

# Testing the Relationships Between Narcissism, Risk Attitude, and Income With Data From a Representative German Sample

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**Supplementary Materials:** Data, Materials, Preregistration [see [Index of Supplementary Materials](#)]



## Abstract

Narcissism is related to income and risk-taking behavior, but previous studies have computed only pairwise associations and have used only domain-specific risk-taking measures. We jointly investigated narcissistic admiration and rivalry, income, and general risk attitude. Using a representative sample from the German population ( $N = 14,473$ ), we contrasted a model with an indirect effect through risk attitude to income and a model with additive effects of narcissism and risk attitude. We found stronger effects of admiration on risk attitude and income than of rivalry and no evidence of the proposed indirect effect. Contrary to previous studies, we found that an individual's income was independent of their risk attitude. In exploratory analyses (Response Surface Analysis, level-and-difference-approach), we found that the relative strength of admiration compared with rivalry positively predicted risk attitude and income. Taken together, our findings are consistent with the hierarchical model of grandiose narcissism.

## Keywords

narcissism, risk attitude, income, admiration, rivalry



### Relevance Statement

We merged three previously distinct lines of research (narcissism-income, narcissism-risk attitudes, risk attitudes-income) by jointly investigating all constructs with a representative sample. Dimensions of narcissism had different effects.

### Key Insights

- Dimensions of narcissism have distinct effects on life outcomes.
- Admiration has a positive effect on risk attitude and income.
- Rivalry has a negative effect on income and no effect on risk attitude.
- Risk attitude has no effect on income.

“Be confident, be bold, and be daring if you want to get ahead.” This advice is frequently heard, and it has even found empirical support from research that has shown that narcissism is related to income and risk attitudes. Three lines of research have fueled the above advice. First, grandiose narcissism is positively related to income (Hirschi & Jaensch, 2015; Leckelt et al., 2019; Spurk et al., 2016). Second, grandiose narcissism is positively correlated with the willingness to take risks (Buelow & Brunell, 2014; Lakey et al., 2008; Leder et al., 2020). Finally, people scoring high on grandiose narcissism are more likely to take risks at work, as many become entrepreneurs (Baldegger et al., 2017), and risk attitudes are positively associated with income (Dohmen et al., 2011; Frey et al., 2021; Shaw, 1996). Still, only pairwise relationships between the three constructs have been investigated. To connect these lines of research, the present study jointly investigated narcissism, income, and general risk attitude<sup>1</sup> in a large representative sample from the Socio-Economic Panel (SOEP).

Narcissism is characterized by agentic extraversion, interpersonal antagonism, and neuroticism, with the first two aspects characterizing grandiose narcissism and the latter two vulnerable narcissism (Back & Morf, 2020). The two aspects of grandiose narcissism are reflected in two positively correlated yet distinct dimensions of grandiose narcissism in the Narcissistic Admiration and Rivalry Concept (NARC; Back et al., 2013). In the NARC, the agentic aspects are reflected in the admiration dimension and the antagonistic aspects in the rivalry dimension. We propose that the admiration and rivalry dimensions of grandiose narcissism as suggested by the NARC (Back et al., 2013) have distinct associations with risk attitude and income.

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1) We use the plural form (risk attitudes) to refer to domain-specific risk measures and the singular form (risk attitude) to refer to general risk attitude.

## Narcissism and Income

*Narcissism* has been separated into a *grandiose* and a *vulnerable* form (Miller & Campbell, 2010). Here, we focus on grandiose narcissism (Back & Morf, 2020; Wallace & Baumeister, 2002), which is characterized by high levels of various aspects of narcissism: interpersonal antagonism, agentic extraversion, self-enhancing behavior (Maaß & Ziegler, 2017; Ong et al., 2011; Wallace & Baumeister, 2002), a lack of empathy (Konrath et al., 2016), impulsivity, aggressive behaviors in social conflict (Campbell & Campbell, 2009), and a sense of entitlement and superiority (Brown et al., 2009; Piff, 2014). Narcissists (i.e., individuals with relatively high scores on measures of subclinical narcissism) strive for fame and power (Raskin et al., 1991) and seek admiration (Morf & Rhodewalt, 2001). Narcissists also pursue situations that have competitive elements and allow them to show superiority and gain status (Morf et al., 2000).

Back et al. (2013) proposed that there are differential effects of grandiose narcissism in social relationships and behavior and that these effects can be explained by agentic and antagonistic aspects that are reflected in distinct but positively correlated dimensions: *admiration* and *rivalry* (Back et al., 2013). Admiration reflects the agentic aspects of grandiose narcissism and is linked to the desire to seek opportunities for self-enhancement and self-promotion by portraying grandiosity, striving for uniqueness, and being charming (Back & Morf, 2020). Rivalry reflects antagonistic aspects of grandiose narcissism and is linked to devaluing others, striving for supremacy, and acting aggressively to transmit antagonistic self-defense (Back et al., 2013).

