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## Exploring shy minds: Relations between shyness and creativity

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## ABSTRACT

The relation between shyness and creativity has not been fully elucidated. The aim of present study was to examine if shy individuals express their creativity in different ways, as indexed by the relation between shyness and open-mindedness and its three facets: intellectual curiosity, aesthetic sensitivity, and creative imagination. We analyzed two separate structural equation models: first treating overall open-mindedness as a predictor of shyness, and the second in which we examined the three separate facets of open-mindedness (i.e., intellectual curiosity, aesthetic sensitivity, and creative imagination). Young adults ( $N = 727$ ,  $M_{\text{age}} = 22.19$  years) self-reported their levels of shyness and the three facets of open-mindedness. Results revealed that although shyness was unrelated to the broader construct of open-mindedness, the differentiation of the open-mindedness facets resulted in a good model fit to the data. Specifically, shyness was *negatively* associated with creative imagination, but *positively* associated with aesthetic sensitivity. Our findings illustrate the importance of examining different components of creativity, as these seem to be differentially associated with personality dimensions such as shyness. Our findings also have theoretical implications for understanding how shy individuals may express their creativity.

## 1. Introduction

Hans Eysenck broadly investigated the relation between personality and creativity in plenty of works, including *Genius: The Natural History of Creativity* (1995). What he mainly uncovered in his research is that creativity is indeed conditioned by personality and falls within the domain of one trait in particular from the Giant Three model – psychoticism (which also served for the explanation of the so called “mad genius phenomenon” and inspired further research to link creativity and psychopathology; Eysenck, 1993, 1995; see also Rushton, 1997). However, in Eysenck's (1995) meta-analysis describing research on specific groups of gifted people (such as artists, musicians, or scientists) it also turned out that both introversion and neuroticism seem to be associated to creativity to some extent (see also Götz & Götz, 1973). Although shyness seems to be linked to both introversion and neuroticism, we know relatively little about the association between shyness and creativity. The purpose of the present paper is to investigate the relation between shyness and creativity guided by the five-factor approach (McCrae & Costa, 1997) where one of the traits, namely–openness to experience–can be defined by creativity, originality, and rich imagination (Goldberg, 1999; Saucier & Ostendorf, 1999; Soto & John, 2017).

## 1.1. Shyness in relation to openness and creativity

Shyness is described as a temperamentally conditioned personality trait characterized by inhibition and a sense of discomfort within unfamiliar social contexts (Asendorpf, 1990; Cheek & Buss, 1981). On one hand, shyness may arise from a lower desire for affiliating with other people (especially unfamiliar individuals), thus reminiscent of introversion (Hofstee, De Raad, & Goldberg, 1992). However, on the other hand, shyness may be rooted within an unfavorable opinion about one's own social competence, which may be more closely linked to neuroticism (Briggs, 1988; Jones, Schulkin, & Schmidt, 2014).

According to a large body of empirical research – starting from the early works of Cheek and Stahl (1986) to more recent work in young adults (Farahini, Afroz, Tabatabaei, & Esmaeili, 2011; Tan, Lau, & Lee, 2017) and children (e.g., Cantero, Alfonso-Benlliure, & Melero, 2016; Kemple, David, & Wang, 1996) – shyness is *negatively* associated to creativity. This relation especially applies to creativity-related *behavioral* activity or its tangible outcomes such as publications, artworks, or creative performance (Tan et al., 2017; Zhou & Shalley, 2008) – specifically when the shy individual anticipates evaluative feedback (Cheek & Stahl, 1986). This finding seems consistent across different measurement methods such as direct or indirect, e.g., the Stroop Color and Word Test assessing cognitive flexibility or performance of specific

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tasks such as writing poems (Arnold & Cheek, 1986; Cheek & Stahl, 1986). In line with these findings, shyness also has been negatively related to openness within the Big Five model (e.g., Kwiatkowska, Kwiatkowska, & Rogoza, 2016; Sala, Skues, & Grant, 2014; Sato, Matsuda, & Carducci, 2018). Nonetheless, recent theoretical hypotheses propose a link between the preference for solitude and *increased* creativity (Coplan & Bowker, 2017). Indeed, recent empirical research of Bowker, Stotsky, and Etkin (2017) was the first to reveal that unsociability is a positive predictor of creativity as measured by the test items referring to the personality trait of openness to experience (Goldberg et al., 2006; Hofstee et al., 1992). Although unsociability and shyness are not identical constructs, the two seem to be somewhat related and each fall under a broader umbrella term of social withdrawal (Asendorpf, 1990). Collectively, these findings may suggest that the relation of shyness and openness is somewhat inconsistent and not fully established yet.

