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Is meta-worry relevant to interpersonal problems? Testing the metacognitive model of generalized anxiety disorder in an analogue- and a clinical sample of GAD

Henrik Nordahl [a], Eivind R. Strand [a,b], Odin Hjemdal [a] and Hans M. Nordahl [c,d]

[a]Department of Psychology, Norwegian University of Science and Technology, Trondheim, Norway; [b]St. Olav`s Hospital, Nidaros DPS, Trondheim, Norway; [c]Department of Mental Health, Norwegian University of Science and Technology, Trondheim, Norway; [d]Department of Acute Psychiatry, Division of Mental Health Care, St. Olavs Hospital HF, Trondheim University Hospital, Trondheim, Norway

ABSTRACT

Interpersonal problems are common in individuals with generalized anxiety disorder (GAD) and improved interpersonal functioning is an important goal in treatment. In the metacognitive model of worry and generalized anxiety disorder, emotional distress and psychological dysfunction are related to two distinct types of worry. Particular emphasis is put on *meta-worry* which refers to "worry about worrying" or appraisal of worrying as threatening in itself. Meta-worry impairs effective mental regulation and might therefore be an important predisposition to self-regulate via others and thereof interpersonal problems. In the current study, we tested the prediction that meta-worry is uniquely associated with interpersonal problems in two samples. The first consisted of 135 individuals with analogue GAD and the second of 56 individuals with a diagnosis of GAD. Using hierarchical linear regressions controlling for anxiety, depression and worry, meta-worry showed a unique relationship with interpersonal problems in both samples. These findings indicate that meta-worry may be relevant to formulate and treat interpersonal problems in individuals with GAD.

Generalized anxiety disorder (GAD) is characterized by excessive worry that the person finds difficult to control (American Psychiatric Association, 2013). It is a prevalent disorder with a lifetime prevalence of 3.7% in the general population (Ruscio et al., 2017). Interpersonal problems are common in patients with GAD and may interfere with remission and recovery following treatment (Malivoire et al., 2020; Wittchen, 2002). These problems are heterogeneous and may take the form of being overly nurturing and non-assertive, or vindictive and intrusive (Borkovec et al., 2002; Przeworski et al., 2011). Targeting interpersonal problems is an important goal for interventions that seek to treat GAD (Malivoire et al., 2020; Newman et al., 2013) and more knowledge on how interpersonal problems are maintained could enhance formulation and treatment.

In the metacognitive model of GAD (Wells, 1995), emotional distress-symptoms and maladaptive behaviours (such as interpersonal strategies and resulting problems) are conceptualized as being maintained by two different types of worry. Type 1 worry refers to worry about non-cognitive events such as health, economy, and relationships (e.g. "what if I lose my job; what if I can't pay my bills; what if others don't like me?"). Type 2 worry (named *meta-worry*; Wells & Matthews, 1994) refers to negative appraisals of worrying ("worry about worry"). Hence, worrying is inherent in meta-worry, but the latter is given more central importance as it reflects both a subjective appraisal of the significance of worrying and also difficulties with cognitive regulation. The content and frequency of meta-worry is closely linked to negative metacognitive beliefs about the uncontrollability and harm of worrying. During worry episodes, negative metacognitive beliefs (e.g. "worrying is uncontrollable and can cause brain damage") may be activated which in turn could lead to activation of meta-worry. Meta-worry intensifies distress as the individual then perceives the worrying process as threatening in itself. An example of meta-worry is "I will go mad if I don't stop worrying" as this is a negative appraisal of worrying founded on the metacognitive belief that worrying can cause madness. Meta-worry is typically frightening and associated with substantial distress for the individual. The increased anxiety is often interpreted as evidence for the perceived threat (e.g. loosing mental control, going crazy). In this context, the metacognitive model of GAD suggests that individuals may attempt to self-regulate through different types of behavioural responses (Wells, 2010). Examples can be thought control strategies, drinking alcohol, or searching the internet for information. In addition, interpersonal strategies (e.g. excessive reassurance-seeking or being overly accommodating) might play a role as interpersonal behaviours may be understood as an attempt to self-regulate or cope with emotional distress via others. For example, if an individual in an episode of worrying and meta-worry about losing one's mind can get reassurance from a relative or a medical professional that one is not going crazy, this interpersonal strategy can momentarily counteract the meta-worry. Acting out may be an attempt to have others take control (over oneself) and can in this perspective for some be a way to escape meta-worry. Pleasing others or avoid arguing can be interpersonal strategies to avoid start worrying in the first place, and thus avoid going into meta-worry. However, using interpersonal behaviours and other people to regulate (meta-) worrying in this way is counterproductive in the long run. The individual will not realize that worrying is controllable and does not pose a threat in terms of going crazy, and dysfunctional metacognitive beliefs will then live on (Wells, 2010).