Narcissism is particularly relevant in the context of career success as narcissists are strongly motivated to get ahead (Spain et al., 2014; Spurk et al., 2016). Narcissists pursue competition and aim to increase their status and show their superiority (Grapsas et al., 2020; Morf et al., 2000). They also often achieve leadership positions (Anninos, 2018; Badura et al., 2020; Brunell et al., 2008; Grijalva et al., 2015; Leckelt et al., 2019).

*Income* is typically seen as a major indicator of extrinsic or objective career success. Career success reflects the accumulation of an individual's achievements as a result of their work experience and has intrinsic and extrinsic components (Judge et al., 1995). Grandiose narcissism has been found to be positively related to income in some studies (Paleczek et al., 2018; Spurk et al., 2016) but not in others (Hirschi & Jaensch, 2015), a difference that may arise from the use of convenience samples (Hirschi & Jaensch, 2015; Spurk et al., 2016). Furthermore, distinguishing between adaptive and maladaptive dimensions of grandiose narcissism may also explain the different findings (Leckelt et al., 2019).

Admiration reflects assertive self-enhancement (facets are grandiosity, striving for uniqueness, and charm) and results in social potency. Rivalry reflects antagonistic self-defense, which typically results in social conflict (Back et al., 2013). Because social potency can enhance career success (Hogan et al., 2013), we hypothesize that admiration and income are positively associated and the association of income with rivalry is smaller

(which might include a null or negative effect). To assert the robustness of the correlation of narcissism with income and to determine the differential effects of the narcissism dimensions, a representative sample should be used, and the dimensions of admiration and rivalry (Back et al., 2013; Leckelt et al., 2019) should be measured.

## Narcissism and Risk Attitude

Narcissism has been described as a general pattern of assertiveness characterized by extraversion, dominance, and confidence (Back & Morf, 2020). Narcissism is positively associated with risk-taking (Buelow & Brunell, 2014; Campbell et al., 2004). Narcissists' increased risk-taking can be explained by increased reward sensitivity (Lakey et al., 2008), overconfidence (Campbell et al., 2004), and a disregard for others' opinions (Leder et al., 2020). Risk-taking behavior is based on an individual's *risk attitude*. Risk attitude reflects the willingness to engage in behaviors that involve risk. A positive risk attitude is characterized by risk-seeking behavior, whereas a negative risk attitude is characterized by risk-averse behavior (for an overview, see Frey et al., 2017).

Risk attitudes have been shown to have domain-specific aspects. For example, taking financial risks does not necessarily predict health-related risk-taking (Blais & Weber, 2006). But general risk attitude measured with a question about a person's "willingness to take risks in general" was found to explain a substantial amount of the variance in risk-taking in various domains (Dohmen et al., 2011). General risk attitude can be considered a trait and underlies risk-taking behavior across domains and situations (Frey et al., 2017). Importantly, studies using behavioral measures to assess relationships between risk attitudes and narcissism have not necessarily captured the relationship between general risk attitude and narcissism (Buelow & Brunell, 2014; Campbell et al., 2004; Lakey et al., 2008). Instead, they showed an effect of narcissism on situation-specific risk-taking because behavioral measures tend to share only a small amount of variance with a person's general risk attitude (Frey et al., 2017).

We propose that grandiose narcissism's positive correlation with general risk attitude is based on its association with admiration but not rivalry. People high in admiration show higher reward sensitivity (Grapsas et al., 2020) and confidence (Back & Morf, 2020) than others. Narcissists' higher risk-taking behavior is explained by higher reward sensitivity (Lakey et al., 2008) and overconfidence (Campbell et al., 2004). Therefore, the two dimensions of narcissism (i.e., admiration and rivalry) should have distinct associations with general risk attitude when age, gender, and income are controlled for—a distinction that past research has not addressed.

## Risk Attitude and Income

Risk attitudes and income are positively correlated (Pfeifer, 2008; Shaw, 1996). However, these correlations speak only to the specific relationships that financial and occupational

risk-taking behavior have with income. Furthermore, risk attitudes are associated with other variables that are positively related to income. A study with business students who had job interviews found direct effects of risk attitudes on the probability of negotiating higher starting salaries, as well as moderating effects of risk attitudes on the relationships between the Big Five personality traits and the probability of negotiating higher starting salaries (Xiu et al., 2015). Furthermore, individuals with a higher career risk attitude tend to change employers more often and are more likely to have founded their own organization, business, or start-up (Rauch & Frese, 2000). Job changes within an industry sector or occupation have been shown to increase a person's income (Gius, 2014). People's risk attitudes influence their competitive behavior (Bartling et al., 2009), and, as Lee and Ohtake (2012) noted, competition (one of the most decisive elements in the labor market) is associated with income. Accordingly, a study with a sample of high-ranking executives showed that those with a higher risk attitude were more successful in terms of income, position, and authority (MacCrimmon & Wehrung, 1990). However, whereas the willingness to make risky decisions is likely to play a role in an executive's success, the question that remains is whether the correlation between risk attitude and income holds in the general population.