Shyness as a personality trait is theoretically and empirically rooted within introversion (Ebeling-Witte, Frank, & Lester, 2007; Hofstee et al., 1992; Kwiatkowska et al., 2016; Sala et al., 2014; Sato et al., 2018). Indeed, this is reflected when shyness is examined in relation to *active* creativity – i.e., based on observer-rated evaluation of completing creativity-related tasks in experimental conditions (e.g., Cantero et al., 2016; Cheek & Stahl, 1986), which seem to have an additional bias due to exposition for distress (Tan et al., 2017). Even though creativity-related behavioral activity is hard to capture in the case of shy individuals given their inhibited and/or self-conscious nature, creativity itself is not determined only by behavioral engagement (Plucker, Beghetto, & Dow, 2004; Puryear, Kettler, & Rinn, 2016). Thus, shy individuals may express their creativity in a more *passive* or *non-active* way relative to less shy individuals, e.g., through passion for aesthetics (Cheek & MacMillan, 1993; Ziller & Rorer, 1985), which is better adopted to their inhibited temperament and it is not necessarily linked to the performance in front of other people.

### 1.2. Bandwidth, fidelity, and hierarchy of the personality structure

Personality traits can be defined either broadly, having the advantage of high bandwidth efficiently summarizing large amount of information, or narrowly, having the advantage of high fidelity and providing precise and accurate descriptions (Soto & John, 2017). Existing research supports that the structure of personality is hierarchical – i.e., there are broad Big Five domains and each of them subsumes several more narrow and specific facets (Costa & McCrae, 1995). Existing research on shyness and creativity is characterized by high bandwidth; it suggests a negative relation with openness investigated only at the domain-level (Bowker et al., 2017; Kwiatkowska et al., 2016; Puryear et al., 2016) but simultaneously it is characterized by low fidelity as the more precise assessment of the facet-level remains unexplored. Recently, Soto and John (2017) synthesized the existing research and provided a new description of the personality hierarchy balancing bandwidth and fidelity, in which each domain was represented by three facets. For each Big Five domain there was a factor-pure facet, which was empirically identified as a central to its own domain only (e.g., sociability as a central facet to extraversion). Open-mindedness (renamed openness to experience) however was an exception for this procedure, as the three facets of intellectual curiosity (interest in abstract ideas and general world's curiosity), creative imagination (ingenuity and clever thinking), and aesthetic sensitivity (fascination and being sensitive of art, beauty, music, and poetry) were perceived as equally important (Soto & John, 2017). Accordingly, when examining the relation between shyness and creativity, it is also crucial to focus on the three components of open-mindedness characterized by high fidelity. This would allow for a more precise investigation of the hypothesis that shy individuals may simply reveal their creative disposition in a unique way that may be captured by the components of open-mindedness.

## 2. Current study

The aim of present study was to examine if shy individuals express their creativity in different ways, as indexed by the relation between shyness and open-mindedness and its three facets: intellectual curiosity, aesthetic sensitivity, and creative imagination. In line with the results of most previous studies examining the high bandwidth (i.e., open-mindedness), we hypothesized that shyness would be negatively related to open-mindedness. However, we expect that with the increase in fidelity (i.e., examination of the components of open-mindedness), differences will emerge. Specifically, we hypothesize that: (1) intellectual curiosity will be unrelated to shyness – given the discrepancy in results on the relation between shyness and perceptions of intellect (Paulhus & Morgan, 1997); (2) aesthetic sensitivity will be positively related to shyness – which is supported by the studies of Ziller and Rorer (1985) as well as Cheek and MacMillan (1993) who established that shy individuals are more likely to be aesthetically oriented on the basis of the assessment of the content of photographs; and (3) creative imagination will be negatively related to shyness – on the basis of the outcomes raised from studies on creativity which considered its components such as idea generation, originality, or problem solving (e.g., Farahini et al., 2011; Tan et al., 2017). To test these hypotheses, we analyzed two separate structural equation models (SEM): first treating overall open-mindedness as a predictor of shyness, and the second which the predictive power of its facets (i.e., intellectual curiosity, aesthetic sensitivity, and creative imagination). For the transparency of our results, we provide data used for analyses via the Open Science Framework platform – both the databases and the syntax commands are available under the following web link: <https://osf.io/qry4a/>.

