



ARTICLE



<https://doi.org/10.1057/s41599-023-02409-z>

OPEN

The way I see the world, the way I envy others: a person-centered investigation of worldviews and the malicious and benign forms of envy among adolescents and adults

Jacky C. K. Ng ^{1✉}, Joanne Y. H. Chong¹ & Hilary K. Y. Ng²

Previous research had extensively studied the consequences of dispositional malicious and benign envy, while relatively few studies examined its determinants. Although one's worldviews have been proposed to shape the experience of malicious and benign envy, empirical studies directly investigating this notion are scarce. To address this gap, we adopted a person-centered approach to identify different individual profiles that underlie five generalized beliefs about the world, operationalized as five *social axiom* dimensions. We then examined how these profiles were associated with dispositional malicious and benign envy among both adolescents and working adults ($N = 1248$). As suggested by latent profile analysis, a 3-profile solution provided the best fit to the data in both groups. Two latent profiles (*skeptical-pessimistic* and *hopeful-optimistic* profiles) were similar across groups, while two distinct profiles (*flexible* and *reserved* profiles) were identified in adolescents and adults respectively. A series of comparisons indicated that people with different profiles experienced malicious and benign envy differently. In general, dispositional malicious envy was stronger among those in the *skeptical-pessimistic* profile, while dispositional benign envy was stronger among those in the *hopeful-optimistic* profile. Overall, our findings facilitate discussions on the similarities and differences in worldview profiles and experiences of envy across developmental groups.

¹The Hong Kong Polytechnic University, Hong Kong, China. ²The Hong Kong Metropolitan University, Hong Kong, China. ✉email: jackyck.ng@polyu.edu.hk

Introduction

Envy typically results from upward comparisons in which one lacks a desirable thing that is possessed by another person, reflecting a sense of inferiority and hostility (Cohen-Charash 2009). Lange and Crusius (2015) conceptualized envy into two forms, malicious and benign envy. Both forms of envy cause discomfort as upward comparison is usually accompanied by feelings of inadequacy. Yet, they differ in the motives to level the difference between oneself and superior others (Van de Ven et al., 2009). Malicious envy emphasizes a sense of hostility towards the superior others, motivating one to pull others down to level the difference. Previous research has shown that malicious envy is associated with moral disengagement (Rengifo and Laham 2022) and negative gossiping (Latif et al. 2021). Benign envy highlights the perceived deservingness of superior others, leading to a motivation to level oneself up, and has been shown to be associated with higher goal setting (Lange and Crusius 2015) and tendency to self-improve (Latif et al. 2021). Despite the fact that different levels of state malicious and benign envy can be experienced from time to time, some people reveal a chronic inclination to experience these two forms of envy across situations (Lange et al. 2018a). This stable tendency to respond to upward comparisons is described as dispositional malicious and benign envy, which would be the focus of this research. Dispositional malicious and benign envy has been consistently shown to be linked with various well-being indicators. For instance, dispositional malicious (benign) envy was negatively (positively) associated with both hedonic and eudaimonic well-being (e.g., Briki 2019; Ng et al. 2020b, 2021) and positively (negatively) associated with depression and anxiety (e.g. Li et al. 2022; Rentzsch and Gross 2015; Smith et al. 1999). Overall, the consequences of dispositional malicious and benign envy have been extensively investigated in previous research.

Although previous findings tended to indicate that malicious envy is linked to negative outcomes while benign envy is related to positive outcomes, it is untenable to draw a simplistic moral conclusion that malicious envy is purely destructive whereas benign envy is purely constructive (Lange and Protasi 2021). In essence, the dual forms of envy do have overlapping characteristics and are just partly opposing to each other (Crusius et al. 2020). For instance, as entailing the painful inferiority in upward comparisons, both malicious and benign envy has been found to elicit negative affect (Lange et al. 2018c) and Machiavellian behaviors (Lange et al. 2018b), while malicious envy, similar to benign envy, has also been shown to correlate with socially adaptive behaviors (Lange and Boecker 2019; Van de Ven et al. 2010).

How individual difference traits shape dispositional envy

Compared to its consequences, relatively fewer studies attempted to examine the determinants of both forms of dispositional envy. Among these studies, most of them focused on examining how more general traits may predict envy. For instance, Jiang et al. (2022) have examined the effects of Big Five personality traits on dispositional malicious and benign envy; neuroticism was negatively associated with dispositional malicious envy while the other four personality traits were positively associated with dispositional benign envy (see also Li et al. 2023b). Berant and Baumel (2017) also revealed that anxiety attachment style was more strongly associated with dispositional malicious envy than avoidance attachment style (see also Baumel and Berant 2015).

Apart from the classic general traits like Big Five personality traits and attachment styles, recent research also studied how dispositional envy could be predicted by various sets of traits which are more domain-specific. For instance, Lange and Crusius

(2015) revealed that hope for success positively predicted dispositional benign envy and negatively predicted dispositional malicious envy, whereas fear of failure only positively predicted dispositional malicious envy. Besides, Lange et al. (2016) showed that narcissistic rivalry positively predicted dispositional malicious and benign envy, while narcissistic admiration positively predicted dispositional benign envy, indicating that the two forms of dispositional envy are conceptually linked to different sets of traits. Similar observations can also be found in dispositional gratitude (Xiang and Yuan, 2021; Xiang et al. 2018) and dispositional mindfulness (Dong et al. 2020; Xiang et al. 2021).

Apart from the constructs that show differential effects on dispositional malicious and benign envy, previous studies have identified the antecedents that are common to both forms of dispositional envy. Hasty et al. (2022) found that trait prestige positively predicted dispositional benign envy and negatively predicted dispositional malicious envy, while trait dominance positively predicted both dispositional malicious and benign envy. Over and above Big Five personality traits, Milić et al. (2023) revealed that Dark Triad personality traits of Machiavellianism and narcissism positively predicted both dispositional malicious and benign envy (see also Lange et al. 2018b). Similarly, previous research found that both dispositional malicious and benign envy could be positively predicted by dispositional greed (Crusius et al. 2021) and dispositional entitlement (Lange et al. 2019). Overall, in alignment with earlier research (Crusius et al. 2020; Lange and Protasi 2021), these studies again demonstrated that the dual forms of dispositional envy are just partly opposing to each other and do have overlapping characteristics.

The aforementioned research examining how individual difference traits predict dispositional envy indeed aligns with the theoretical framework of self-view that has long been proposed (Kuiper and Rogers 1979; Markus 1977). As a cognitive framework that highlights information about self, self-views have been shown to predict various psychological outcomes (Swann et al. 2007). Likewise, individual difference traits (e.g., Big five personality traits, dispositional gratitude) captures beliefs and perceptions about oneself and can be conceptualized as a representation of self-views. For instance, neuroticism captures one's perception of his/her own self as being tense, emotional, and nervous, while dispositional gratitude reflects one's perception of his/her own self regarding the appreciation of the positive aspects of life and the kindness of others. Thus, it is predictable to observe the effects from various individual difference traits on dispositional malicious and benign envy.

Notably, while the individual difference traits discussed above typically measure one's perception of their own self (i.e., self-view), some of them include a small subset of items that reflect one's perception of a different focus, such as their social world. For instance, in the measurement of narcissistic rivalry, there are items that to some extent reflect views on the social world (e.g., "most people won't achieve anything"). Similar items can also be found in trait prestige (e.g., "others always expect me to be successful"), trait dominance (e.g., "some people are afraid of me"), and dispositional entitlement (e.g., "people like me deserve an extra break now and then").

Going beyond self-views: how worldviews shape dispositional envy

Extending the predictive framework of self-view, recent studies have started to incorporate the role of worldview in predicting various psychological outcomes (Bond et al. 2004a; Kurman 2011; Ng et al. 2020a). Worldview represents propositions and beliefs that people endorse about the world and how it functions

(Koltko-Rivera 2004) and is conceptually distinguishable from self-view that highlights one's perceptions and beliefs about oneself (Chen et al. 2006a, 2006b). Lange et al. (2018a) suggested that envy, at its core, results from a threat to social status which highlights a possible loss of respect and social influence in the eyes of others. Critically, given this objective threat, people may exhibit different emotional and behavioral reactions to these situations. Lange et al. (2018a) further suggested that some reactions might be more prevalent in certain groups/societies than others because of differing views on how status is gained across social environments. As such, the varying reactions to upward comparison may be shaped by one's subjective belief about the world (i.e., worldviews). Therefore, going beyond previous research that examined how various self-views (e.g., personality traits, dispositional gratitude) are linked to dispositional envy, the present investigation attempted to study how worldviews may shape one's dispositional malicious and benign envy.

