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Research Paper

Contribution of Social Problem-Solving to the Prediction of Trait and Pathological Worry in a Sample of the General Population

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ABSTRACT

Background: There is conceptual confusion between trait and pathological worry associated with generalized anxiety disorder (GAD). Of particular interest is the contribution that social problem-solving strategies may make to both constructs. **Methods:** The aim of this study was to analyze the differential role of social problem-solving strategies in trait and pathological worry. Participants were 331 adults from the general population (Mean age = 31.6, SD= 12.2), of whom 56.2% were female. **Results**: The results showed that neuroticism (N), negative problem orientation (NPO), and avoidant style were related to both trait and pathological worry, whereas rational problem-solving style was related only to trait worry. The single predictor shared by trait and pathological worry, after controlling for N and gender, was NPO, while higher rational style and positive problem orientation, as well as lower avoidant style, were specific predictors of trait worry. **Conclusions:** The results are discussed with regard to the differences between trait and pathological worry, along with their implications for the application of cognitive-behavioral interventions.

Keywords: *Trait Worry, Generalized Anxiety Disorder, Social Problem-Solving, Neuroticism*

Most people feel worry and anxiety at some time, but these feelings can become dysfunctional and problematic if people respond to ambiguous, harmless, and/or neutral stimuli as threatening or potentially dangerous (Ellis & Hudson, 2010). Worry has been defined as "a chain of thoughts or verbal-linguistic activity laden with negative and relatively uncontrollable affect. The process of worry represents an attempt to

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mentally solve problems about a topic whose result is uncertain, although it involves the possibility of one or more negative consequences" (pp. 10) (Borkovec et al., 1983). This dynamic definition shows that worry can be used as a preventive coping strategy, characterized by reducing or inhibiting the imaginary and physiological activities in people with anxiety (Borkovec et al., 2004).

The content of worry is typically related to future events whose results are uncertain (Hirsch & Mathews, 2012), and it is conceptualized continuously with quantitative rather than qualitative differences between normal and pathological worry (Ehring & Watkins, 2008). Thus, there are non-constructive worries, which provoke a repetitive range of negative results in which the person tries to generate coping solutions until achieving some internal goal; and constructive worries, which are oriented toward solving the problem and giving rise to problem-focused behavior (Llera & Newman, 2020; McNeill & Dunlop, 2016). In this sense, worry has been defined as "a constructive and appropriate task-oriented process that contributes to problem-solving and reducing anxiety". However, Davey described non-constructive worry as "a tendency to look for more problems within problems" (pp. 327) (Davey, 1994).

High levels of pathological worry characterize the generalized anxiety disorder (GAD), in which an excessive and uncontrollable worry is present. At least three of six somatic symptoms (restlessness or impatience, easy fatigue, difficulty concentrating or having a blank mind, irritability, muscle tension, or sleep disturbances) interfere significantly with social, family, and labor areas (APA, 2013). Excessive and uncontrollable worry is not specific to GAD but is considered a transdiagnostic construct of various emotional disorders (Ehring & Behra, 2020; González et al., 2017; Gústavsson et al., 2021; Thompson et al., 2022).

The concept of social problem-solving has two partially independent components: 1) problem orientation, consisting of positive and negative problem orientation (PPO and NPO, respectively) and 2) problem-solving styles, consisting of the rational problem-solving style, the impulsive/careless style, and the avoidant style (D'Zurilla & Nezu, 2010). PPO and the rational style represent functional problem-solving processes that are likely to help promote or maintain positive psychological outcomes. On the contrary, NPO, impulsive/careless, and avoidant styles are dysfunctional processes (Fergus et al., 2015). The two orientations, PPO and NPO, are negatively related. These processes are better conceptualized as two-dimensional: PPO induces positive emotions and NPO generates negative emotions (D'Zurilla & Nezu, 2010). This has resulted in research into NPO being studied as an independent construct (Clarke et al., 2017).