## 3. Materials and methods

### 3.1. Participants and procedure

Participants were  $N = 727$  Polish young adults (508 females) aged between 18 and 35 years old ( $M = 22.19$ ;  $SD = 2.54$ ) recruited via social networking sites. Respondents completed a larger set of self-report measures administered using Google Forms online survey platform, which on average took no > 25 min to complete. In accordance with ethical guidelines, each participant had the right to withdraw from participation in the study at any time without any consequences. There was no remuneration for taking part in the study; however, for interested respondents there was a lottery in which one could win small material prizes. The answers of the respondents did not contain any missing data. All procedures were approved by institutional Ethics Board.

### 3.2. Measures

The questionnaire set administered to respondents included the Revised Cheek and Buss Shyness Scale (RCBS; Cheek, 1983; Cheek & Buss, 1981) and the Open-Mindedness domain scale from the Big Five Inventory-2 (BFI; Soto & John, 2017). The RCBS is comprised of 13 statements (e.g., *I feel tense when I'm with people I don't know well*) assessing general shyness defined as inhibition in social contexts (i.e., unidimensional solution proved to be better fitted than three-factor one; Kwiatkowska & Rogoza, 2017). The Open-Mindedness scale consists of 12 statements – four test items per each of three facets scales: Intellectual Curiosity (e.g., *I am someone who... is curious about many different things*), Aesthetic Sensitivity (e.g., *... is fascinated by art, music, or literature*), and Creative Imagination (e.g., *... is original, comes up with new ideas*). For both the shyness and open-mindedness scales, respondents rated the statements using a 5-point Likert-type scale (1 = *disagree strongly*; 5 = *agree strongly*). For the current study, both measures demonstrated excellent reliability ( $\omega_{\text{shyness}} = 0.91$ ;  $\alpha_{\text{shyness}} = 0.89$ ;  $\omega_{\text{open-mindedness}} = 0.86$ ;  $\alpha_{\text{open-mindedness}} = 0.82$ ) and

good distribution statistics ( $S_{\text{shyness}} = -0.10$ ;  $K_{\text{shyness}} = -0.77$ ;  $S_{\text{open-mindedness}} = -0.21$ ;  $K_{\text{open-mindedness}} = -0.39$ ). No gender differences were observed for either variables (at  $t_{(725)} = 0.96$ ;  $p = .337$  for shyness; and at  $t_{(725)} = 1.65$ ;  $p = .099$  for open-mindedness). However, on average, respondents scored significantly higher on open-mindedness ( $M = 3.80$ ;  $SD = 0.67$ ) than on shyness ( $M = 2.94$ ;  $SD = 0.87$ ) at  $t_{(726)} = -19.22$ ;  $p < .001$ .

#### 4. Results

In the assessment of the SEM model fit, we relied on standard recommendations, i.e., CFI > 0.90 and RMSEA < 0.06 (Hu & Bentler, 1999; Marsh, Hau, & Wen, 2004). Moreover, we used the Bayesian Information Criterion (BIC) to compare the fit of analyzed models – model with the smaller BIC value should be preferred (Schwarz, 1978). The robust maximum likelihood estimator was used, and the analyses were carried out in Mplus version 7.2 (Muthén & Muthén, 2012). No residuals were allowed to covary within the models.

##### 4.1. High bandwidth assessment of the relation between openness and shyness

The standardized factor loadings of the measurement models and the standardized regression coefficient of open-mindedness predicting shyness are presented on Fig. 1.

The analyzed model was poorly fitted to the data ( $\chi^2_{(274)} = 1471.98$ ;  $p < .001$ ; CFI = 0.793; RMSEA = 0.078; RMSEA 90%CI [0.074–0.081];  $p = .001$ ; BIC = 54,100.50) suggesting that a more complex model may better represent the data. However, the strength of the factor loadings on both latent factors was adequate. The results of the structural model demonstrated that open-mindedness was a significant negative predictor of shyness, and thus – our hypothesis was confirmed.

##### 4.2. High fidelity assessment of the relation between openness and shyness

Subsequently, we tested whether a more precise operationalization of the analyzed personality domain of open-mindedness would have a differential impact on shyness. The standardized factor loadings of the measurement models and the standardized regression coefficients of the structural model are depicted on Fig. 2.