Previous research investigating the link between belief about the world and envy is notably limited, except for the studies conducted by Crusius et al. (2016), Den Nieuwenboer et al. (2023), and Li et al. (2023a). For instance, Crusius et al. (2016) demonstrated that belief in Protestant work ethics positively predicted benign envy while belief in status fatalism positively predicted malicious envy. In a similar context, Den Nieuwenboer et al. (2023) and Li et al. (2023a) found that individuals' beliefs towards their organization (viz., status importance and competitive climate in organization) were associated with higher levels of workplace envy. Yet, these prior studies focused on the beliefs that are relatively domain- and context-specific (e.g., work ethics and workplace) and may not be applicable to non-laboring individuals (e.g., students and retirees). Therefore, to enhance generalizability, we aimed at examining the relationship between generalized beliefs about the world and envy.

In the present research, we attempted to study how dispositional malicious and benign envy is related to five dimensions of social axioms that represent five generalized worldviews. Leung and Bond (2004) proposed the construct of social axioms to quantify worldviews, tapping into a person's generalized beliefs about people, social groups, social institutions, the physical environment, and the spiritual world. Social axioms are organized into five dimensions, and these have been identified and validated in 40 nations (Cheung et al. 2006) and across developmental stages (Chen et al. 2016). The five pan-cultural dimensions are (1) *social cynicism*, denoting a negative view of human nature, (2) *reward for application*, a belief in the positive role of effort on achievement, (3) *social complexity*, the belief that multiple ways exist to achieve the same goal, (4) *fate control*, the belief that fate influences life events but people can alter fate, and (5) *religiosity*, which denotes the positive functions of religious belief.

The validity and usefulness of the five dimensions of social axioms in predicting outcomes have been demonstrated both for national groups and for individuals. For national level, social axioms were associated with a series of societal-level outcomes, such as GDP, life expectancy, suicide rate, unemployment rate, pace of life, and work hours per week (Bond et al. 2004b; Leung and Bond 2004; Zhou et al. 2009). For individual level, the predictability of social cynicism and reward for application has been more reliably demonstrated than the other three dimensions of social axioms. For instance, social cynicism was consistently linked with higher levels of psychological illness, mistrust, relationship conflict, and moral disengagement (Alexandra 2019; Kurman 2011; Lai et al. 2007; Li et al. 2011). On the other hand, reward for application was frequently associated with higher levels of psychological well-being, optimism, loci-of-hope, and exertion of effort (Bernardo and Nalipay 2016; Hui and Bond 2010; Ng et al. 2020a; Zhou et al. 2009). In general, previous

findings have revealed the predictability of undesirable and favorable outcomes for social cynicism and reward for application respectively. Comparatively, the predictability for the dimensions of social complexity, fate control, and religiosity is less systematic and conclusive. For instance, previous research indicated that these three dimensions were not correlated with stress, depressive cognition, self-esteem, optimism, and either approach or avoidance motivation (Chen et al. 2009; Hui and Bond 2010). Instead, social complexity was positively associated with dialectical thinking (Ng and Chen 2023), fate control was positively associated with perceived benefit of gambling (Wu et al. 2019), while religiosity was negatively correlated with cognitive abilities (Stankov and Lee 2018). Taken together, previous findings revealed that the predictions of social complexity, fate control, and religiosity are highly diverse. Based on these findings, it is expected that social cynicism and reward for application may be more strongly linked to individual's dispositional malicious and benign envy than other social axiom dimensions.

The present research

Our objectives in this research were threefold.

First, although previous studies have examined the links between different beliefs and envy, these beliefs are mostly domain-specific and are likely to vary across groups, such as beliefs about work ethics (Crusius et al. 2016). To the best of our knowledge, no previous studies have been conducted to examine the relationship between generalized beliefs about the world and dispositional envy. Thus, we aimed at investigating how the five dimensions of social axioms, which are well-validated across cultures and developmental stages, link with dispositional malicious and benign envy.

Second, social axioms have been mostly studied in isolation using a variable-centered approach (e.g. Bond et al. 2004a; Chen et al. 2016). This approach merely considers one's scores on the single axiom factors in explaining the effects of social axioms on a certain outcome. For instance, a variable-centered approach may reveal a positive effect of social cynicism and fate control and a negative effect of reward for application on dispositional malicious envy. An interpretation is commonly made as "people high in social cynicism and fate control and low in reward for application might have a stronger chronic tendency to experience malicious envy". Yet, the validity of this interpretation is questionable and can even be misleading since it implies that the findings from a variable-centered approach are person-centered in nature (see Brewer et al. 2016). Put it differently, this interpretation assumes that a person's profile high in social cynicism and fate control and low in reward for application is empirically available. Thus, through addressing the heterogeneity across people in the empirical sample, a person-centered approach is preferred to identify the distinct profiles that are empirically available (Howard and Hoffman 2018). In the present research, the five social axiom dimensions function jointly as a profile since one's worldview varies as a function of multiple dimensions of social axioms rather than a single dimension. Thus, we aimed at identifying the individual social axiom profiles in empirical data through a person-centered approach that have not been utilized in previous studies.¹ Upon identifying the profiles, we would examine how they are linked to dispositional malicious and benign envy.

Finally, as our worldviews are contingent to our social environment (Leung and Bond 2004), it is necessary to examine the social axiom profiles and their influences across different social groups. Chen et al. (2016) showed that the effects of social axioms varied among developmental groups, including children, adolescents, and adults (see also Boehnke 2009). These findings

highlighted the importance of incorporating multiple samples in this research to capture the potential group differences in social axiom profiles and their influences. Moreover, apart from social axioms, previous research has documented that the associations of dispositional malicious and benign envy with other constructs, such as self-esteem (Ng et al. 2020b) and happiness (Ng et al. 2019), differed across adolescents and adults. Hence, relying solely on research evidence from a single group of participants may overlook the intriguing patterns observed in social axiom profiles and their associations with dispositional malicious and benign envy. In this study, we aimed to identify the social axiom profiles among two developmental groups with varying social environments (*viz.*, adolescents and working adults), thereby exploring the possible similarities and differences in these profiles.

Method

Participants and procedure. A sample of 664 adolescents and 584 working adults were recruited in Hong Kong, yielding a total sample size of 1248. The sample of adolescents (327 females; $M_{age} = 14.32, SD = 1.74$) was recruited from six different grades in a secondary school in Hong Kong (equivalent to Grade 7 to 12 in the American school system) with an age range from 11 to 19. A comparable number of students from junior grades (Grade 7 to 9; 54.8%) and senior grades (Grade 10 to 12; 45.2%) were recruited for this study. To recruit working adults, we partnered with a Hong Kong-based participant recruitment and data collection company (Kantar Hong Kong Ltd.). This company curates a massive pool of over 450,000 Hong Kong people who have consented to receiving information about various research investigations they can be involved in. Our survey was sent out to the pool of potential participants who met our requirements (*i.e.*, full-time employees from a variety of industries in low to high level positions). Among the sample of working adults (317 females; $M_{age} = 35.69, SD = 7.78$), around 34.9% had a college education or below and 65.1% had a bachelor’s degree or above, while around 49.0% were single and 51.0% were married. All the participants completed a survey consisting of the measurements of social axioms and dispositional malicious and benign envy. Informed consent was obtained from all the participants as well as the parents of adolescents in advance. The sample size in each group should be able to address our research questions of interest.²

Measures

Social axioms. The 40-item Social Axioms Survey (Leung et al. 2012) was used to assess five generalized beliefs about the world. The items were anchored on a 5-point scale ranging from 1 (*strongly disbelieve*) to 5 (*strongly believe*). Sample items include “People who become rich and successful forget the people who helped them along the way” (social cynicism; $\alpha = 0.78$ and 0.72

for adolescents and working adults, respectively), “Difficult problems can be overcome by hard work and persistence” (reward for application; $\alpha = 0.84$ and 0.78 for adolescents and working adults, respectively), “A bad situation can suddenly change for the better” (social complexity; $\alpha = 0.68$ and 0.70 for adolescents and working adults, respectively), “Fate determines a person’s success in life” (fate control; $\alpha = 0.81$ and 0.75 for adolescents and working adults, respectively), and “Religion helps people make good choices for their lives” (religiosity; $\alpha = 0.90$ and 0.84 for adolescents and working adults, respectively).³

Dispositional malicious and benign envy. The 10-item Benign and Malicious Envy Scale (Lange and Crusius 2015) was used to measure one’s chronic experiences of malicious and benign envy. The items were anchored on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Sample items include “Seeing other people’s achievements makes me resent them” (dispositional malicious envy; $\alpha = 0.83$ and 0.80 for adolescents and working adults, respectively) and “If I notice that another person is better than me, I try to improve myself” (dispositional benign envy; $\alpha = 0.81$ and 0.83 for adolescents and working adults, respectively).