Studies on trait worry have found that worry is related to NPO and poor perceived control over the problem-solving process. However, it appears not to be related to knowledge of problem-solving skills (Davey, 1994; Davey et al., 1996; Dugas et al., 1995). In this line, it was found that people who worry chronically were good at defining problems and identifying possible negative outcomes, but often found it difficult to implement solutions to their problems (Borkovec et al., 1983). In another study, both trait and pathological worry were related to the impulsive/careless and avoidant problem-solving styles but not to the rational style (Belzer et al., 2002).

Concerning pathological worry, people who meet GAD criteria and patients with GAD have greater NPO than those who worry moderately, indicating that NPO is more closely related to the level of symptoms than to clinical status (whether or not the person seeks psychological

help) and that a deficit in problem orientation can make it more difficult to properly apply problem-solving skills, interfering with the problem-solving process and prolonging worry (Dugas et al., 1998; Handley et al., 2014; Romano et al., 2019). Clinical samples have found that NPO was positively related to trait worry and that low impulsive/careless style was a predictor of problem-solving effectiveness (Clarke e al., 2017; Pawluk et al., 2017). Contrary to these studies, and after controlling for NPO and trait anxiety, the rational problem-solving style and the impulsive/careless style were predictors of pathological but not of trait worry (Belzer et al., 2002). Other authors report that people with GAD: 1) have difficulty concentrating and making decisions, 2) consider worry excessive or exaggerated, and 3) have problems controlling worry (Dugas, 2007; González et al., 2018; Hallion et al., 2018).

Trait and pathological worry have also been linked to personality and gender dimensions. Thus, personality factors such as neuroticism (N) and extraversion are considered general vulnerability factors (van der Heiden et al., 2010). N is a personality trait characterized by a tendency to worry and be anxious, hence it is associated with negative affect (Brown & Naragon-Gainey, 2013). It was found that N was negatively related to PPO, positively related to the dysfunctional dimensions, and did not show significant relationships with the rational problem-solving style (D'Zurilla et al., 2011).

There is empirical evidence about the role of gender on trait and pathological worry (Banerjee & Mukherjee, 2020). Females obtain higher mean scores on NPO, GAD, trait worry, and neuroticism, whereas males obtain higher mean scores on PPO and the rational problem-solving style (De la Torre et al., 2010; Groves et al., 2020). Also, being female was positively related to N, and N was negatively related to social problem-solving (Koruklu, 2015).

The reviewed studies found, on the one hand, that NPO relates to both trait and pathological worry, whereas problem-solving skills may be reduced in the case of pathological worry, but not in trait worry. However, these studies show some discrepancies including 1) heterogeneous results have been observed, possibly due to the samples used in the studies; 2) few studies clearly differentiate trait from pathological worry; 3) trait and pathological worry have usually been related to NPO, but the relationship with other factors of the social problem-solving model (D'Zurilla et al., 1999) has not been analyzed; and 4) although some studies controlled the impact of trait anxiety, no study has controlled N as a general vulnerability factor that is shared by both trait and pathological worry.

The objective of this study was to analyze whether N, gender, and social problem-solving styles predict trait and pathological worry differentially. The rational problem-solving style is expected to be more strongly associated with trait than with pathological worry, whereas NPO will explain pathological worry to a greater extent than trait worry.

METHOD

Participants

A total of 331 people from the island of Tenerife (Canary Islands, Spain) participated in this research, of whom 56.2% were female. Their age ranged between 18 and 74 years (M = 31.6, SD = 12.2) and a mode of 24. Concerning marital status, 57.2% were single, 33.3% were married, 5.5% were divorced/separated, and 1.8% had been widowed. Regarding their educational level, 10.7% had primary education, 15.9% had high school studies, 11.9% had studied vocational training, 29.3% had diploma studies, and 32.8% had undergraduate studies.

Concerning their place of residence, 80% of the sample lived in urban areas, and 20% were from rural areas.

Instruments

The Penn State Worry Questionnaire –PSWQ- (Meyer et al., 1990) is a 16-item inventory that assesses trait worry. Its responses are rated on Likert-type scales, ranging from 1 (*not at all*) to 5 (*very much*). The internal consistency was .92 and test-retest reliability was .85 (Sandín et al., 2009). In this study, the internal consistency (Cronbach's α) was .94.