Contrariwise to the previous analyzed SEM model, the differentiation of the open-mindedness facets resulted in a good model fit to the data ( $\chi^2_{(269)} = 839.57$ ;  $p < .001$ ; CFI = 0.901; RMSEA = 0.054; RMSEA 90%CI [0.050–0.058];  $p = .054$ ) and moreover, the model itself explained more information than the one-dimensional model (BIC = 53,449.27). Intellectual curiosity, similarly to open-mindedness, turned out to be a negative predictor of shyness, but whereas the creative imagination was a non-significant predictor, the aesthetic sensitivity positively predicted higher scores in shyness.<sup>1</sup> Thus, our results demonstrated a mutually suppressing effect of intellectual curiosity and aesthetic sensitivity, which in fact confirmed our expectations.

#### 5. Discussion

Previous empirical research has found that shyness was negatively related to creativity as well as to the Big Five domain of openness to experience (e.g., Cheek & Stahl, 1986; Farahini et al., 2011; Kwiatkowska et al., 2016; Sala et al., 2014; Sato et al., 2018; Tan et al., 2017). However, considering the many years of theoretical reports, e.g., by Eysenck (1995) that creativity may also have its basis in introversion

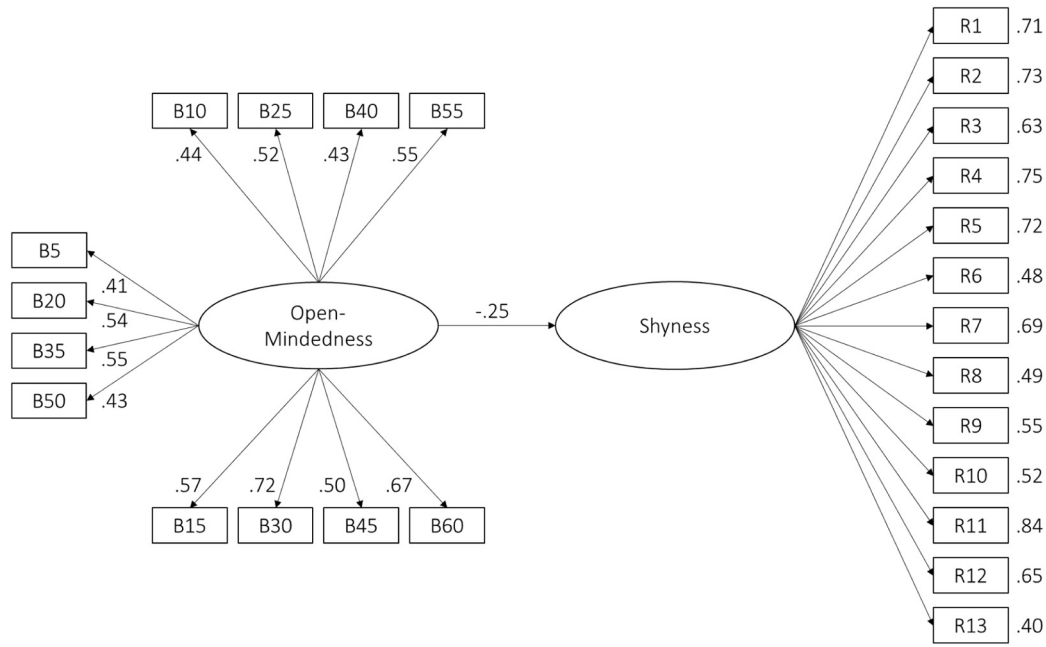
and neuroticism, as well as recent work linking creativity with the preference to solitude (Coplan & Bowker, 2017), it becomes evident that some inconsistency on this relation exists. There are several reasons why this inconsistency may exist. One reason may be due to the subtype of social withdrawal that is examined. For example, Bowker et al. (2017) considered various components of social withdrawal within their research and revealed that unsociability was a positive predictor of openness, but less attention has been devoted specifically to shyness. An additional reason is due to the way in which creativity is examined. To our knowledge, no previous studies have examined the lower-order structure of this Big Five domain (i.e., open-mindedness).

Our study was the first to investigate the relation of shyness and creativity through the prism of open-mindedness – i.e., openness as reconceptualized by Soto and John (2017) – balanced in terms of bandwidth and fidelity as well as strictly focusing on mental rather than social experiences. While analyzing the relation of shyness and the openness domain, we successfully replicated the results of previous studies both in strength and direction of the relationship (Bowker et al., 2017; Kwiatkowska et al., 2016; Sala et al., 2014; Sato et al., 2018). Shyness was significantly negatively predicted by open-mindedness, with the strength of the relation being weak to moderate, which mirrors previous work in this domain. At the general level, it is thus confirmed that shy individuals do not appear to be especially inventive, creative, or showing off their mental life. All in all, shyness sticks to the preference of “narrow range of perceptual, cognitive, and affective experiences” (Soto & John, 2017, p. 120), which seem to be in line as well with very first findings on the relation between shyness and creativity, highlighting the importance of cognitive processes (Cheek & Stahl, 1986).