Data Analysis Plan. To examine whether adolescents and working adults with different social axiom profiles would have different levels of dispositional malicious and benign envy, a three-step approach was utilized. In Step 1, measurement invariance of social axioms and dispositional malicious and benign envy was evaluated to ensure the compatibility of these constructs across samples of adolescents and working adults. In Step 2, latent profile analysis was then conducted to identify the latent profiles of adolescents and working adults based on the scores for the five social axioms. In Step 3, the levels of dispositional malicious and benign envy were compared across the social axiom profiles identified in Step 2. Mplus 8.0 was used to perform multiple-group confirmatory factor analysis in Step 1 and latent profile analysis in Step 2, while SPSS 29.0 was used to perform correlation analysis and analysis of variance (ANOVA) in Step 3.

Results

Descriptive statistics and bivariate correlations of variables are presented in Table 1.

Evaluating the measurement invariance of social axioms and dispositional malicious and benign envy. Prior to the latent profile analysis on social axioms in Step 2 and the comparisons of dispositional malicious and benign envy across adolescents and working adults in Step 3, it is important to ensure the equivalency in the measurements of social axioms and dispositional malicious and benign envy across the two samples. Specifically, a series of multiple-group confirmatory factor analysis was performed to

Table 1 Descriptive Statistics, Alphas, and Bivariate Correlations of Measures Among Adolescents (AD) and Adults (WA).

	$M(SD)_{AD}$	$M(SD)_{WA}$	1	2	3	4	5	6	7
1. SCYN	3.07 (0.61)	3.26 (0.52)		-0.16***	0.05	0.29***	-0.11**	0.41***	-0.02
2. RFA	3.81 (0.60)	3.62 (0.51)	-0.28***		0.30***	0.19***	0.36***	-0.12**	0.44***
3. SCOM	3.96 (0.44)	3.86 (0.44)	0.20***	0.27***		0.17***	0.11*	-0.19***	0.15***
4. FC	2.69 (0.72)	3.33 (0.55)	0.35***	-0.08*	0.04		0.22***	0.23***	0.19***
5. REL	3.27 (0.76)	3.22 (0.64)	-0.10*	0.26***	0.17***	-0.07		0.03	0.27***
6. ME	2.45 (0.80)	2.70 (0.75)	0.47***	-0.22***	-0.08	0.30***	-0.14***		0.08
7. BE	3.51 (0.67)	3.46 (0.69)	0.05	0.33***	0.20***	0.11**	-0.03	0.09*	

SCYN social cynicism, RFA reward for application, SCOM social complexity, FC fate control, REL religiosity, ME dispositional malicious envy, BE dispositional benign envy. Intercorrelations for adolescents are provided below the diagonal while those for working adults are provided above the diagonal. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2 Model Fit for Different Profile Solutions Among Adolescents and Adults.

	Adolescents				Adults			
	2-profile	3-profile	4-profile	5-profile	2-profile	3-profile	4-profile	5-profile
No. of parameter	16	22	28	34	16	22	28	34
Log likelihood	-3033.12	-2989.12	-2932.71	-2905.45	-2215.86	-2163.65	-2137.99	-2116.47
BIC	6170.25	6121.21	6047.37	6031.84	4533.63	4467.44	4454.33	4448.91
aBIC	6119.42	6051.35	5958.46	5923.89	4482.83	4397.560	4365.440	4340.97
Entropy	0.771	0.803	0.716	0.763	0.523	0.803	0.798	0.757
BLRT <i>p</i> -value	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

The bold values indicates that the 3-profile solution is the finalized solution.

evaluate the configural, metric, scalar invariance in all measurements. The factor analytic model was fitted with parceling in which two to three indicators were randomly combined into four parcels (Little et al. 2002).⁴

First, the configural model showed an acceptable fit to the data, $\chi^2(658) = 1673.527, p < 0.001, CFI = 0.930, NNFI = 0.920, SRMR = 0.051, RMSEA = 0.050, 90\% CI \text{ for } RMSEA [0.047, 0.053]$, revealing the equivalent factor structure in the constructs across adolescents and young adults. Second, to test for metric invariance, factor loadings were constrained to be equal across the two samples. The constrained model also fitted the data well, $\chi^2(679) = 1730.534, p < 0.001, CFI = 0.928, NNFI = 0.920, SRMR = 0.055, RMSEA = 0.051, 90\% CI \text{ for } RMSEA [0.047, 0.053]$. All factor loadings were statistically significant in both samples, ranging from 0.46 to 0.94 with an average of 0.72. To confirm metric invariance, a comparison of model fit between unconstrained and constrained models was required to examine whether the constrained model had a substantial drop in model fit. Instead of using the chi-square difference statistic, which is sensitive to sample size and the violation of normality assumption (Boer et al. 2018; Rutkowski and Svetina 2014), we adopted the recommendation proposed by Chen (2007) in which ΔCFI less than 0.010 supplemented with $\Delta RMSEA$ less than 0.015 or $\Delta SRMR$ less than 0.030 indicate model invariance. The comparison on goodness-of-fit indices indicated that the constrained model had a trivial drop in model fit, providing support for the metric invariance of the constructs across adolescents and working adults, $\Delta CFI = 0.002, \Delta RMSEA = -0.001, \Delta SRMR = -0.004$. Finally, for scalar invariance, we tested a model in which intercepts were constrained to be equal across the two samples. This constrained model also yielded an acceptable fit to the data, $\chi^2(700) = 1873.156, p < 0.001, CFI = 0.919, NNFI = 0.913, SRMR = 0.057, RMSEA = 0.052, 90\% CI \text{ for } RMSEA [0.049, 0.055]$. Importantly, the comparison on goodness-of-fit indices indicated that the constrained model just had a trivial drop in model fit, supporting for the scalar invariance of the constructs across the two samples, $\Delta CFI = 0.009, \Delta RMSEA = -0.001, \Delta SRMR = -0.002$. Overall, the results of measurement invariance ensured the compatibility of the measurements of social axioms and dispositional malicious and benign envy across the samples of adolescents and working adults. Therefore, the latent profile analysis on social axioms in Step 2 and the comparisons of dispositional malicious and benign envy across the two samples in Step 3 could be safely employed.

Identifying the worldview profiles among adolescents and working adults. Latent profile analysis was conducted to identify the latent profiles of individuals based on the scores for the five social axioms. A series of latent profile models, ranging from two- to five-profile solutions, was tested in both adolescents and adults. As shown in Table 2, Bayesian information criteria (BIC) and sample-size adjusted Bayesian information criteria (aBIC)

dropped as the profiles increased, while the bootstrap likelihood ratio test (BLRT) was significant in all profile solutions. Yet, some profile sizes in the solutions were extremely small (e.g., a profile size of 6 in the five-profile solution in adolescents). Importantly, among both adolescents and adults, the entropy index was highest and larger than the conventional cutoff of 0.80 in the three-profile solution (Celeux and Soromenho 1996; Tein et al. 2013). To achieve balance across profile size, entropy index, fit probability, and interpretability, the three-profile solution was preferred among both adolescents and adults as it showed an acceptable level of entropy (≥ 0.80), a large fit probability in each latent profile (≥ 0.80), and a reasonable size of each latent class (≥ 20).