There is now substantial evidence for the metacognitive model of GAD from both cross-sectional (Nordahl, Vollset, et al., 2023) and longitudinal studies (Nordahl, Anyan, et al., 2023). In line with theory, meta-worry is more closely related to emotional distress compared to type-1 worry (Nordahl, Vollset, et al., 2023; Wells & Carter, 1999) and are particularly relevant to patients with GAD (Wells & Carter, 2001). In line with theory, a recent study reported that meta-worry is uniquely and most strongly associated with negative metacognitive beliefs compared to other metacognitive belief domains (Fergus & Stratton, 2023). However, to the best of our knowledge, no previous study has empirically tested the potential association between meta-worry and interpersonal problems in GAD as suggested by the metacognitive model (Wells, 1995). However, results

from other studies indicate that there is reason to pursue this suggested link empirically as metacognitive beliefs are associated with interpersonal problems in non-clinical (Nordahl et al., 2021) and a clinical sample consisting of patients with social anxiety disorder (Strand, Nordahl, et al., 2023).

In the current study, we therefore set out to evaluate the independent contribution from meta-worry to interpersonal problems whilst also controlling for the overlap with anxiety and depression symptoms, and with general worry proneness (as a marker for type-1 worry frequency and distress). It has been suggested that anxiety and depression symptoms might be both a cause and effect of interpersonal problems (Grant et al., 2013) and they further overlap with meta-worry (Khawaja & McMahon, 2011). Controlling them is therefore necessary to test a potential unique link between meta-worry and interpersonal problems beyond the presence of elevated emotional distress. Furthermore, type-1 worrying is inherent in (state) meta-worry following the activation of underlying negative metacognitive beliefs, but the metacognitive model of GAD (Wells, 1995) distinguishes between these two worry domains and point to meta-worry as the most influential factor for behavioural strategies (e.g. interpersonal strategies) and anxiety symptoms. Therefore, controlling for the overlap with worrying was deemed necessary to evaluate whether meta-worry is uniquely related to interpersonal problems. Founded on the metacognitive model of GAD (Wells, 1995), we hypothesised meta-worry to be a unique and stronger correlate of interpersonal problems than worry, and this prediction was tested in two separate studies aiming to assess replicability and robustness of the expected relationships. In the following, study 1 describes how the prediction was tested in an analogue sample of individuals with GAD, and study 2 describes how the prediction was tested in a sample of individuals diagnosed with GAD.

Study 1

Materials and methods

Participants and procedure

Social media platforms (such as various mental health groups via Facebook) were used to invite participants at convenience to an online survey about the relationships between interpersonal problems and worrying. The survey was registered with the Norwegian Agency for Shared Services in Education and Research (ref. nr. 503288) and informed consent following an information sheet was signed by all participants prior to entering the survey. The participants had to be 18 years old or older and able to read Norwegian, but other than that we had no set exclusion criteria. Participation was voluntarily and no compensation was offered.

Five-hundred and nineteen participants responded to the survey, and among them 135 was eligible to the present study as they scored eight or above on the Generalized Anxiety Disorder scale 7 (Spitzer et al., 2006) which is a commonly used cut-off score balancing specificity and sensitivity to select individuals with a probable diagnosis of GAD (Plummer et al., 2016).