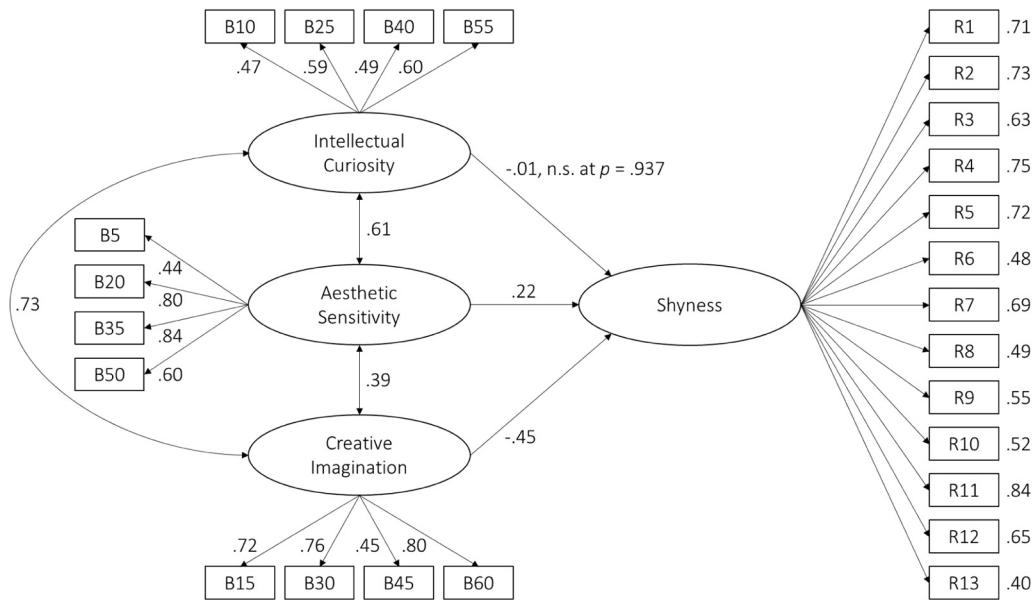
However, in concordance with our expectations, the observed relation between shyness and openness changed within our second model, which included facets of openness representing high fidelity (i.e., intellectual curiosity, aesthetic sensitivity, and creative imagination). Noteworthy, the multidimensional model was indisputably better fitted to the data (as according to the approximate fit indices and information criterion) than one-dimensional one, which follows the results of latest research and assumptions of Soto and John (2017), who highlighted the importance of looking at facets of the higher order scales. Thus, focusing specifically on narrow personality traits allows for greater precision and ultimately a better understanding of the correlates of shyness than does looking at the broader open-mindedness scale. In this vein, within multidimensional model we demonstrated that the relation between shyness and open-mindedness domain blurs while investigating through the prism of its facets. As hypothesized on the basis of modest assumptions resulting from previous studies (e.g., Cheek & MacMillan, 1993; Farahini et al., 2011; Paulhus & Morgan, 1997; Tan et al., 2017; Ziller & Rorer, 1985), shyness was unrelated to intellectual curiosity, positively related to aesthetic sensitivity, and negatively related to creative imagination.

Taken together, our results concerning the shyness-openness relation suggest that there may be a suppression effect when examining the higher order construct of openness relative to examining the three components encompassing this domain. Creative imagination proved to be the strongest predictor of shyness, and consequently, due to the negative direction, it shadowed the positive prediction of aesthetic sensitivity and null relation with intellectual curiosity. The source of the observed discrepancy may be explained within Gray's (1987) behavioral motivations taxonomy that distinguishes two independent dimensions of temperament – Behavioral Inhibition System (BIS) and Behavioral Approach System (BAS). These systems form neurobiological underpinnings of behavior and affect – whereas BIS is related to withdrawal preventing the behavior leading to punishment or loss of reward, BAS is motivated by approach and directed at reward acquisition (Gray, 1987). Empirical research demonstrated that shyness is positively related to BIS and negatively to BAS (Bowker et al., 2017). Openness howbeit is hardly, if at all, predicted by both behavioral

<sup>1</sup> When analyzing the models, we also tested whether age and gender influenced the obtained results; however, both of these covariates turned out to be non-significant.