The levels of the five social axioms for each of the three latent profiles are presented in Table 3 and Fig. 1. As shown in Fig. 1, The pattern of the three profiles was similar across adolescents and adults. Among adolescents, the first profile consisted of those who were relatively high in social cynicism, and low in reward for application and religiosity, reflecting a “skeptical-pessimistic” profile (12.7% of the sample). The second profile consisted of those who were relatively high in reward for application and religiosity, and low in social cynicism, reflecting a “hopeful-optimistic” profile (83.4%). The third profile was the smallest (3.9%) and consisted of those who were high in all social axioms, and we termed this profile “flexible”. Adults showed a comparable profile pattern (Fig. 1), with a “skeptical-pessimistic” profile (5.3%) and a “hopeful-optimistic” profile (20.0%). The third and largest profile (74.7%) consisted of those who were relatively moderate in all social axioms, the “reserved profile”. The means of the indicators in the skeptical-pessimistic and hopeful-optimistic profiles were generally comparable across adolescents and adults, while the means of the indicators in the last profile differed across adolescents and adults (see the upper panel of Table 3).⁵

Examining the patterns of dispositional malicious and benign envy across worldview profiles. To examine whether people with different social axiom profiles experienced different levels of dispositional malicious and benign envy, we compared the levels of dispositional malicious and benign envy across the profiles in both adolescents and adults. As in the lower panel of Table 3 and Fig. 2, adolescents in the skeptical-pessimistic and flexible profiles generally reported a higher level of dispositional malicious envy than those in the hopeful-optimistic profile, $F(2, 661) = 31.92, p < 0.001, \eta_p^2 = 0.088$, revealing a medium-to-large size of differences across profiles (Cohen 1988). Adolescents in the hopeful-optimistic and flexible profiles showed a higher level of dispositional benign envy than the skeptical-pessimistic profile, $F(2, 661) = 18.59, p < 0.001, \eta_p^2 = 0.053$, indicating a medium size of differences across profiles. Among adults, dispositional malicious envy did not statistically differ across the three profiles,

Table 3 Results of the Three-Profile Solution Among both Adolescents and Adults, and Mean Comparisons of Dispositional Malicious and Benign Envy across Three Profiles.

	Adolescents (n = 664)			Adults (n = 584)		
	Skeptical-pessimistic profile (12.7%)	Hopeful-optimistic profile (83.4%)	Flexible profile (3.9%)	Skeptical-pessimistic profile (5.3%)	Hopeful-optimistic profile (20.0%)	Reserved profile (74.7%)
SCYN	3.52	2.94	4.08 ^c	3.57	3.26	3.24 ^c
RFA	2.93	3.94	4.23 ^c	3.23	4.04	3.52 ^c
SCOM	3.77	3.96	4.53 ^c	4.01	4.09	3.77 ^c
FC	2.90	2.59 ^b	3.74	3.19	3.62 ^b	3.25
REL	2.68 ^a	3.35	3.61	1.75 ^a	3.96	3.12
n	84	554	26	31	117	436
Within-Group Comparison Across Profiles[#]						
ME	2.94 ^d	2.35 ^e	3.12 ^d	2.55 ^d	2.67 ^d	2.72 ^d
BE	3.17 ^d	3.53 ^e	4.00 ^f	2.96 ^d	3.84 ^e	3.39 ^f

SCYN social cynicism, RFA reward for application, SCOM social complexity, FC fate control, REL religiosity, ME dispositional malicious envy, BE dispositional benign envy.

^asignificant mean difference of profile 1 between adolescents and adults.

^bsignificant mean difference of profile 2 between adolescents and adults.

^csignificant mean difference of profile 3 between adolescents and adults.

[#]Means with different superscripts (viz., d, e, and f) are significantly different within the same group.

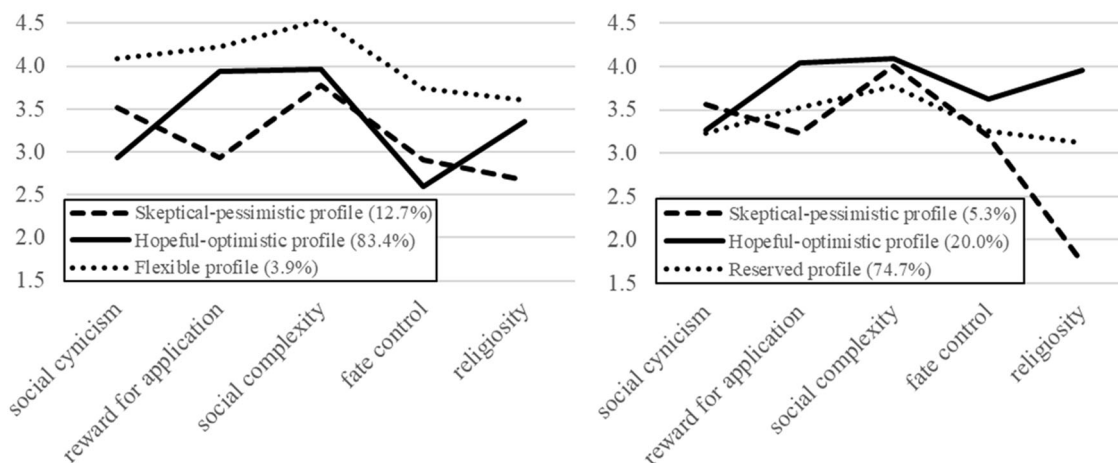


Fig. 1 Estimated Mean of Social Axioms as a Function of the Three-Profile Solution Among Adolescents (Left) and Adults (Right).

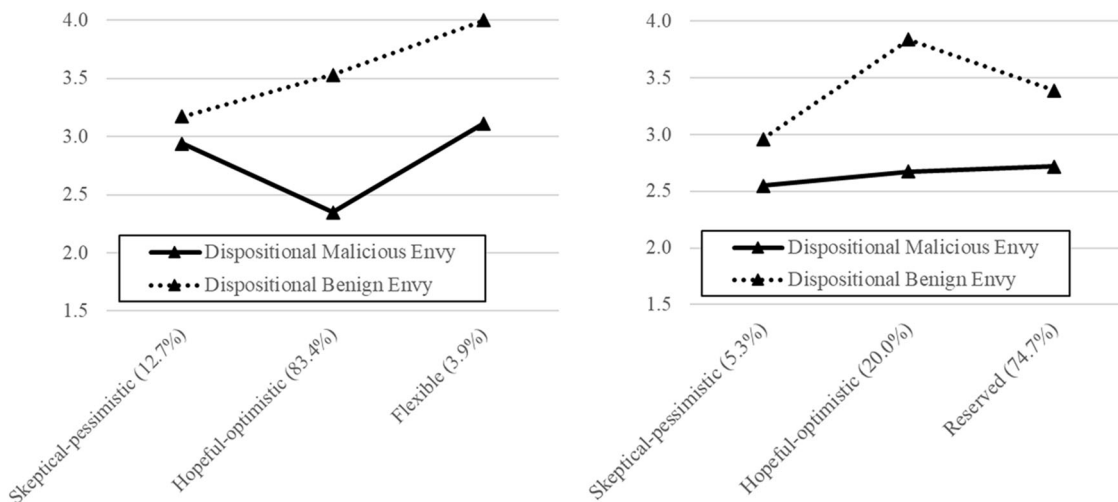


Fig. 2 Mean Comparisons of Dispositional Malicious and Benign Envy Across Three Profiles Among Adolescents (Left) and Adults (Right).

Table 4 Results of the Path Analysis with Worldviews Predicting Dispositional Malicious and Benign Envy Among Adolescents and Adults.

	Adolescents (n = 664)		Adults (n = 584)	
	ME	BE	ME	BE
SCYN	0.43*	0.09	0.38*	0.04
RFA	-0.04	0.36*	-0.05	0.39*
SCOM	-0.15*	0.10	-0.24*	0.01
FC	0.15*	0.09	0.15*	0.08
REL	-0.06	-0.12*	0.08	0.11

All coefficients are standardized. SCYN social cynicism, RFA reward for application, SCOM social complexity, FC fate control, REL religiosity, ME dispositional malicious envy, BE dispositional benign envy. * $p < 0.005$.

$F(2, 581) = 0.83, p = 0.436, \eta_p^2 = 0.003$, while a medium-to-large size of differences in dispositional benign envy was observed across profiles in which those in the hopeful-optimistic profile reported a higher level of dispositional benign envy than the other two profiles, $F(2, 581) = 31.51, p < 0.001, \eta_p^2 = 0.098$.