The Worry and Anxiety Questionnaire –WAQ- (Dugas et al., 1995) evaluates two factors through 16 mixed items (list and 9-point Likert-type scale): 1) emotionality, referring to somatic symptoms of GAD, with an internal consistency of .84 and test-retest reliability of .61, and 2) worry, which evaluates the cognitive symptoms of GAD. In this study, the overall score has been used. The internal consistency was .86 and test-retest reliability was .70 (Ibáñez et al., 2000). Cronbach's alpha for this sample was .90.

The Social Problem-Solving Inventory -SPSI-R- (D'Zurilla et al., 1999) is a 52-item inventory rated on a 5-point Likert-type scale (0 = *Does not apply at all to me* and 4 = *Absolutely applies*). It contains five scales assessing two dimensions of problem orientation: Positive (PPO, α = .75; 5 items relating to a general cognitive set indicative of the tendency to view problems positively, to see them as challenges rather than threats, and to be optimistic about the existence of a solution and one's ability to detect and implement effective solutions) and Negative (NPO, α = .89; 10 items relating to a cognitive emotional set that prevents effective problem-solving), and three problem-solving styles: the Rational Problem-Solving Style (RPS, α = .94; 20 items about the tendency to use effective social problem-solving techniques systematically and deliberately, including defining the problem, generating alternatives, evaluating alternatives, and implementing solutions and evaluating outcomes); the Impulsive/Careless Style (ICS, α = .81; 10 items about the tendency to implement skills in an impulsive, incomplete, and haphazard manner); and the Avoidant Style (AS, α = .80; 7 items about dysfunctional patterns of social problem-solving characterized by putting the problem off and waiting for problems to solve themselves) (D'Zurilla et al., 1999). The alpha coefficients (Cronbach's α) indicated are those obtained in this study.

The short version (EPQ-RS) of the Revised Eysenck Personality Questionnaire -EPQ-R- (Eysenck et al., 1997) was used for this study. This questionnaire consists of 24 items with a dichotomous response (yes/no). The EPQ-R contains the following three scales: Extraversion (E), Neuroticism (N), and Psychoticism (P). The alpha coefficients of the EPQ-R scales are .80 (E), .83 (N), and .67 (P). Only N was used for this study, with a Cronbach's alpha of .85.

Procedure

In the community sample, a total of 15 students who were working on their final year dissertation were trained through role playing to administer questionnaires. They were asked to recruit a group of 8 to 10 adults over 18 years old from their close circle through snowball sampling. Participants received an envelope with instructions on how to respond to each questionnaire and a contact telephone number; they gave their written informed consent. The research was approved by the Research Ethics and Animal Welfare Committee of the University of La Laguna, Spain.

Data Analyses

First, missing values were detected using Little's MCAR test. The Mahalanobis distance test was used to detect outliers with a criterion of $p \leq .001$ (Brereton, 2015). For the remaining statistical analyses, it was considered whether the scalar values were normally distributed according to skewness (expected between -3 and 3) and kurtosis (expected at less than 6) (Kim, 2013).

This study conducted correlational analyses between gender (Spearman's rho) and the problem-solving variables, N, trait worry, and pathological worry. A partial correlation was performed, controlling for N. In both cases, the observed probability level was adjusted with the Bonferroni correction ($\alpha = .05/36 = .00138$) for the zero-order correlation, and with the Bonferroni ($\alpha = .05/28 = .00170$) for the partial correlation. Hierarchical linear regression analyses were performed with the step-by-step method, with pathological and trait worry as the dependent variables, and the five problem-solving factors, gender, and N as predictors. In the first step, gender and N were introduced; in the second step, the two factors of problem orientation (NPO and PPO) were included; and the three factors of problem-solving style (RPS, ICS, and AS) were entered in the third step. Multicollinearity was controlled by tolerance and variance inflation factor (VIF). It is recommended that the tolerance value be greater than .10 and that the VIF value be less than 10 (Kline, 2015).

RESULTS

The initial sample consisted of 406 adults. Since Little's MCAR test indicated that there were 14 participants (3.44%) with missing values that were not completely randomly distributed ($\chi^2 = 22.37$, df 8, $p = \leq .004$), they were eliminated. The Mahalanobis distance test, with a criterion of $p \leq .001$ (Brereton, 2015), detected 61 (15.02%) outliers, which were eliminated, leaving the final sample of 331 participants.

