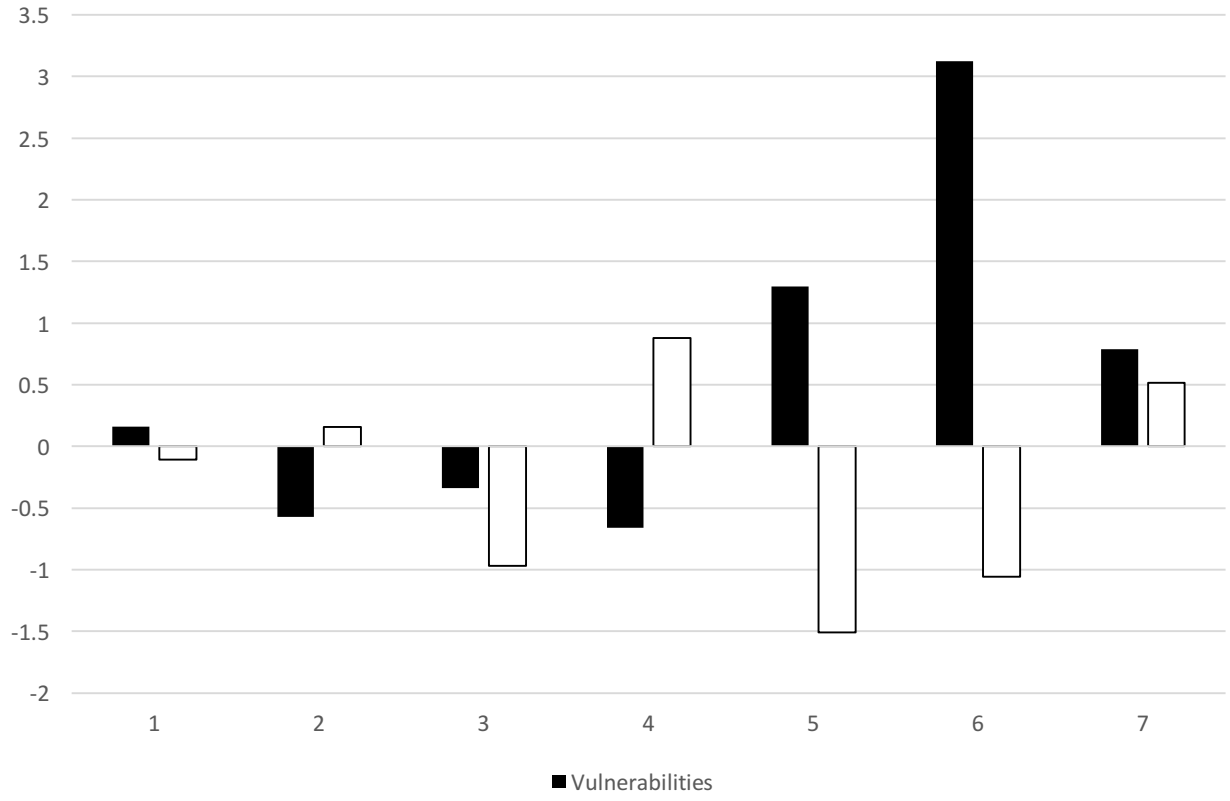
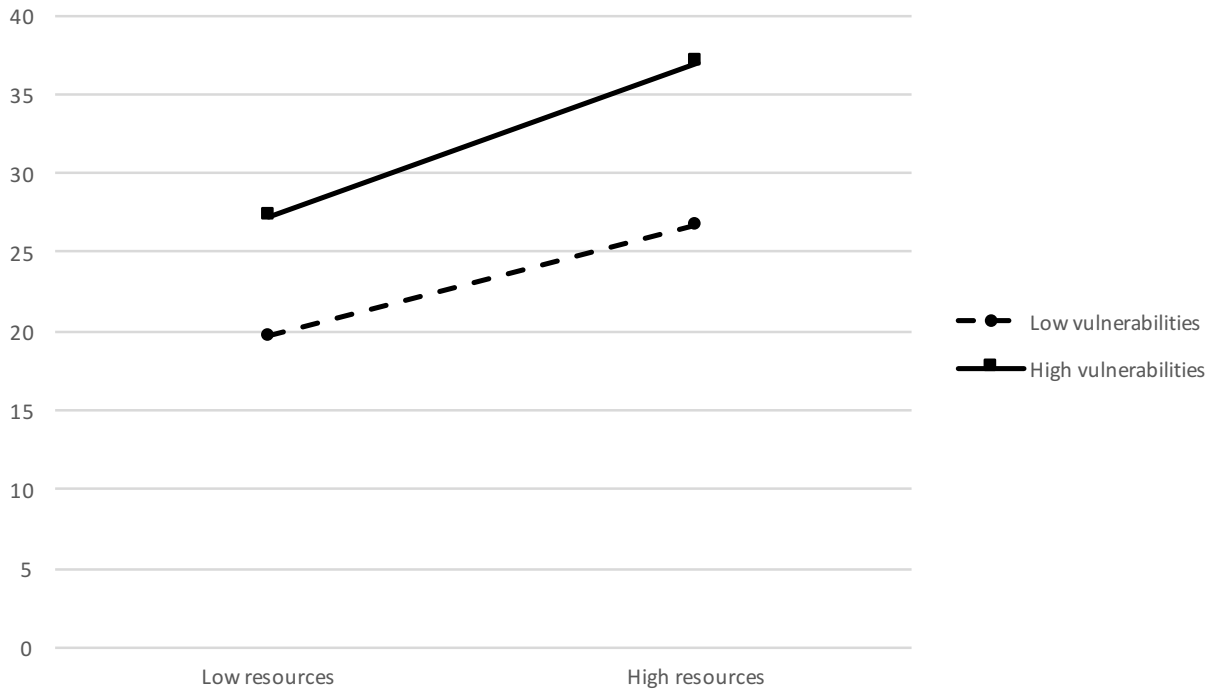


Figure 2

Simple slopes depiction of the interaction between vulnerabilities and resources in predicting creative achievement across the whole sample



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