As the supplementary information, we also employed the variable-centered approach to examine the associations between five social axioms and dispositional malicious and benign envy (Table 4). Briefly put, based on the multiple-group path analysis, social cynicism (positively), social complexity (negatively), and fate control (positively) predicted dispositional malicious envy among both adolescents and adults, while reward for application also positively predicted dispositional benign envy among both adolescents and adults. Interestingly, religiosity negatively predicted dispositional benign envy among adolescents only. As aforementioned, based on these findings from the variable-centered approach, it is tempting to conclude that people high in social cynicism and fate control and low in social complexity might have a higher level of dispositional malicious envy. Yet, by a close inspection of the social axiom profiles among both adolescents and adults, none of the profiles indicated the standings of these social axiom dimensions. Besides, through comparing the profiles (e.g., flexible vs. hopeful-optimistic profiles), social cynicism (but not social complexity and fate control) is the factor that can differentiate people with different levels of dispositional malicious envy in the empirical sample. Overall, in this study, the person-centered approach helped to identify social axiom profiles that empirically exist, thereby providing a legitimate examination of the associations between worldview profiles and dispositional malicious and benign envy.

Discussion

This research examined whether worldviews are associated with dispositional malicious and benign envy. Using a person-centered approach, we identified different individual profiles based on five social axioms among adolescents and working adults. Then, we examined whether the identified profiles would show different levels of dispositional malicious and benign envy.

Two similar profiles were identified in both adolescents and adults, namely, the *skeptical-pessimistic* and *hopeful-optimistic* profiles. We also identified a *flexible* profile consisting of adolescents high in all social axioms, and a *reserved* profile consisting of adults who are relatively moderate in all social axioms. Interestingly, the dominant profile in adolescents (i.e., the hopeful-optimistic profile) was not the dominant adult profile. For adults, the reserved profile was dominant, seemingly implying a shift of profiles across developmental groups. This shift is consistent with previous findings that adolescents revealed more optimistic bias than adults (Arnett 2000). Since one’s sense of primary control

has been found to increase from birth and peak at middle age (Schulz et al. 1991), younger people may feel more optimistic and hopeful because of a stronger belief in personal control. This may explain the shift from hopeful-optimistic to reserved across adolescents and adults.

Among adolescents, a higher level of dispositional malicious envy was observed in the skeptical-pessimistic and flexible profiles that show a higher level of social cynicism. Among adults, dispositional malicious envy was comparable across the three profiles that show a similar level of social cynicism. In this sense, dispositional malicious envy is sensitive to the level of social cynicism in profiles. This observation aligns with the conceptualization of social cynicism, in which social cynics tend to achieve a goal without taking ethical issues into consideration (Leung and Bond 2004). Previous research has also shown that people experiencing malicious envy are more likely to attack the envied person to get that which they desire (Van de Ven et al. 2009). Therefore, people with a skeptical-pessimistic or flexible profile are likely to feel hostile to and pull down the superior others, yielding a stronger chronic tendency to experience malicious envy. Indeed, Kuo et al. (2020) observed a positive relationship between this cynical view of the world and dispositional malicious envy.

A close inspection of both adolescent and adult profiles reveals that a higher level of dispositional benign envy is generally reported among those with profiles showing a higher level of reward for application and religiosity (e.g., the flexible and hopeful-optimistic profiles). Reward for application refers to a belief that a thoughtful investment of effort and resources will lead to positive outcomes, while religiosity refers to a belief that supernatural forces and religious practices have beneficial functions for human social life (Leung and Bond 2004). Both beliefs highlight one’s positive worldviews and have been shown to associate with a wide range of constructive behaviors. For instance, people high in reward for application were more willing to exert effort (Zhou et al. 2009) and adopt active coping styles such as compromising, accommodating, and collaborating strategies to overcome challenges (Bond et al. 2004a). Besides, Bernardo and Nalipay (2016) showed that people high in religiosity were more likely to maintain hope as they think that external resources from spiritual forces may help them to solve problems. More explicitly, Nalipay et al. (2017) showed that religiosity was associated with adaptive cognitive processing and posttraumatic growth in survivors of a natural disaster, providing one with a positive sense of meaning during distressing and difficult moments. Taken together, these findings may explain why people with profiles denoting a high level of both reward for application and religiosity (e.g., the flexible and hopeful-optimistic profiles) may reveal a high level of dispositional benign envy. Benign envy is a painful experience which motivates people to pull themselves up to reduce the difference between themselves and superior others (Van de Ven et al. 2009). Essentially, benign envy reflects a challenge-accepting response during difficult times, such as hope for success (Lange and Crusius 2015) and self-improvement (Ng et al. 2023). Therefore, people with the flexible and hopeful-optimistic profiles should be more likely to maintain hope and employ adaptive positive strategies to cope with situations that highlight their inadequacy, thereby yielding a stronger chronic tendency to experience benign envy during upward social comparison. Furthermore, the current findings may complement the explanation of the association between psychological entitlement and benign envy (Lange et al. 2019). It has been observed that individuals with high psychological entitlement experienced more benign envy in upward social comparisons due to their endorsement of a higher level of prestige motivation. Prestige motivation entails sharing expertise and skills to attain status. These

sharing behaviors can be regarded as adaptive coping strategies against challenging moments and highlight a hopeful attitude towards human nature. Thus, the current findings in the flexible and hopeful-optimistic profiles may help elucidating why prestige motivation may increase benign envy, which represents a response of accepting challenges during difficult times. Moreover, the present findings may offer insights into why individuals with a high level of benign envy may engage in more Machiavellian behaviors (Lange et al. 2018b). It is important to note that individuals with a hopeful-optimistic profile may not always exhibit desirable behaviors. Previous studies have indicated that being unrealistically optimistic can sometimes be maladaptive, leading to negative experiences in subsequent events (Dillard et al. 2006) and displaying risky behavioral intentions (Radcliffe and Klein 2002). Hence, it is plausible that individuals with a high level of benign envy may occasionally demonstrate unrealistic optimism, which may prompt them to employ Machiavellian tactics that reflect duplicity and manipulation.

Methodologically, the findings obtained through a person-centered approach in the present research offer two implications over those that can be derived from a variable-centered approach. First, in order to classify individuals into different social axiom profiles, it is necessary to consider the theoretical maximum number of profiles (e.g., dichotomizing each of the five social axioms into high and low levels would result in a total of 32 profiles). However, as revealed in our findings from latent profile analysis, many of these theoretically possible profiles do not empirically exist. For instance, even though it is theoretically possible to classify individuals into a profile characterized by relatively high social cynicism and relatively low social complexity, no individuals in reality appeared to belong to this profile. Hence, our latent profile analysis helped to identify heterogeneous and realistic subgroups within the population. Second, based on our supplementary findings from path analysis (see Table 4), dispositional malicious and benign envy varied as a linear function of the five social axioms. For instance, social complexity and fate control linearly predicted dispositional malicious envy among adolescents. Considering the comparable standings of social complexity and fate control in both skeptical-pessimistic and hopeful-optimistic profiles, dispositional malicious envy should not differ significantly across the two profiles. However, as demonstrated in our profile comparisons, dispositional malicious envy did actually differ. These findings suggest that the linear effects of social complexity and fate control alone do not fully capture the complexity within social axiom profiles. Put it differently, different social axioms may interact with each other, exerting non-linear effects on dispositional malicious envy. In this case, the remaining three social axioms may interact to weaken or intensify the linear effects of social complexity and fate control across profiles. Theoretically, testing all possible higher-order interactions among the five social axioms in path analysis could capture the complexity within social axiom profiles. However, this approach is empirically infeasible due to the unrealistically large number of higher-order interaction terms required. Hence, compared to a variable-centered approach, our findings obtained through a person-centered approach offer a crucial advantage in capturing the complex associations between social axiom profiles and dispositional malicious and benign envy.

This study has some noteworthy limitations. First, while this research revealed the associations between social axiom profiles and dispositional envy, it is uncertain whether these associations hold after accounting for various antecedents of dispositional envy, such as Big Five and Dark Triad personality traits. Thus, future studies should include a range of general and specific traits as covariates to demonstrate the incremental validity of social axiom profiles beyond the previous research findings. Additionally, building upon the predictive framework of self-view and worldview, it would be intriguing to compare the predictive

power of individuals' perceptions of themselves versus their perceptions of the social world in predicting dispositional envy. Second, the present research employed a cross-sectional design, measuring constructs at the trait level. Causality cannot be inferred as the temporal directions between social axioms and dispositional envy remain unclear in this design. While the experience of envy is conceptualized as arising from differing views on how status is gained (i.e., one of the subjective beliefs about the world), it is also plausible that the reverse causal direction holds true, where dispositional envy, reflecting accumulated experiences of envy, may predispose individuals to adopt certain worldviews (e.g., a cynical worldview). As such, future studies should employ a multi-wave longitudinal design to examine this reciprocal dynamic.