## A Joint Nomological Network of Narcissism, Risk Attitude, and Income

According to our review of the literature, a person's risk attitudes, narcissism, and income are correlated, but past research has investigated only pairwise relationships between the three constructs and used situation-specific measures of risk attitudes. Frey et al. (2017) showed that distinct risk-attitude measures (behavioral measures, self-reported propensity measures, and self-reported frequency measures) loaded on distinct latent specific factors and the general global factor. The loadings on the general global factor differed depending on the measure. Out of the self-reported propensity measures, the item assessing general risk attitude had a high loading on the global risk attitude factor (from the SOEP measures) and reflected a trait-like characteristic that was not captured by behavioral measures. This finding mirrors other studies that have shown that self-reports and behavioral measures are uncorrelated and that only self-report measures show high test-retest stability (e.g., Lönnqvist et al., 2015). For these reasons, we investigated general risk attitude.

Several aspects of narcissism (i.e., striving for supremacy vs. striving for uniqueness) overlap with tendencies that are typical of individuals with a higher risk attitude, such as participating in competitive situations, being willing to take risks, and actual success in getting ahead (Zou et al., 2020). Grandiose narcissism is positively related to a person's risk attitude and risk-taking (e.g., Buelow & Brunell, 2014). Further, a person's risk attitude is thought to be a positive predictor of income (Pfeifer, 2008; Shaw, 1996). Thus, we propose that a person's risk attitude should (partially) explain variance in the association

between narcissism and income. By contrast, the variables could also have an additive relationship.

If we find that an individual's risk attitude explains the variance shared between admiration, rivalry, and income, this could imply that a person who feels the need to be outstanding shows a higher willingness to take risks, which in turn is associated with a higher income. By contrast, if we do not observe that the dimensions of narcissism and risk attitude overlap and share variance that explains income, this would suggest that variables other than risk attitude provide a link between narcissism and income. Two models follow from these considerations: 1) a model in which there are unique additive effects of admiration, rivalry, and risk attitude on income and 2) a model in which there is an overlap in the variance explained in income by the dimensions of narcissism and risk attitude.

## The Present Study

We used a representative sample from the German SOEP. First, we tested the relationships between the two dimensions of narcissism (i.e., rivalry and admiration) and risk attitude. We entered the covariates age and gender as control variables as both were previously found to explain risk attitude (Frey et al., 2021). Second, we tested an additive regression model that included rivalry, admiration, and risk attitude as predictors of income. We entered age, gender, and employment status as covariates as these are the usual control variables (Ng et al., 2005). We tested the following hypotheses:

**H1:** Admiration and rivalry positively predict risk attitude. Risk attitude has a stronger association with admiration than with rivalry. This would suggest that admiration explains the positive association between risk attitude and narcissism.

**H2:** Admiration, rivalry, and risk attitude positively predict income. However, income has a stronger association with admiration than with rivalry.

**H3:** Risk attitude shares variance with admiration when predicting income and shares variance with rivalry when predicting income.<sup>2</sup>

## Method

### Participants

We used data from the 2018 wave of the German SOEP, which was the first large-scale assessment of narcissistic rivalry and admiration in a representative sample. The So-

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2) In the preregistration, we formulated H3 as mediation hypotheses. Reviewers pointed out that the data used in the present study did not allow us to test causal hypotheses, which was not our intention, but to avoid language that would suggest this, we dropped the mediation analyses and changed the hypotheses so that they now ask about the extents to which risk attitude and the dimensions of narcissism share variance in their relationships with income.

cio-Economic Panel has provided a representative view of the structure and traits of the entire population of Germany (Wagner et al., 2007) by collecting annual data from households and individuals since 1984 (Goebel et al., 2008).

We analyzed data from questionnaires administered to all participants from the age of 17 and used the recent release of the SOEP-Core data at the time of the preregistration (i.e., v35) in 2018 (<https://doi.org/10.5684/soep-core.v35>). After we deleted missing values (regarding the variables on risk propensity etc. used in our study), the total sample size was  $N = 14,749$ .

We excluded participants who reported that they were unemployed. We excluded participants whose incomes represented outliers or seemed implausible. To detect outliers in income, we followed the upper-outer-fence method and added three times the interquartile range to the upper quartile in income (Croarkin & Tobias, 2021). Consequently, participants with a monthly gross income of over 10,746€ were excluded from the analyses (1.51%). We also ran the regression models with the outliers, and the results did not differ (see Tables S2-S7 in [Supplementary Materials](#), Supplement E).

A total of 276 participants were excluded from the analyses, resulting in a sample of  $N = 14,473$  participants (7,611.60 men; 6,861.40 women, 47.4%) with an average age of  $M = 44.50$  ( $SD = 12.93$ ) who were included in the analyses. Note that the decimals resulted from the application of cross-sectional weights as recommended for panel studies (Gelman, 2007).

We used survey weights provided by the SOEP (e.g., Goebel et al., 2008). This means that the results are representative of the German population.