We first present the zero-order and partial correlation coefficients, controlling for N. The observed level was adjusted with the Bonferroni correction ($\alpha = .05/36 = .00138$) and with Bonferroni ($\alpha = .05/28 = .00178$) for the partial correlation. Table 1 (above the diagonal) shows that gender was negatively related to pathological worry (WAQ), trait worry (PSWQ), and NPO. N was positively associated with NPO, trait worry, and pathological worry, and negatively with PPO. PPO only showed a significant positive relationship with rational problem-solving. NPO was positively related to trait worry, pathological worry, and the avoidant and impulsive/careless problem-solving styles. The rational problem-solving style was related to trait but not to pathological worry. Concerning the partial correlation (below the diagonal), when controlling for N, there were no changes in the correlations of gender with pathological worry, or between NPO, PPO, rational problem-solving style with pathological worry, and trait worry. Among the changes, the correlation coefficients between trait and pathological worry were lower, with differences between them ($z = 3.01$, $p \leq .002$). Another difference was a non-significant correlation between PPO and NPO ($z = 2.08$, $p \leq .03$). Statistically significant relationships were found between the avoidant problem-solving style and pathological ($z = 2.20$, $p \leq .02$) and trait worry ($z = 2.18$, $p \leq .02$).

In short, through partial correlations, controlling for N, the rational problem-solving style was positively related to trait worry to a greater extent than to pathological worry. NPO was positively related to pathological worry and trait worry, with very similar coefficients.

Table 1. Zero-order (above the diagonal) and partial order correlation coefficients controlling for neuroticism (below the diagonal) of the variables gender, social problem-solving with trait and pathological worry

	SEX	N	PPO	NPO	RPS	ICS	AS	WAQ	PSWQ
SEX[1]		-.15	.13	-.18**	.05	.09	.03	-.25***	-.19***
N			-.30***	.56***	-.06	.18***	.30***	.55***	.57***
PPO	.07	-		**-.18****	.62***	.00	-.12	-.10	-.06
NPO	-.10	-	**-.03**		.16	.44***	.64***	.58***	.57***
RPS	.05	-	.64***	.22***		-.17**	.05	.12	.32***
ICS	.14	-	.08	.42***	-.16		.64***	.13	.00
AS	.09	-	-.02	.59***	.06	.63***		**.25*****	***.19****
WAQ	-.24***	-	.06	.43***	.19**	.04	**.12**		***.60****
PSWQ	-.14	-	.13	.38***	.43***	-.12	**.02**	***.48****	
Skewness	.05	.31	.04	.50	.03	.68	.85	.17	.09
Kurtosis	-2.01	-.90	-.42	-.34	-.47	.19	**.72**	-.68	-.90

*Note: Statistically significant differences (Fisher's z-test) are shown in bold; SEX = 0 = Female, 1 = Male; 1 = Spearman's rho; PSWQ = Trait Worry; WAQ = Worry and Anxiety Questionnaire ; N = Neuroticism; NPO = Negative Problem Orientation; PPO = Positive Problem Orientation; RPS = Rational Problem-Solving; ICS = Impulsivity/Carelessness Style; AS = Avoidance Style; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$*

Hierarchical regression analyses

No multicollinearity problems were found, since the correlation coefficients between the independent and dependent variables did not exceed .80, the tolerance for the PSWQ ranged between .64 and .96, and the VIF ranged between 1.03 and 1.55. For the WAQ, the tolerance ranged from .43 to .93, and the VIF ranged from 1.07 to 2.3.

Table 2 presents the hierarchical regression analyses, with N and being female as predictors of trait worry, explaining 34% of the variance. After controlling for N, the predictors were NPO and PPO, explaining an additional 10% of the variance and the rational problem-solving style, as well as a lower avoidant style, which explained an additional 10% of the trait worry variance. Pathological worry was predicted by being female and N, explaining 34% of the variance, and by NPO, explaining an additional 10%. Therefore, after controlling for N, trait and pathological worry shared the NPO and being female as predictors, while higher PPO, and rational problem-solving style, as well as lower avoidant style, predicted trait worry.