In conclusion, moving beyond the variable-centered approach, the present study utilizes a person-centered approach to identify the individual profiles underlying different worldviews and examines how people with different profiles show different levels of dispositional malicious and benign envy. Our results reveal that across different profiles, the chronic tendency to experience malicious and benign envy is mostly linked to the worldviews of social cynicism, reward for application, and religiosity.

Data availability

The dataset in the current study is available at <https://shorturl.at/myJKX>. All the data collected in this line of research has been reported in the paper. The current study was not preregistered.

Received: 28 March 2023; Accepted: 16 November 2023;

Published online: 07 December 2023

Notes

- 1 It is noteworthy that a variable-centered approach can indeed serve the similar purposes through examining all possible higher-order interactions among the five social axioms. Clearly, this approach is not practically feasible as the number of higher-order interaction terms required in the model will be unrealistically huge (see Bauer & Shanahan, 2007).
- 2 Under the typical settings of latent profile analysis (e.g., interclass distance's $d = 0.8-1.5$), simulation studies revealed that the sample size of 500 can provide sufficient power in revealing the correct number of classes (Nylund et al., 2007; Tein et al., 2013). As reviewed by Spurk et al. (2020), the median sample size of empirical studies that employed latent profile analysis is 493.5, being close to the recommended sample size of 500. The current sample size in both groups of adolescents ($n = 664$) and working adults ($n = 584$) exceeded the recommended and common sample sizes in previous research, and should be able to yield an acceptable performance in latent profile analysis.
- 3 The reliability of social complexity among adolescents is lower than the other four social axioms (0.68 vs. the average of 0.83), similar to previous research (Leung et al. 2012; 0.70 vs. the average of 0.85). As a sensitivity analysis, we removed one item in the social complexity subscale based on item-total correlation, yielding a reliability of 0.71 in the refined composite of social complexity (7 items). With the refined composite of social complexity, all findings did not show substantial changes.
- 4 Bentler and Chou (1987) recommended that the ratio of sample size (N) relative to the number of free parameters (q) should be at least 5:1 to maintain a fair performance in structural equation modeling. In the present research, specifying a two-group CFA model for a total of 50 items across seven constructs (i.e., five social axioms dimensions and two envy dimensions) requires 342 free parameters (i.e., 86 factor loadings, 14 factor variances, 42 factor covariances, 100 error variances, and 100 intercepts). This results in an N/q ratio of 3.65:1 (i.e., 1248 adolescents and adults/342 free parameters). Thus, to provide a fair test of a two-group CFA model, parceling was used to ensure an N/q ratio of at least 5:1. A two-group CFA model having five or more parcels per latent factor would yield more than 252 free parameters, yielding an N/q ratio smaller than 5:1. This indicates that four parcels are the maximum number that can be created in each latent factor. For a two-group CFA model with four parcels per latent factor, there are 210 free parameters (i.e., 42 factor loadings, 14 factor variances, 42 factor covariances, 56 error variances, and 56 intercepts), yielding an N/q ratio of 5.94:1 (i.e., 1248 adolescents and adults/210 free parameters).

5 Given that our sample size is not small ($n = 1248$), we followed previous practice in employing a stricter significance threshold of $p < 0.005$ to avoid incorrect rejection of the null hypothesis in all analyses (Benjamin et al. 2018; Demes and Geeraert 2015; Di Leo and Sardanelli 2020).