Participants' average monthly income was 2,793.60€ ( $SD = 1,857.70$ ). A total of 1,314.04 men (17.3%) reported working part-time jobs, and 6,297.56 men (82.7%) had full-time jobs, whereas 3,672.76 women (53.5%) had part-time jobs, and 3,188.64 women (46.5%) had full-time jobs.

## Measures

- **Monthly gross income** (in Euro) was measured using self-reports of income from work, including overtime pay but excluding vacation or back pay. We used the gross income variable with the imputed values provided by the SOEP (for the imputation process, see Frick & Grapka, 2014). As the distribution was right-skewed, we log-transformed the gross income values.
- **Risk attitude** was measured with one item, "Are you generally a person who is willing to take risks or do you try to avoid taking risks?" measured on an 11-point Likert scale ranging from 0 (*not at all*) to 10 (*very willing to take risks*). The item is associated with behavioral measures and self-reported risk-taking behavior, shows a moderate to high stability over time, and underlies risk-taking in specific domains (Dohmen et al., 2011).

- **Narcissism** was measured with the Admiration and Rivalry Questionnaire short scale (NARQ-S; [Leckelt et al., 2018](#)), which contains six items (for the specific wording, see [Supplementary Materials \[B\]](#)), three for measuring admiration (Cronbach's  $\alpha = .77$ ) and three for rivalry ( $\alpha = .63$ ).
- **Gender** was coded as "male" or "female" for each participant in the SOEP.
- **Age** was based on participants' date of birth as reported in the SOEP. To compute age in years, we subtracted participants' birth date (Year/Month/Day) from the median date of the data collection period. Data were collected from February to August 2018; thus, the median was June 15th ([Bohlender et al., 2020](#)).
- **Employment status** was assessed in six categories: full-time employment, part-time employment, vocational training, marginal or irregular employment, sheltered workshops, and unemployment. To distinguish between full-time and part-time employment, we collapsed all types of employment not coded as full-time into one category. As stated above, we excluded unemployed participants.

## Analytic Strategy

Due to the positively skewed distribution, we log-transformed monthly gross income for all analyses. To improve the interpretability of the results, all continuous predictors were grand-mean centered before we tested the models. To ensure that the sample was representative of the German population ([Gelman, 2007](#)), the models were tested with cross-sectional weights provided by the SOEP ([Goebel et al., 2008](#)).

To test the associations of admiration and rivalry with risk attitude, we used an ordered-probit regression model because the item measuring risk attitude was measured on an ordinal scale, which would inflate the beta and alpha errors when using a linear model ([Liddell & Kruschke, 2018](#)). The predictors were the aggregated means of each narcissism short scale for admiration and rivalry with the covariates age and gender.

To test the associations of admiration, rivalry, and risk attitude with income, we used a multiple regression model. The predictors were the aggregated means of the two narcissism scales and risk attitude with the covariates age, gender, and employment status. We had planned to test the indirect effects of admiration and rivalry on income via risk attitude using mediation analyses. As the current data did not allow tests of causal mediation, we dropped these analyses. Instead, to investigate the relative contributions of risk attitude and the dimensions of narcissism in explaining income, we carried out exploratory analyses using commonality analyses ([Nimon et al., 2008](#)) as suggested by the editor.

As suggested by the reviewers and the editor, we carried out three different sets of exploratory analyses to assess the robustness of our results. First, we tested whether our results held when we increased the time lag between income and our measures by one year. Second, as admiration and rivalry reflect agentic and antagonistic processes that influence one another, we investigated how their relationship to each other corresponded

to income and risk attitude. As suggested by the reviewers, we investigated suppression effects using the level-and-difference approach (Seidman et al., 2020). To circumvent the problems that come with the use of difference scores, we used polynomial regression and Response Surface Analysis (RSA; e.g., Edwards, 2002). Whereas RSA relies on multiple regression assumptions (Shanock et al., 2010) that were violated by the correlation of admiration and rivalry, we centered both predictors and thereby minimized multicollinearity (Aiken & West, 1991).

All models were run in R (R Development Core Team, 2020). The script for the analyses can be found in [Supplementary Materials](#), and the regression equations can be found in [Supplementary Materials](#), Supplement C. All analyses were preregistered at <https://osf.io/nmhtc>.

## Results

[Table 1](#) presents weighted descriptive statistics and weighted zero-order correlations for all variables.

**Table 1**

*Means, Standard Deviations, and Weighted Zero-Order Correlations*

Measure	1.	2.	3.	4.	5.	6.	7.	<i>M</i>	<i>SD</i>
1. Income	-							2,793.60	1,857.70
2. Risk attitude	.06**	-						4.65	2.36
3. Admiration	.03**	.18**	-					2.46	1.13
4. Rivalry	.01	.10**	.45**	-				1.78	0.81
5. Full-time	.56**	.09**	.04**	.05**	-				
6. Female	-.30**	-.20**	-.07**	-.15**	-.38**	-			
7. Age	.12**	-.11**	-.18**	-.14**	-.03**	.02*	-	44.50	12.93

*Note.* Continuous variables are monthly gross income (in Euro), age (in years), risk attitude (Likert scale ranging from 0 to 10), admiration, and rivalry (Likert scale ranging from 1 to 6). Dichotomous variables are gender (male = 0, female = 1) and employment status (part-time = 0, full-time = 1).  $N = 14,473$ .