In the final sample consisting of analogue GAD patients ($N = 135$), the mean age was 34.29 ($SD = 10.02$, range = 19–65), 107 (79.3%) of the participants were female, 41

(30.4%) reported to be single, and 70 (51.9%) reported to have completed three or more years of higher education at a university or equivalent. One-hundred and three (76.3%) reported that they at some point in their life had been diagnosed with a mental disorder, while 119 (88.1%) reported that they had received treatment from a mental health professional at some point in their life.

Measures

The Inventory of Interpersonal Problems 32 (IIP-32; Barkham et al., 1996) is derived from the scale originally developed by Horowitz et al. (1988) and measures interpersonal problems with 32 items asking participants about things they do too much (e.g. "being to aggressive") and things they find hard to do (e.g. "get along with people") rated on a 0 ("not at all") to 4 ("very") scale. It assesses eight domains of interpersonal problems (domineeringness, vindictiveness, coldness, socially avoidant, non-assertiveness, exploitable, overly nurturant, and intrusiveness) and a global score of interpersonal problems and distress is represented by the sum score of all items. The global score is especially relevant to capture the total amount of interpersonal problems and distress experienced by the individual and was therefore utilized in the current study (Horowitz et al., 1988). The scale had a good internal consistency in the current study ($\alpha = .88$).

The Beck Anxiety Inventory (BAI; Beck et al., 1988) measures intensity of physical and cognitive anxiety symptoms over the past week by 21 items rated on a scale from 0 (low intensity) to 3 (high intensity). In the current study, the scale had a good internal consistency ($\alpha = .92$).

The Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001) measures severity and presence of depression symptoms over the past two weeks with 9 items rated on a 4-point scale from 0 ("not at all") to 3 ("nearly every day). In this study, the scale had a good internal consistency ($\alpha = .87$).

The Penn State Worry Questionnaire (PSWQ; Meyer et al., 1990) measures trait-worry with 16-items rated on a 5-point scale ranging from "not at all typical of me" to ("very typical of me"). The measure has relevance to worry in GAD since it taps three central diagnostic criteria: worry has to be chronic, excessive, and generalised (Wells & Carter, 1999). In the current study, the scale had a good internal consistency ($\alpha = .90$).

The Anxious Thoughts Inventory (AnTI; Wells, 1994) assesses three domains of worry: health worry, social worry, and meta-worry. The scale consists of 22 items rated on a 4-point scale from "almost never" to "almost always". In the present study, the subscale meta-worry (e.g. "I worry that I cannot control my thoughts as well as I would like to") was used as it assesses worry about thoughts and worry about worrying (i.e. meta-worry or type-2 worry (Wells, 2009)). In this study, the scale had a good internal consistency ($\alpha = .76$).

Statistical analyses

IBM SPSS Statistics version 29 was used to conduct the analyses. Bivariate correlations were conducted to assess the basic relationships between the variables. A hierarchical linear regression was run to test the relative contribution of worry and meta-worry to interpersonal problems when controlling for anxiety and

depression. The total score on the IIP-32 was used as the dependent variable. In step 1, anxiety (BAI) and depression (PHQ-9) symptoms were entered. Worry (PSWQ) was entered in step 2, and meta-worry (from the AnTI) was entered in the third and final step.

Results

Correlational analyses
Descriptive statistics and bivariate correlations between the variables are presented in Table 1. Interpersonal problems showed positive and significant correlations of moderate strength with anxiety, depression, worry, and meta-worry.

Hierarchical linear regression
On the first step of the regression, anxiety and depression as a block accounted for 37.1% of the variance in interpersonal problems. On the second step, worry accounted for an additional 2.6% of the variance in interpersonal problems. On the third step, meta-worry accounted for an additional 2.1% of the variance. In this step, when the overlap between all the predictors were controlled, anxiety, depression, and meta-worry but not worry were unique predictors of interpersonal problems. These three showed about equally strong independent relationships with the outcome. The results from the regressions are presented in Table 2.