References

- Alexandra V (2019) The role of social worldviews and self-control in moral disengagement. *Personal Individ Diff* 143:74–79. <https://doi.org/10.1016/j.paid.2019.02.012>
- Arnett JJ (2000) Optimistic bias in adolescent and adult smokers and nonsmokers. *Addict Behav* 25(4):625–632. [https://doi.org/10.1016/s0306-4603\(99\)00072-6](https://doi.org/10.1016/s0306-4603(99)00072-6)
- Bauer, DJ, & Shanahan, MJ (2007). Modeling complex interactions: Person-centered and variable-centered approaches. In T. D. Little, J. A. Bovaird & N. A. Card (Eds.), *Modeling contextual effects in longitudinal studies* (pp. 255–283). Lawrence Erlbaum Associates Publishers
- Baumel A, Berant E (2015) The role of attachment styles in malicious envy. *J Res Personal* 55:1–9. <https://doi.org/10.1016/j.jrp.2014.11.001>
- Benjamin DJ, Berger JO, Johannesson M, Nosek BA, Wagenmakers EJ, Berk R, Bollen KA, Brembs B, Brown L, Camerer C, Cesarini D, Chambers CD, Clyde M, Cook TD, De Boeck P, Dienes Z, Dreber A, Easwaran K, Efferson C, Johnson VE (2018) Redefine statistical significance. *Nat Hum Behav* 2(1):6–10. <https://doi.org/10.1038/s41562-017-0189-z>
- Bentler PM, Chou CP (1987) Practical issues in structural modeling. *Social Methods Res* 16(1):78–117. <https://doi.org/10.1177/0049124187016001004>
- Berant E, Baumel A (2017) Attachment styles as contributors to dispositional envy and coping with contextual deficiency priming. *Asia Pac J Couns Psychother* 8(2):101–114. <https://doi.org/10.1080/21507686.2017.1337647>
- Bernardo AB, Nalipay MJN (2016) Social axioms as social foundations of locus-of-hope: a study in three Asian cultural groups. *Personal Individ Differ* 95:110–113. <https://doi.org/10.1016/j.paid.2016.02.046>
- Boehnke, K (2009). Are parents decisive? The intergenerational transmission of social axioms under conditions of rapid social change. In K. Leung & M. H. Bond (Eds.), *Psychological aspects of social axioms: Understanding global belief systems* (pp.109–128). New York, NY: Springer. https://doi.org/10.1007/978-0-387-09810-4_7
- Boer D, Hanke K, He J (2018) On detecting systematic measurement error in cross-cultural research: A review and critical reflection on equivalence and invariance tests. *J Cross-Cultural Psychol* 49(5):713–734. <https://doi.org/10.1177/0022022117749042>
- Bond MH, Leung K, Au A, Tong KK, Chemonges-Nielson Z (2004a) Combining social axioms with values in predicting social behaviours. *Eur J Personal* 18:177–191. <https://doi.org/10.1002/per.509>
- Bond MH, Leung K, Au A, Tong K-K, De Carrasquel SR, Murakami F, Yamaguchi S, Bierbrauer G, Singelis TM, Broer M, Boen F, Lambert SM, Ferreira MC, Noels KA, Van Bavel J, Safdar S, Zhang J, Chen L, Solcova I, Lewis JR (2004b) Culture-level dimensions of social axioms and their correlates across 41 cultures. *J Cross-Cultural Psychol* 35:548–570. <https://doi.org/10.1177/0022022104268388>
- Brewer SK, Zahniser E, Conley CS (2016) Longitudinal impacts of emotion regulation on emerging adults: Variable-and person-centered approaches. *J Appl Dev Psychol* 47:1–12. <https://doi.org/10.1016/j.appdev.2016.09.002>
- Briki W (2019) Harmed trait self-control: Why do people with a higher dispositional malicious envy experience lower subjective wellbeing? A cross-sectional study. *J Happiness Stud* 20(2):523–540. <https://doi.org/10.1007/s10902-017-9955-x>
- Celeux G, Soromenho G (1996) An entropy criterion for assessing the number of clusters in a mixture model. *J Class* 13(2):195–212. <https://doi.org/10.1007/bf01246098>
- Chen FF (2007) Sensitivity of goodness of fit indexes to lack of measurement invariance. *Struct Equ Modeling: A Multidiscip J* 14(3):464–504. <https://doi.org/10.1080/10705510701301834>
- Chen SX, Bond MH, Cheung FM (2006a) Personality correlates of social axioms: are beliefs nested within personality? *Personal Individ Diff* 40:509–519. <https://doi.org/10.1016/j.paid.2005.04.016>
- Chen SX, Fok HK, Bond MH, Matsumoto D (2006b) Personality and beliefs about the world revisited: Expanding the nomological network of social axioms. *Personal Individ Diff* 41:201–211. <https://doi.org/10.1016/j.paid.2006.01.009>
- Chen SX, Lam BCP, Wu WCH, Ng JCK, Buchtel EE, Guan Y, Deng H (2016) Do people's world views matter? The why and how. *J Personal Soc Psychol* 110:743–765. <https://doi.org/10.1037/pspp0000061>
- Chen SX, Wu WCH, Bond MH (2009) Linking family dysfunction to suicidal ideation: the mediating roles of self-views and world-views. *Asian J Soc Psychol* 12:133–144. <https://doi.org/10.1111/j.1467-839X.2009.01280.x>
- Cheung MWL, Leung K, Au K (2006) Evaluating multilevel models in cross-cultural research: an illustration with social axioms. *J Cross-Cultural Psychol* 37(5):522–541. <https://doi.org/10.1177/0022022106290476>
- Cohen, J (1988). *Statistical Power Analysis for the Behavioral Sciences*. Routledge. <https://doi.org/10.4324/9780203771587>
- Cohen-Charash Y (2009) Episodic envy. *J Appl Soc Psychol* 39(9):2128–2173. <https://doi.org/10.1111/j.1559-1816.2009.00519.x>
- Crusius, J, Blatz, L, & Lange, J (2016). How work ethics beliefs are linked to status-related emotions. *Unpublished Data Set*
- Crusius J, Gonzalez MF, Lange J, Cohen-Charash Y (2020) Envy: an adversarial review and comparison of two competing views. *Emot Rev* 12(1):3–21. <https://doi.org/10.1177/1754073919873131>
- Crusius J, Thierhoff J, Lange J (2021) Dispositional greed predicts benign and malicious envy. *Personal Individ Diff* 168:110361. <https://doi.org/10.1016/j.paid.2020.110361>
- Demes KA, Geeraert N (2015) The highs and lows of a cultural transition: A longitudinal analysis of sojourner stress and adaptation across 50 countries. *J Personal Soc Psychol* 109(2):316–337. <https://doi.org/10.1037/pspp0000046>
- Den Nieuwenboer NA, Kish-Gephart JJ, Treviño LK, Peng AC, Reychav I (2023) The dark side of status at work: perceived status importance, envy, and interpersonal deviance. *Bus Ethics Q* 33(2):261–295. <https://doi.org/10.1017/beq.2022.2>
- Di Leo G, Sardanelli F (2020) Statistical significance: p value, 0.05 threshold, and applications to radiomics—Reasons for a conservative approach. *Eur Radiol Exp* 4(1):1–8. <https://doi.org/10.1186/s41747-020-0145-y>
- Dillard AJ, McCaul KD, Klein WMP (2006) Unrealistic optimism in smokers: Implications for smoking myth endorsement and self-protective motivation. *J Health Commun* 11:93–102. <https://doi.org/10.1080/10810730600637343>
- Dong X, Xiang Y, Zhao J, Li Q, Zhao J, Zhang W (2020) How mindfulness affects benign and malicious envy from the perspective of the mindfulness re-perceiving model. *Scand J Psychol* 61(3):436–442. <https://doi.org/10.1111/sjop.12596>
- Hasty, CR, Ainsworth, SE, Martinez, JL, & Maner, JK (2022). Lifting me up or tearing you down? The role of prestige and dominance in benign versus malicious envy. *Personality and Social Psychology Bulletin*. Advance online publication. <https://doi.org/10.1177/0146167222113670>
- Howard MC, Hoffman ME (2018) Variable-centered, person-centered, and person-specific approaches: Where theory meets the method. *Organ Res Methods* 21(4):846–876. <https://doi.org/10.1177/1094428117744021>
- Hui CM, Bond MH (2010) Relationship between social axioms and subjective well-being: the role of self-regulation. *J Psychol Chin Societies* 11:29–52
- Jiang X, Li X, Dong X, Wang L (2022) How the Big Five personality traits related to aggression from perspectives of the benign and malicious envy. *BMC Psychol* 10(1):1–11. <https://doi.org/10.1186/s40359-022-00906-5>
- Koltko-Rivera ME (2004) The psychology of worldviews. *Rev Gen Psychol* 8(1):3–58. <https://doi.org/10.1037/1089-2680.8.1.3>
- Kuiper NA, Rogers TB (1979) Encoding of personal information: Self–other differences. *J Personal Soc Psychol* 37:499–514. <https://doi.org/10.1037/0022-3514.37.4.499>
- Kuo CC, Chang K, Kuo TK, Chen S (2020) Workplace gossip and employee cynicism: the moderating role of dispositional envy. *Chin J Psychol* 62(4):537–552. [https://doi.org/10.6129/CJP.202012_62\(4\).0005](https://doi.org/10.6129/CJP.202012_62(4).0005)
- Kurman J (2011) What I do and what I think they would do: social axioms and behaviour. *Eur J Personal* 25:410–423. <https://doi.org/10.1002/per.801>
- Lai JHW, Bond MH, Hui NHH (2007) The role of social axioms in predicting life satisfaction: a longitudinal study in Hong Kong. *J Happiness Stud* 8(4):517–535. <https://doi.org/10.1007/s10902-006-9029-y>
- Lange, J, Blatz, L, & Crusius, J (2018a). Dispositional envy: a conceptual review. In V. Zeigler-Hill & T. K. Shackelford (Eds.), *SAGE Handbook of personality and individual differences* (pp. 424–440). SAGE. <https://doi.org/10.4135/9781526451248.n18>
- Lange J, Boecker I (2019) Schadenfreude as social-functional dominance regulator. *Emotion* 19:489–502. <https://doi.org/10.1037/emo0000454>
- Lange J, Crusius J (2015) Dispositional envy revisited: Unraveling the motivational dynamics of benign and malicious envy. *Personal Soc Psychol Bull* 41:284–294. <https://doi.org/10.1177/0146167214564959>
- Lange J, Crusius J, Hagemeyer B (2016) The Evil Queen's dilemma: Linking narcissistic admiration and rivalry to benign and malicious envy. *Eur J Personal* 30(2):168–188. <https://doi.org/10.1002/per.2047>
- Lange J, Paulhus DL, Crusius J (2018b) Elucidating the dark side of envy: Distinctive links of benign and malicious envy with dark personalities. *Personal Soc Psychol Bull* 44:601–614. <https://doi.org/10.1177/0146167217746340>
- Lange, J, & Protasi, S (2021). An interdisciplinary perspective on the value of envy. *Review of Philosophy and Psychology*. Advance online publication. <https://doi.org/10.1007/s13164-021-00548-3>
- Lange J, Redford L, Crusius J (2019) A status-seeking account of psychological entitlement. *Personal Soc Psychol Bull* 45(7):1113–1128. <https://doi.org/10.1177/0146167218808501>
- Lange J, Weidman AC, Crusius J (2018c) The painful duality of envy: evidence for an integrative theory and a meta-analysis on the relation of envy and schadenfreude. *J Personal Soc Psychol* 114:572–598. <https://doi.org/10.1037/pspi0000118>
- Latif K, Weng Q, Pitafi AH, Ali A, Siddiqui AW, Malik MY, Latif Z (2021) Social comparison as a double-edged sword on social media: the role of envy type