Table 2. Hierarchical regression analysis of the prediction of trait and pathological worry

Criterion variables	Model	Predictor variables	B	β	R^2aj	SE B	t	p	95% CI	
									LL	UL
		Intercept	41.2			1.28	32.2	.001		
		Gender	-2.45	-.11		1.20	-2.04	.042	-.220	-.004
	1	N	1.77	.56	.34	.174	10.2	.001	.450	.665
		Intercept	32.9			2.26	14.6	.001		
		NPO	.54	.36		.089	6.01	.001	.245	.483
	2	PPO	.35	.13	.44	.145	2.45	.015	.025	.232
PSWQ		Intercept	32.5			2.13	15.2	.001		
		ICS	-.14	-.08		.122	-1.15	.253	-.217	.057
		AS	-.39	-.17		.264	-2.36	.019	-.305	-.028
	3	RPS	.24	.33	.54	.055	4.44	.001	.180	.465
		Intercept	22.1			1.86	11.0	.001		
		Gender	-6.61	-.21		1.75	-3.78	.001	-.316	-.099
	1	N	2.38	.52	.34	.253	2.88	.001	.409	.625
		Intercept	11.9			3.24	3.67	.001		
		NPO	.90	.42		.128	7.05	.001	.302	.5.8
	2	PPO	.30	.07	.44	.208	1.45	.150	-.027	.176
WAQ		Intercept	12.7			3.35	3.80	.001		
		ICS	-.13	-.05		.192	-.69	.491	-.200	.096
		AS	-.39	-.11		.263	-1.50	.136	-.263	.036
	3	RPS	.04	.04	.46	.086	.482	.630	-.116	.192

Note. Gender = 0 = Female; 1 = Male; PSWQ = Penn State Worry Questionnaire (trait worry); WAQ = Worry and Anxiety Questionnaire (pathological worry); N = Neuroticism; NPO = Negative Problem Orientation; PPO = Positive Problem Orientation; RPS = Rational Problem Solving; ICS = Impulsive /Careless style; AS = Avoidant Style. CI = confidence interval; LL = lower limit; UL = upper limit.

DISCUSSION

This study analyzed the relationships of social problem-solving with trait and pathological worry in a general population sample. The results are consistent with those of previous studies that found higher prevalence of trait and pathological worry in females (Bottesi et al., 2018; De la Torre, 2010; Groves et al., 2020). Similarly, a significant relationship was also found between neuroticism, trait worry, and pathological worry (Brown & Naragon-Gainey, 2012).

As for social problem-solving factors, the rational problem-solving style was related to trait worry, in line with a previous study in which trait worry was associated with more adaptive cognitive emotion–regulation strategies, such as reappraisal and perspective-taking (González et al., 2017). In the case of pathological worry, there were no significant relationships with PPO. However, trait worry and RPS were positively associated, though with correlations of low magnitude, contrary to another study which found a negative relationship between PPO and trait worry (Belzer et al., 2002; Clarke et al., 2017). NPO appeared to be similarly associated with both trait and pathological worry, though no significant relationships were found between impulsive/careless and avoidant problem-solving styles with trait and pathological worry. Although these results concur with previous studies, other studies have found that the impulsive/careless style was positively related to both pathological worry and trait worry (Belzer et al., 2002).

Both neuroticism and being female predicted trait and pathological worry. Social problem-solving strategies differentially predicted these constructs. Thus, pathological worry was predicted only by NPO, whereas trait worry was predicted by NPO, PPO, rational problem-solving style, and avoidance style. These results partially coincide with a study that found impulsive/careless and rational problem-solving styles to be predictors of catastrophic worry, suggesting "that a more rational problem-solving and an impulsive/careless style are associated with more catastrophic worry" (pp. 581) (Belzer et al., 2002). These differences could be attributed to the mean age of the sample. In the last study, the sample involved younger people, who may employ more impulsive coping strategies.