Table 1. Descriptive statistics and bivariate correlations ($N = 135$).

	Mean (SD)	2	3	4	5
1. IIP	28.07 (14.40)	.55*	.53*	.46*	.58*
2. Anxiety	24.12 (12.98)		.57*	.49*	.69*
3. Depression	15.84 (6.03)			.45*	.59*
4. Worry	63.23 (10.76)				.65*
5. Meta-worry	18.41 (4.60)				

IIP = Inventory of interpersonal problems, SD = Standard deviation. *$p < .01$.

Table 2. Statistics for the regressions with interpersonal problems as the dependent variable and anxiety, depression, worry, and meta-worry as predictors ($N = 135$).

Step	Variable	F cha	R^2 cha	r	t	Tolerance	VIF
1		38.920	.371**				
	Anxiety			.295	4.275**	.675	1.481
	Depression			.270	3.905**	.675	1.481
2		5.655	.026*				
	Anxiety			.227	3.346**	.604	1.654
	Depression			.224	3.300**	.638	1.568
	Worry			.161	2.378*	.714	1.401
3		4.757	.021*				
	Anxiety			.138	2.067*	.485	2.064
	Depression			.179	2.678**	.596	1.678
	Worry			.078	1.162	.567	1.762
	Meta-worry			.146	2.181*	.373	2.682

**$p < .01$, *$p < .05$, r = semipartial (part) correlation, VIF = variance inflation factor.

Study 2

Materials and methods

Participants and procedure

The clinical sample was drawn from a randomized controlled trial of 60 patients with GAD (Nordahl et al., 2018). The patients were diagnosed with GAD as their primary diagnosis by independent assessors using the Anxiety Disorders Interview Schedule for DSM (ADIS-IV; Brown et al., 1994), and 29 (48.3%) of the participants also met diagnostic criteria for comorbid major depressive disorder. Only participants with complete data on the included measures at pre-treatment were included ($N = 56$). In this sample the mean age was 37.43 ($SD = 12.68$) years, 39 were female (69.6%), 41 (73.2%) were in a relationship, 8 (14.3%) were separated or single, whilst the remaining 7 participants (12.5%) did not report on their civil status.

Measures

As in study 1, the BAI, PSWQ, and AnTI were also used in study 2. These scales showed the following internal consistencies: BAI ($\alpha = .91$), PSWQ ($\alpha = .82$), and AnTI meta-worry subscale ($\alpha = .81$). The Inventory of Interpersonal problems 64 (IIP-64; Alden et al., 1990) which is also based on the longer and original version by Horowitz et al. (1988) was used. The IIP-64 is built up and scored similarly to the 32-items version as used in study 1. In the current study, the IIP-64 total scale had a good internal consistency ($\alpha = .88$). The Beck Depression Inventory (BDI; Beck et al., 1961) was used instead of the PHQ-9 in this study since it was used as a measure of depression in the clinical trial. The scale measures cognitive, affective and somatic symptoms of depression during the last two weeks by 21 items rated from 0 to 3 with higher scores indicating higher levels of depression. In the current study the internal consistency was good ($\alpha = .90$).

Statistical analyses

The same software and statistical procedures as in study 1 were also used in study 2.

Results

Correlational analyses

Descriptive statistics and bivariate correlations between the variables are presented in Table 3. Interpersonal problems showed positive and significant correlations of weak strength with anxiety and worry, and of moderate strength with depression, and meta-worry.

Table 3. Descriptive statistics and bivariate correlations ($N = 56$).

	Mean (SD)	2	3	4	5
1. IIP	80.04 (37.01)	.36**	.51**	.29*	.62*
2. Anxiety	23.07 (12.21)		.38**	.16	.44*
3. Depression	16.13 (9.30)			.29*	.53**
4. Worry	66.22 (7.58)				.62**
5. Meta-worry	18.82 (4.10)				

IIP = Inventory of interpersonal problems, SD = Standard deviation. *$p < .05$, **$p < .01$.

Table 4. Statistics for the regressions with interpersonal problems as the dependent variable and anxiety, depression, worry, and meta-worry as predictors ($N = 56$).