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

### Tests of Preregistered Hypotheses: H1-H3

To test the differential relationships of risk attitude with admiration and rivalry in a representative sample, we fit two additive weighted probit regression models (one model without and one model with covariates). [Table 2](#) presents the standardized and unstandardized coefficients for admiration and rivalry and the covariates gender and age (see [Tables S2 and S3](#) in [Supplementary Materials](#), Supplement E, for unweighted results with and without outliers). The cut-off points for risk attitude resulting from the

probit regression are reported in [Supplementary Materials](#), Supplement D. The results revealed that admiration and risk attitude were positively associated ( $B = 0.15$ ,  $p < .001$ ). The relationship between rivalry and risk attitude was negative ( $B = -0.01$ ,  $p < .001$ ) but close to zero. However, the coefficient for rivalry deviated when the covariates were not taken into account (for further discussion, see the Results and Discussion sections for the exploratory analyses).

**Table 2**

*Results of the Weighted Probit Regression Predicting Risk Attitude*

Predictor	Without covariates		With covariates	
	$\beta$	$B$	$\beta$	$B$
Admiration	.18** [.18, .18]	0.16** [0.15, 0.16]	.17** [.17, .17]	0.15** [0.15, 0.15]
Rivalry	.03** [.03, .03]	0.03** [0.03, 0.03]	-.01** [-.01, -.01]	-.01** [-0.01, -0.01]
Age			-.08** [-.08, -.08]	-.01** [-0.01, -0.01]
Female			-.19** [-.19, -.19]	-.39** [-0.39, -0.39]
Observations	14,473		14,473	

*Note.* Reporting standardized and unstandardized coefficients. Values in parentheses depict the 95% CI of the estimate. The continuous variable *age* was centered for all analyses. The cut-off values (intercepts) can be found in [Supplementary Materials](#), Supplement D. Note that the weighted probit regression reports 36,312,034 observations; however, this is because we used design weights, but the actual sample size did not change. For the probit regression, no  $R^2$  value is available.

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

To investigate income's relationships with admiration, rivalry, and risk attitude, we fitted two weighted additive linear regression models (one model without and one model with the covariates gender, age, and employment status). We used log-transformed monthly gross income for all regression analyses. Admiration was positively related to income ( $B = 0.01$ ,  $p < .01$ ), whereas rivalry was negatively associated with income ( $B = -0.04$ ,  $p < .001$ ). Here, risk attitude had a significant association with income ( $B = 0.02$ ,  $p < .01$ ) only when the covariates were not included in the model. Thus, the variance in income explained by risk attitude in the model without the covariates was explained by differences in gender and employment status when the covariates were included.

When we retransformed log-income into natural income and compared the predicted values from the unstandardized weighted regression analysis, we found that a person with average admiration earned 2,706.36€ per month, a person 1 *SD* below the mean on admiration earned 2,665.35€, and a person 1 *SD* above the mean on admiration earned 2,748.00€. The retransformed effects of rivalry on income were more noticeable: A person with average rivalry earned 2,706.36€ per month, a person 1 *SD* below the mean on rivalry earned 2,795.64€, whereas for a person 1 *SD* above the mean on rivalry, their

income dropped to 2,619.93€. Risk attitude was not associated with income when the covariates were included. Employment status was the strongest predictor of income ( $B = 1.19$ ,  $p < .001$ ; for all standardized and unstandardized coefficients, see Table 3 (see Tables S4 and S6 in Supplementary Materials, Supplement E, for unweighted results with and without outliers).

**Table 3**

*Results of the Weighted Linear Regression Predicting the Log of Gross Income*

Predictor	Without covariates		With covariates	
	$\beta$	$B$	$\beta$	$B$
Admiration	.01 [-0.01, .03]	0.01 [-0.01, 0.02]	.02* [.003, .03]	0.01* [0.002, 0.02]
Rivalry	-.01 [-0.03, .01]	-0.01 [-0.03, 0.01]	-.03** [-0.04, -.02]	-0.04** [-0.05, -0.02]
Risk attitude	.04** [.03, .06]	0.02** [0.01, 0.02]	-.01 [-0.02, .01]	-0.002 [-0.01, 0.003]
Female			-.02** [-0.03, -.01]	-0.03** [-0.06, -0.01]
Full-time			.58** [.57, .59]	1.19** [1.16, 1.21]
Constant	7.65** [7.63, 7.66]	7.57** [7.53, 7.62]	7.59** [7.58, 7.60]	6.93** [6.89, 6.98]
Observations	14,473		14,473	
$R^2$	.002		.43	
Adjusted $R^2$	.002		.43	
Residual SE	43.81 ( $df = 14374$ )		33.17 ( $df = 14371$ )	
F Statistic	11.77** ( $df = 3, 14374$ )		1,795.11** ( $df = 6, 14371$ )	

*Note.* Standardized and unstandardized coefficients are reported. Values in parentheses depict the 95% CI of the estimate. The continuous variable *age* was centered for all analyses.