On the other hand, these results support previous studies stating that NPO can make it difficult to adequately apply problem-solving skills, thus interfering with the problem-solving process and prolonging worry (Ladouceur et al., 1998). NPO implies a lack of confidence in problem-solving that makes people feel more uncertain (Tormala et al., 2008). Anxiety and uncertainty have been associated with avoidant problem- solving strategies, or problem-solving strategies that do not lead to adequate resolution, which subsequently maintains worry (Clarke et al., 2017; González et al., 2006; González et al., 2004; Ren et al., 2021). Worry reflects an inflexible functional brain configuration (Fonzo & Etkin, 2017) and reduces the quality of problem-solving (Pawluk et al., 2017) because anxiety interferes with cognitive processing, making it difficult to concentrate, take decisions, and control worry (Dugas & Robichaud, 2007; González et al., 2018; Hallion et al., 2018). Likewise, the results on the prediction of trait worry are consistent with those indicating that trait worry is related to knowledge of problem-solving skills, as the rational style refers to systematic, deliberate, and effective social problem-solving strategies, including problem definition, generation of alternatives, evaluation of the alternative, solution implementation, and assessment of the outcome (Davey, 1994; Davey et al., 1996).

PPO and NPO's contribution to trait worry is explained by the fact that both problem orientations are best conceptualized as two-dimensional. PPO refers to activities such as logical analysis and, consequently, self-confidence (Davey, 1994), and induces positive emotions that facilitate problem-solving, as well as the belief in one's personal ability to solve problems successfully and, therefore, confidence in solving problems. On the contrary, NPO generates negative emotions and avoidance tendencies that are likely to hinder or disrupt problem-solving, leading to low confidence in the solution (D'Zurilla & Nezu, 2010). Individuals who use avoidance strategies are characterized by scoring higher in the social inhibition trait (Duijndam et al., 2021) and show higher panic symptoms over time (Geyer et al., 2022).

Although this study was based on a local population sample, the results are consistent with those obtained in clinical samples, thereby demonstrating ecological validity (Dugas & Robichaud, 2007; González et al., 2018; Pawluk et al., 2017). The differences between trait and pathological worry seem to be better specified. In the case of pathological worry, there appears to be an interaction between worry and somatic anxiety, which contributes to excessive and uncontrollable worry, as the central feature of GAD (APA, 2013; González et al., 2018; Ibáñez et al., 2000). Therefore, trait and pathological worry are not equivalent. On the other hand, it seems that trait worry can be characterized by the combination of a relatively strong tendency to worry non-constructively and a moderate tendency to worry constructively (McNeill & Dunlop, 2016). This worry is consistent with the definition of worry as "a constructive and appropriate task-oriented process that contributes to problem-solving and

reducing anxiety" (Davey, 1994). However, the theory of attention control indicates that constructive worry plays a role in self-regulation by pointing out threats and motivating their reduction, whereas non-constructive worry identifies threats, but does not contribute to their reduction, which is plausibly what happens in GAD (Eysenck, 2007). Social problem-solving styles contributed to the differentiation of both types of worry. Pathological and trait worry shared NPO, while for trait worry the specific predictors were to a higher rational problem-solving style and positive problem orientation, as well as a lower avoidant style. In this case, worry was possibly used as a strategy to solve a problem that the person can realistically solve, so that worry functions as an adaptive coping behavior. People who are characterized by high coping flexibility and are able to wait for the opportunity to handle interpersonal stressors show less depressive symptomatology (Kato, 2021). In the case of pathological worry, it could be used as a strategy aimed at increasing safety in the face of a perceived social or physical threat. It is, then, conceptualized as a safety-seeking behavior, which keeps the worry excessive and uncontrolled (Baker et al., 2021; Gústavsson et al., 2021), interfering with executive functions, such as working memory (Nyberg et al., 2021).

This study has several limitations. It is cross-sectional, so causal relationships cannot be established. Longitudinal studies in which two-way relationships of negative affect, anxiety, and intolerance of uncertainty can be analyzed are therefore needed. These results have clinical implications because people's effective solutions to social problems have far-reaching consequences for their personal adjustment and social functioning. Hence, cognitive-behavioral interventions are proposed, focused mainly on NPO, which, together with worry, has been considered a transdiagnostic process linked to other emotional problems (Ehring & Behar, 2020; González et al., 2017; Nyberg et al., 2021).

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Conflict of Interest

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