Step	Variable	F cha	R^2 cha	r	t	Tolerance	VIF
1		10.934	.292**				
	Anxiety			.189	1.638	.864	1.157
	Depression			.401	3.469**	.864	1.157
2		1.227	.016				
	Anxiety			.181	1.570	.861	1.161
	Depression			.353	3.061**	.804	1.243
	Worry			.128	1.108	.905	1.106
3		12.714	.138**				
	Anxiety			.044	.427	.762	1.312
	Depression			.194	1.865	.699	1.431
	Worry			−.111	−1.068	.600	1.665
	Meta-worry			.371	3.566**	.432	2.316

$**p < .01$, $*p < .05$, r = semipartial (part) correlation, VIF = variance inflation factor.

Hierarchical linear regression

On the first step of the regression, anxiety and depression as a block accounted for 29.2% of the variance in interpersonal problems, but among them, only depression made a unique contribution to interpersonal problems. In the second step, worry did not significantly account for additional variance. In the third step, meta-worry accounted for an additional 13.8% of the variance. In the final regression when the overlap between all the predictors were controlled, only meta-worry was a significant and unique predictor of interpersonal problems. Adding meta-worry to the model led depression symptoms to become non-significant as a unique predictor of interpersonal problems. The results from the regressions are presented in Table 4.

Discussion

In the present study, we set out to test the relevance of meta-worry as a predictor of interpersonal problems whilst controlling for anxiety and depression symptoms and worry proneness in two separate samples. In the first sample, consisting of 135 individuals with analogue GAD, meta-worry accounted for unique variance in interpersonal problems on top of anxiety and depression symptoms and worry proneness. In the second sample, consisting of 56 individuals diagnosed with GAD, meta-worry but not worry proneness or anxiety/depression symptoms accounted for unique variance in interpersonal problems when the overlap between the predictors were controlled. These findings support the metacognitive model of GAD (Wells, 1995) and indicate that meta-worry may be relevant to formulate and treat interpersonal problems.

The metacognitive model of GAD (Wells, 1995, 2009) suggests that meta-worry is a state of apprising worrying as threatening which means that the individuals perceive worrying itself as posing a danger to momentary well-being and mental health. During episodes of worrying, meta-worry may be a result of the activation of underlying negative metacognitive beliefs (see Fergus & Stratton, 2023). This intensifies the experience of immediate danger for the individual which will then make attempts to remove the perceived threat, for instance through interpersonal behaviours. Interpersonal problems can in this perspective be understood as interpersonal self-regulatory strategies (e.g. reassurance seeking to control (meta-) worrying). Alternatively, interpersonal problems

may reflect more general problems with mental regulation linked to biases in metacognitive knowledge and result from ineffective self-regulation strategies (i.e. rumination) that impair self-confidence and may lead to problems with being assertive.

Our results suggests that interpersonal problems in GAD are more closely linked to meta-worry (i.e. perceived internal threat posed by worrying) compared to general worry proneness, and that meta-worry is an equal or more important target to alleviate interpersonal problems in comparison to anxiety and depression symptoms. These findings are in line with previous studies reporting a unique association between dysfunctional metacognitions and interpersonal problems even when controlling emotional distress symptoms (Nordahl et al., 2021; Strand, Nordahl, et al., 2023). However, it is important to note that worrying is inherent in meta-worry, so the finding that meta-worry but not worry is uniquely correlated with interpersonal problems is likely to reflect the statistical overlap between these indicators used in this study. Nonetheless, the observation is in line with the metacognitive model of GAD (Wells, 1995) which place more central importance on meta-worry as a mechanism of distress and dysfunction in GAD. However, reducing worry frequency can reduce meta-worry frequency as "worrying about worry" naturally depends on being worried in the first place.