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

## Exploratory Analyses

### Common and Unique Variances

Linear regression does not allow direct access to the unique variance explained in the criterion by each predictor in the case of correlated predictors. To estimate the proportions of common and unique variance of correlated predictors in a linear regression, commonality analysis is the method of choice. For each predictor in a regression model, a commonality analysis splits the explained variance ( $R^2$ ) into common variance and unique variance. The unique variance of a predictor is its explanatory power when all other predictors are controlled for. The common variance is the variance explained by the predictor and the correlated predictor jointly. For this reason, when only considering the predictor in isolation (i.e., without the correlated predictors), the explained variance is the sum of the common and unique explained variance (Nimon et al., 2008).

The amount of common and unique variance for admiration, rivalry, and risk attitude when predicting income indicated that most of the unique variance in income was

explained by risk attitude but only when the covariates were not considered. The association of risk attitude and income did not share any variance with admiration or rivalry. However, when the covariates gender, age, and employment status were included, risk attitude explained almost no unique variance, and the variance that was previously explained by risk attitude was captured by the common variance with employment status and gender (for the unique and common variances, see Table 4 (for each combination of predictors, see [Supplementary Materials](#), Supplement G – Exploratory analyses: Commonality analyses).

**Table 4**

*Summarized Results for the Commonality Analyses for Income - Unstandardized Regression Without Weighting*

Predictor	Without covariates			With covariates		
	Unique	Common	Total	Unique	Common	Total
Admiration	0.0005	0.0003	0.0008	0.0008	0	0.0008
Rivalry	0.0001	-0.0001	0	0.0016	-0.0016	0
Risk attitude	0.0012	0.0003	0.0015	0.0002	0.0013	0.0015
Age				0.0117	0.0052	0.0169
Female				0.0009	0.0843	0.0852
Employment status				0.3188	0.0891	0.4079

*Note.* Unique =  $x$ 's unique effect; Common =  $\Sigma x$ 's common effects; Total = Unique + Common.

### Robustness of Results

To test the robustness of our results for income in 2019, we used a balanced panel consisting of participants with responses in 2018 and 2019 (details in [Supplementary Materials](#), Supplement H). We fit the same regression models as in the main analyses of the data from 2018 with and without covariates for the balanced panel. We included the predictor values for the covariates (age, gender, and employment status) from 2019 and the predictor values for admiration, rivalry, and risk attitude from 2018. The results were comparable to our results from the main analyses with the representative data from 2018 (see Table S11 in [Supplementary Materials](#), Supplement H). To test whether risk attitude and the dimensions of narcissism (admiration and rivalry) had incremental predictive validity over the covariates when predicting income, we used our fitted model with the 2018 data to predict income in 2019. As in our main analyses, we found that the variance in income was mostly explained by the covariates (RSME = 0.64538, 95%CI [0.63704, 0.65394]). Adding admiration, rivalry, and risk attitude had a minuscule positive effect (RSME = 0.64543, 95%CI [0.63709, 0.65399]). Taken together, the results were robust across a 1-year lag between income and the personality measures.

## Response Surface Analyses

Weighted polynomial regression and the Response Surface Analyses (RSA) on the relationships of admiration, rivalry, and risk attitude showed a positive association between rivalry and risk attitude for low levels of admiration, which diminished with higher levels of admiration. For income, the response surface was flat (indicating very small significant effects), but it showed that only beyond the lowest levels of rivalry was the positive association between admiration and income observed (see [Supplementary Materials](#), Supplement I, for regression tables and RSA plots).

## Level-and-Difference Approach

Results of the level-and-difference approach showed no evidence of suppression effects. Furthermore, we observed that not taking into account the relative strengths of rivalry and admiration may lead to only a small underestimation of the positive association of admiration with income and to a small underestimation of the positive association of rivalry with risk attitude (for the level-and-difference approach analyses, see [Supplementary Materials](#), Supplement J).

## Discussion

The present study used a representative sample to test the relationships between the narcissism dimensions of admiration and rivalry with risk attitude and their associations with income. We used a large sample, which resulted in high statistical power. For this reason, even small associations could reliably and precisely (as indicated by tight confidence intervals) be estimated and were found to be different from zero (i.e., significant). First, we tested whether the two dimensions of grandiose narcissism (i.e., rivalry and admiration) were equally associated with risk attitude. Second, we tested the relationships between rivalry, admiration, risk attitude, and income to determine whether 1) narcissism and risk attitude were additive and unique predictors of income or 2) narcissism and risk attitude had common variance in their relationships with income.