**Fig. 1.** Structural equation model of Open-Mindedness predicting shyness. All pathways are standardized and significant at  $p < .001$  regressions. Note. The numbers of BFI items are consistent with the numbering according to Soto and John (2017).



**Fig. 2.** Structural equation model of Open-Mindedness facet scales (Intellectual Curiosity, Aesthetic Sensitivity, and Creative Imagination) predicting shyness. All pathways are standardized and significant at  $p < .001$  regressions (except for the regression coefficient between Intellectual Curiosity and shyness). Note. The numbers of BFI items are consistent with the numbering according to Soto and John (2017).

activation and inhibition (i.e., there was only one positive effect of fun seeking, a BAS component; Smits & Boeck, 2006). Studies on creativity in turn revealed that BAS – through flexible processing – generally enhances creative performance but impedes it when the situation induces local processing and narrow focus (De Dreu, Nijstad, & Baas, 2011). Our results correspond with these findings as on the facet-level of openness some discrepancies emerge, i.e., creative imagination, as a more agentic trait, is related to problem solving – thus it is closer linked to BAS; whereas aesthetic sensitivity is more closely related to focusing, experiencing, or even devotion, what makes it closer to BIS and hence with shyness.

Our findings extend previous studies on the aesthetic orientation of shy individuals, which were mostly based on indirect measurement and data from small samples of college women (e.g., Cheek & MacMillan, 1993; Ziller & Rorer, 1985). Cheek and MacMillan (1993) measured the preference for aesthetics by assessing the aesthetic value of photographs

– they revealed that shyness was positively, albeit not significantly related with measures of aesthetic orientation with a simultaneous (also insignificant) negative relationship with creativity and openness. Our research, even though reliant on self-report methods, sheds a new light on previous results (e.g., Cheek & MacMillan, 1993; Ziller & Rorer, 1985) using a large sample size. Ziller and Rorer (1985) suggested that aesthetic orientation of shy individuals is linked to a different hierarchy and range of orientations in comparison to less shy people. In this vein, they proposed not to limit shyness to social phobia, but rather the lesser orientation toward other people and greater demand for aesthetic experience (Ziller & Rorer, 1985).

We predict that the passion for art and aesthetics is a better way to express creativity in individuals with an inhibited temperament. It may be one of the positive outcomes of solitude of shy individuals (Coplan & Bowker, 2017). Although shyness may be associated with poorer social functioning for some individuals, it might also have benefits such as

greater sensitivity and the ability to focus. Mark Rothko (2006), one of the most appreciated artists of the modern age and the best-selling representatives of “color field painting” movement, in 1947 within one of his statements wrote that “a picture [or any other work of art] lives by companionship, expanding and quickening in the eyes of the sensitive observer” (p. 44). Perhaps it is the shy individuals who deserve this special designation of a works of art “companion”.

### 5.1. Limitations and future directions

The findings of the present study should be interpreted in light of the following limitations, which provide avenues for future research. First, shyness was treated as a unidimensional construct, and subtypes of shyness were not examined (e.g., Asendorpf, 1990). It would be particularly interesting for future work to explore these relations accounting for subtypes of social withdrawal (e.g., Bowker et al., 2017). Second, a valuable step for further investigations could be to move beyond self-report measures and a cross-sectional design, by employing a longitudinal design and objective measures of shyness and creativity. This would be useful to understand the direction of the current results, as well as provide an important opportunity to examine both behavioral and passive aspects of creativity within one study. It would also be interesting to replicate the present findings during other developmental periods (e.g., childhood, adolescence), as well as investigate if developmental trajectories in shyness and openness (and its facets) overlap (Wängqvist, Lamb, Frisén, & Hwang, 2015). Given that some research has found that shyness may increase across the life-span (Van Zalk, Lamb, & Rentfrow, 2016) and adults are more shy than adolescents (Kwiatkowska & Rogoza, 2017), they may also be expected to be less open-minded (Wängqvist et al., 2015); however, do these variables affect each other across human development? Lastly, it would also be interesting to empirically examine whether creativity in shy individuals serves some sort of “protective” effect against negative secondary psychosocial consequences (e.g., social anxiety, loneliness, self-esteem) that are common in shy individuals.

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