Better understanding for factors amenable to change that contributes to interpersonal problems in those with GAD has been demanded (Malivoire et al., 2020). Our findings are based on cross-sectional data and a restricted set of indicators. However, they suggest that meta-worry is relevant to understanding interpersonal problems. If this suggestion is valid, clinicians should formulate and modify meta-worry when aiming to improve interpersonal problems in patients with GAD. In the metacognitive model of GAD, meta-worry is a central characteristic of the disorder driving both emotional distress symptoms and behavioural strategies. Metacognitive therapy (MCT; Wells, 2009) was specifically designed to modify dysfunctional metacognitions, and the disorder-specific metacognitive treatment of GAD (Wells, 1995, 2009) place central emphasis on meta-worry as a mechanism of distress. In line with the model, MCT has shown to be more effective than Cognitive-Behavioural Therapy for GAD in several randomized controlled trials (Normann & Morina, 2018). In one of these (Nordahl et al., 2018), interpersonal problems were one of the secondary outcomes and showed significant superiority of improvement at post-treatment and 2-years follow-up in those treated with MCT compared to those treated with CBT. A possible explanation aligning with our results is that MCT more directly targets meta-worry which impacts the interpersonal functioning in GAD. One advantage of the metacognitive approach is its focus on common processes across psychopathology (e.g. perseverative thinking, strategic attention and maladaptive behavioural strategies) that is likely to affect a range of symptoms and psychological dysfunctions as they are a result of biases in metacognition (Wells, 2019). This could render additional treatment strategies or packages to treat parallel issues such as interpersonal problems unnecessary in MCT. This notion is further supported by studies reporting improvements in interpersonal problems following MCT for other mental health disorders such as major depression (Strand, Veium, et al., 2023; Strand et al., 2018), mixed anxiety (Johnson et al., 2017), and borderline personality disorder (Nordahl & Wells, 2019).

There are several limitations that should be noted. First, causal inferences cannot be drawn based on cross-sectional data. Second, the sample size for the second study was limited. Third, measurement of the constructs may have

impacted on the results and thus our interpretations. The PSWQ was used as an indicator of worry, and as this is a measure of trait-worry we cannot rule out the possibility that a state measure of worrying could be a better predictor of interpersonal problems. The AnTI was used as an indicator of meta-worry, but one could argue that some of its items might not capture the phenomenon of meta-worry in an optimal way. Future studies should operationalize and evaluate the role of meta-worry as a state factor activated under episodes of worrying. This approach could provide more accurate knowledge about the role of meta-worry in distress and disorder and has just recently been employed to evaluate the relationships between meta-worry and metacognitive beliefs (Fergus & Stratton, 2024). However, to the best of our knowledge, this is the first study looking into the relationships between meta-worry and interpersonal problems, and along its limitations there are also several strengths associated with our research. For example, the hypotheses were tested and results replicated in two independent samples of which one consisted of individuals with a clinical diagnosis of GAD. In evaluating the role of meta-worry we controlled for the potential contribution from anxiety and depression symptoms and worry proneness which are established correlates of both interpersonal problems and metacognitions. As these results suggest that meta-worry may be a target for improving interpersonal problems in GAD, further studies should seek to employ longitudinal and experimental designs to further test this assumption. Whether meta-worry or perceived threats from worrying itself are implicated in interpersonal problems in different diagnostic groups should also be evaluated. It could be that meta-worry is more characteristic of GAD and therefore more relevant to interpersonal problems in those with GAD compared to other diagnostic groups.

In conclusion, meta-worry is uniquely associated with interpersonal problems across an analogue and clinical sample of GAD patients. Meta-worry may be an important contributor to interpersonal problems in GAD and thus a target for treatment with an aim to improve interpersonal problems. More research is warranted to evaluate this link further with more precise indicators and better designs.

Disclosure statement

No potential conflict of interest was reported by the author(s).

ORCID

Henrik Nordahl 🔟 https://orcid.org/0000-0001-8502-5079
Eivind R. Strand 🔟 https://orcid.org/0000-0002-1232-5545
Odin Hjemdal 🔟 https://orcid.org/0000-0002-6430-2345
Hans M. Nordahl 🔟 https://orcid.org/0000-0001-9275-646X

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request and ethical approval.

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