## Implications of the Associations of Admiration, Rivalry, and Risk Attitude

In line with H1 and the literature (e.g., [Campbell et al., 2004](#)), we found that narcissism and risk attitude were positively related in the German population. Additionally, using RSA ([Edwards, 2002](#)), we found that admiration had a stronger association with risk attitude than rivalry did, but the association between rivalry and risk attitude was stronger at lower levels of admiration and diminished at higher levels of admiration. By distinguishing between the dimensions of grandiose narcissism as specified by the NARC model ([Back et al., 2013](#)), we showed that risk attitude reflects a motivation for

self-enhancement rather than self-defense, but this tendency becomes more prominent at higher levels of admiration.

Our results, along with the observation that admiration is associated with higher reward sensitivity (Grapsas et al., 2020), indicate that risk attitude might reflect narcissists' desire to positively distinguish themselves from others. This finding is in line with the observation that among college students, narcissism is associated with higher engagement in health-related risk-taking behavior, which can have negative consequences (Buelow & Brunell, 2014). It is not that narcissists are reckless, but they seem to perceive that engaging in risky behavior is a way to positively distinguish themselves (Leder et al., 2020), and the strength of the association between admiration and risk attitude observed in the current study was about as strong as the known effect of gender (Frey et al., 2021).

Future research is needed to test for whether the findings of increased reward sensitivity (Lakey et al., 2008), overconfidence (Campbell et al., 2004), and a disregard for others' opinions (Leder et al., 2020), all of which are associated with narcissism and measured with the Narcissistic Personality Inventory (NPI; Raskin & Hall, 1979), can primarily be explained by the admiration dimension rather than the rivalry dimension. Importantly, in the present study, we did not examine the effect of ego-threatening situations. It remains an open question whether, under ego-threatening conditions, rivalry might result in higher risk-seeking to avoid a loss of status.

## Implications of the Associations of Admiration, Rivalry, and Income

After we separated the dimensions underlying narcissism into admiration and rivalry as specified by the NARC, they showed distinct relationships with income. Whereas income and admiration were weakly positively associated, rivalry and income were weakly negatively correlated. However, the associations were substantially smaller than in previous studies (Hirschi & Jaensch, 2015; Leckelt et al., 2019; Spurk et al., 2016). Importantly, the zero-order correlations were already low, which suggests that the low associations we observed in the regression models could not be accounted for by the different covariates that were entered into the models. There might be two major reasons for the contrast between our results and previous findings. First, previous studies (Hirschi & Jaensch, 2015; Paleczek et al., 2018) used either the NPI (Raskin & Hall, 1979) or the Dirty Dozen (Spurk et al., 2016), neither of which differentiate between the dimensions of narcissism and both of which contain somewhat "weaker" statements than the NARC. Therefore, more people should be likely to choose higher ratings, thus leading to more variance in the narcissism variable. However, Leckelt et al. (2019) also used the NARC, and their sample showed means and standard deviations that were similar to the ones in our sample for admiration and rivalry. For this reason, the explanation that different measures of narcissism result in different relationships with income is not adequate.

Additionally, the different results in previous studies are probably due to the respective samples; for example, [Leckelt et al.'s \(2019\)](#) sample contained fewer participants as it was an innovation sample and was not weighted to ensure representativeness.

Second, in Germany, income relies heavily on not only educational attainment, weekly work hours, and position within a company, but also on collective wage agreements. As the OECD showed for 2016, in Germany, the percentage of collective bargaining coverage was 56.0%, whereas, for example, in the US, it was only 11.5% ([OECD/AIAS, 2020](#)). Therefore, in Germany, income and working conditions are in part agreed upon by union representation rather than by individual contracts. Hence, personality can explain only so much variance in income. It is an important question for future research how other streams of revenue besides income from work (e.g., from financial investments) are related to measures reflecting narcissism and risk attitude. Regarding the practical importance of the observed associations, the strengths of the associations of admiration and rivalry with income were similar to the association between gender and income. The regression coefficients reflected a constant slope for the entire spectrum of income. Thus, even though the absolute increase in income had only small associations with admiration, rivalry, and risk attitude, these associations might still be practically relevant for individuals with low incomes.

## Further Implications From the Exploratory Analyses

The commonality analyses for income revealed that risk attitude explained unique variance in income but only as long as the covariates age, gender, and employment status were not included in the analysis. Then, the previously unique variance that risk attitude accounted for in income became variance that was shared with gender and employment status. This finding could also be seen in the weighted regression analyses for income, as the coefficient for risk attitude changed when the covariates were taken into account. Taken together, these findings indicate that the variance that risk attitude explains in income is better explained by gender and employment status, suggesting that research should further investigate the relationship between gender, employment status and risk attitude. With a negative common variance for rivalry, the commonality analyses also indicated a small suppression effect that was not captured by the level-and-difference approach.

The RSA revealed that the association between income and admiration rests on a certain “threshold” level of rivalry. Higher income might not rely on only the aspects of narcissism that are often more positively evaluated by interaction partners, namely, agentic narcissism reflected in admiration ([Back et al., 2013](#)), but it requires a certain level of antagonistic narcissism reflected in rivalry to take effect.