- and online social identity. *Telemat Inform* 56:101470. <https://doi.org/10.1016/j.tele.2020.101470>
- Leung K, Bond MH (2004) Social axioms: A model for social beliefs in multi-cultural perspective. *Adv Exp Soc Psychol* 36:119–197. [https://doi.org/10.1016/S0065-2601\(04\)36003-X](https://doi.org/10.1016/S0065-2601(04)36003-X)
- Leung K, Lam BCP, Bond MH, Conway III LG, Gornick LJ, Amponsah B, Boehnke K, Dragolov G, Burgess SM, Golestaneh M, Busch H, Hofer J, Espinosa AdelCD, Fardis M, Ismail R, Kurman J, Lebedeva N, Tatarko AN, Sam DL, Zhou F (2012) Developing and evaluating the social axioms survey in eleven countries: Its relationship with the five-factor model of personality. *J Cross-Cultural Psychol* 43(5):833–857. <https://doi.org/10.1177/0022022111416361>
- Li F, Zhou F, Leung K (2011) Expecting the worst: moderating effects of social cynicism on the relationships between relationship conflict and negative affective reactions. *J Bus Psychol* 26(3):339–345. <https://doi.org/10.1007/s10869-010-9192-3>
- Li M, Xu X, Kwan HK (2023a) The antecedents and consequences of workplace envy: a meta-analytic review. *Asia Pac J Manag* 40(1):1–35. <https://doi.org/10.1007/s10490-021-09772-y>
- Li X, Tu L, Jiang X (2022) Childhood maltreatment affects depression and anxiety: The mediating role of benign envy and malicious envy. *Front Psychiatry* 13:924795. <https://doi.org/10.3389/fpsy.2022.924795>
- Li X, Zhang W, Xiang Y (2023b) Big Five personality traits and envy: the mediating role of emotional intelligence. *Soc Behav Personality: Int J* 51(1):1–11. <https://doi.org/10.2224/sbp.12046>
- Little TD, Cunningham WA, Shahar G, Widaman KF (2002) To parcel or not to parcel: exploring the question, weighing the merits. *Struct Equ Modeling: A Multidiscip J* 9(2):151–173. https://doi.org/10.1207/s15328007sem0902_1
- Markus H (1977) Self-schemas and processing information about the self. *J Personal Soc Psychol* 35:63–78. <https://doi.org/10.1037/0022-3514.35.2.63>
- Milić A, Kardum I, Švegar D (2023) Contours of the envious personality: reassessing the capacity of the Big Five and the Dark Triad personality traits in predicting dispositional envy. *Curr Psychol* 42(16):14051–14064. <https://doi.org/10.1007/s12144-021-02633-3>
- Nalipay MJN, Bernardo AB, Mordeno IG (2017) Posttraumatic growth in survivors of a natural disaster: The role of social axioms of religiosity, reward for application, and social cynicism. *J Posit Psychol* 12(4):342–353. <https://doi.org/10.1080/17439760.2016.1187199>
- Ng HKY, Chen SX (2023) How does social complexity facilitate coping flexibility? The mediating role of dialectical thinking. *Anxiety, Stress, Coping* 36(3):291–303. <https://doi.org/10.1080/10615806.2022.2117304>
- Ng JCK, Au AKY, Wong HSM, Sum CKM, Lau VCY (2021) Does dispositional envy make you flourish more (or less) in life? An examination of its longitudinal impact and mediating mechanisms among adolescents and young adults. *J Happiness Stud* 22(3):1089–1117. <https://doi.org/10.1007/s10902-020-00265-1>
- Ng JCK, Cheung VWT, Lau VCY (2019) Unpacking the differential effects of dispositional envy on happiness among adolescents and young adults: The mediated moderation role of self-esteem. *Personal Individ Diff* 149:244–249. <https://doi.org/10.1016/j.paid.2019.06.011>
- Ng JCK, Cheung VWT, Wong HSM, Leung SMY, Lau VCY (2020a) Is it helpful to believe that efforts will lead to positive outcomes? Two cross-lagged panel investigations among adolescents and young adults. *Int J Environ Res Public Health* 17(20):7585. <https://doi.org/10.3390/ijerph17207585>
- Ng JCK, Lau VCY, Chen SX (2020b) Why are dispositional envious not satisfied with their lives? An investigation of intrapersonal and interpersonal pathways among adolescents and young adults. *J Happiness Stud* 21(2):525–545. <https://doi.org/10.1007/s10902-019-00094-x>
- Ng JCK, Lin ESS, Lee VKY (2023) Does Instagram make you speak ill of others or improve yourself? A daily diary study on the moderating role of malicious and benign envy. *Comp Hum Behav* 148:107873. <https://doi.org/10.1016/j.chb.2023.107873>
- Nylund KL, Asparouhov T, Muthén BO (2007) Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Struct Equ Modeling: A Multidiscip J* 14(4):535–569. <https://doi.org/10.1080/10705510701575396>
- Radcliffe NM, Klein WMP (2002) Dispositional, unrealistic, and comparative optimism: differential relations with the knowledge and processing of risk information and beliefs about personal risk. *Personal Soc Psychol Bull* 28:836–846. <https://doi.org/10.1177/0146167202289012>
- Rengifo M, Laham SM (2022) Careful what you wish for: the primary role of malicious envy in predicting moral disengagement. *Motiv Emot* 46(5):674–688. <https://doi.org/10.1007/s11031-022-09973-y>
- Rentzsch K, Gross JJ (2015) Who turns green with envy? Conceptual and empirical perspectives on dispositional envy. *Eur J Personal* 29(5):530–547. <https://doi.org/10.1002/per.2012>
- Rutkowski L, Svetina D (2014) Assessing the hypothesis of measurement invariance in the context of large-scale international surveys. *Educ Psychol Meas* 74(1):31–57. <https://doi.org/10.1177/0013164413498257>
- Schulz R, Heckhausen J, Locher JL (1991) Adult development, control, and adaptive functioning. *J Soc Issues* 47(4):177–196. <https://doi.org/10.1111/j.1540-4560.1991.tb01841.x>
- Smith RH, Parrott WG, Diener EF, Hoyle RH, Kim SH (1999) Dispositional envy. *Personal Soc Psychol Bull* 25(8):1007–1020. <https://doi.org/10.1177/01461672992511008>
- Spurk D, Hirschi A, Wang M, Valero D, Kauffeld S (2020) Latent profile analysis: a review and “how to” guide of its application within vocational behavior research. *J Vocat Behav* 120:103445. <https://doi.org/10.1016/j.jvb.2020.103445>
- Stankov L, Lee J (2018) Conservative syndrome and the understanding of negative correlations between religiosity and cognitive abilities. *Personal Individ Diff* 131:21–25. <https://doi.org/10.1016/j.paid.2018.04.016>
- Swann Jr WB, Chang-Schneider C, Larsen McClarty K (2007) Do people’s self-views matter? Self-concept and self-esteem in everyday life. *Am Psychol* 62:84–94. <https://doi.org/10.1037/0003-066X.62.2.84>
- Tein JY, Cox S, Cham H (2013) Statistical power to detect the correct number of classes in latent profile analysis. *Struct Equ Modeling: A Multidiscip J* 20(4):640–657. <https://doi.org/10.1080/10705511.2013.824781>
- Van de Ven N, Zeelenberg M, Pieters R (2009) Leveling up and down: the experiences of benign and malicious envy. *Emotion* 9(3):419–429. <https://doi.org/10.1037/a0015669>
- Van de Ven N, Zeelenberg M, Pieters R (2010) Warding off the evil eye: When the fear of being envied increases prosocial behavior. *Psychol Sci* 21:1671–1677. <https://doi.org/10.1177/0956797610385352>
- Wu WCH, Chen SX, Wong SSK (2019) Predicting gambling propensity and behavior: The role of social axioms and distortive beliefs. *J Gambl Stud* 35:969–986. <https://doi.org/10.1007/s10899-019-09861-0>
- Xiang Y, Chao X, Ye Y (2018) Effect of gratitude on benign and malicious envy: The mediating role of social support. *Front Psychiatry* 9:139. <https://doi.org/10.3389/fpsy.2018.00139>
- Xiang Y, Dong X, Zhao J, Li Q, Zhao J, Zhang W (2021) The relationship between mindfulness and envy: The mediating role of emotional intelligence. *PsyCh J* 10(6):898–904. <https://doi.org/10.1002/pchj.493>
- Xiang Y, Yuan R (2021) Why do people with high dispositional gratitude tend to experience high life satisfaction? A broaden-and-build theory perspective. *J Happiness Stud* 22(6):2485–2498. <https://doi.org/10.1007/s10902-020-00310-z>
- Zhou F, Leung K, Bond MH (2009) Social axioms and achievement across cultures: the influence of reward for application and fate control. *Learn Individ Diff* 19:366–371. <https://doi.org/10.1016/j.lindif.2008.11.002>

Acknowledgements

This work was supported by the Internal Research Funds from the Hong Kong Polytechnic University (Project No.: P0046101 and P0041494).

Author contributions

JCKN: Conceptualization, Methodology, Project administration, Data curation, Formal analysis, Writing – original draft, Writing – review & editing. JYHC: Conceptualization, Project administration, Writing – original draft, Writing – review & editing. HKYN: Conceptualization, Methodology, Writing – review & editing.

Competing interests

The authors declare no competing interests.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study was approved by the Human Subjects Ethics Sub-Committee of The Hong Kong Polytechnic University (Project No.: HSEARS20221125001).

Informed consent

Informed consent was obtained from all the participants as well as the parents of adolescents in advance (including data protection, confidentiality and privacy, consent to participate, and consent to publish).

Additional information

Correspondence and requests for materials should be addressed to Jacky C. K. Ng.

Reprints and permission information is available at <http://www.nature.com/reprints>

Publisher’s note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>.

© The Author(s) 2023