We did not find evidence of a positive link between risk attitude and income as had been found in previous studies, albeit the associations reported there were also very close to zero ([Pfeifer, 2008](#); [Shaw, 1996](#)). The relationship between narcissism and income

was also weak. Thus, the present analysis casts doubt on the idea that risk attitude explains income and that the link between narcissism and income can be explained by an individual's risk attitude, particularly because the current sample size allowed precise estimates to be made as indicated by the narrow confidence intervals.

Finally, we observed that when using the absolute levels of rivalry and admiration to predict income or risk attitude, one predictor captured the variance explained by the other. Future research might want to investigate the relationship between admiration and rivalry and examine a causal relationship between the two.

## Limitations and Future Research

The measure of narcissism is conflated in that some individuals are probably correct in reporting that they are above average on certain features. But the NARC measure used in the SOEP is not able to distinguish between individuals who provide a correct self-perception and those who have an inflated self-view. Therefore, we cannot unambiguously determine whether narcissists are more willing than others to engage in risky behavior or whether they simply present themselves in a highly positive manner. It is also possible that part of the variance shared between narcissism and risk attitude can be explained by the fact that some individuals truly possess extraordinary abilities and a high propensity to take risks.

The current study is based on cross-sectional data and cannot be used to test for causal effects. The mediation analysis we had planned would have failed to identify a causal indirect effect because, in a cross-sectional design, all predictors, criteria, and the mediator can be arbitrarily arranged (Pearl et al., 2016). Thus, instead of testing a mediation, we followed the reviewers' and the editor's suggestions and used commonality analyses to test the theory-based assumption that the dimensions of narcissism and risk attitude overlap and share variance in explaining income.

In general, given that all the measures were based on self-reports, we cannot rule out effects of common method bias, which could be a particular problem for the measure of risk attitude because individuals high in narcissism might also report that they are risk-seeking just because they want to portray themselves as above average. Thus, common method bias could have inflated our effects. However, because our results are in line with experimental and behavioral studies that have shown that narcissism is positively associated with risk attitude (Lakey et al., 2008), we interpret the results as reflecting true relationships and not artifacts. Whereas the current study assessed the link between the dimensions of narcissism and risk attitude, future research should investigate relationships between the dimensions of narcissism and risk-taking, which could be done using self-reported risk-taking behavior or behavioral risk-taking measures. The results of such studies would provide information about the behavioral aspects of narcissism and would extend the understanding of the relationship between risk attitude and risk-taking.

Finally, we investigated the relationships in a highly individualistic culture, and therefore, our results might apply only to Germany and its specific labor market characteristics—or perhaps to other similar countries. Conclusions for other countries (e.g., those with a collectivistic culture) cannot be drawn from our study.

## Conclusion

First, income in the general population is not as strongly related to narcissism as previous studies with smaller and more specific samples have suggested. Second, risk attitude did not predict income when other variables were controlled for. Our findings support the hierarchical model of grandiose narcissism with admiration as the “default” mode (Back, 2018; Grapsas et al., 2020) because admiration and rivalry share variance with each other, and thus, one dimension can be a “less noisy” representation of the other. Most importantly, the order seems to depend on the outcome because, in our case, admiration was “closer” to risk attitude but more “distant” from income.

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**Data Availability:** Data that are part of the SOEP cannot be published because of the data protection law in Germany. Researchers can apply to use the SOEP data at [https://www.diw.de/de/diw\\_02.c.222843.de/formulare.html](https://www.diw.de/de/diw_02.c.222843.de/formulare.html).

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## Supplementary Materials

For this article the following Supplementary Materials are available (for access see [Index of Supplementary Materials](#) below).

Via the Open Science Framework (OSF) repository:

- The preregistration documentation.

Via the PsychArchives repository:

- Analysis script file "main\_syntax\_risk\_narcissism\_income.R".
- Analysis script file "syntax\_risk\_narcissism\_income\_outliers\_included.R".
- Analysis script file "Commonality\_Analysis.Rmd".
- Analysis script file "Generate\_Balanced\_panel\_syntax\_\_18\_19.R".
- Analysis script file "Prediction\_Income\_2019.Rmd".
- PDF file, that includes preregistered plan, measures, and equations (Supplements A-C), regression results (Supplements D-E), and exploratory analyses (Supplements F-J).

### Index of Supplementary Materials

Leder, J., Schneider, S., & Schütz, A. (2020). *Supplementary materials to: Testing the relationships between narcissism, risk attitude, and income with data from a representative German sample* [Preregistration documentation]. OSF. <https://osf.io/nmhtc>

Leder, J., Schneider, S., & Schütz, A. (2021). *Supplementary materials to: Testing the relationships between narcissism, risk attitude, and income with data from a representative German sample* [Analysis scripts, tables, figures, equations, and additional materials]. PsychOpen GOLD. <https://doi.org/10.23668/psycharchives.5162>

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