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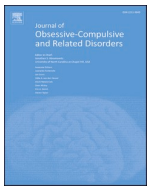

Whom are you mad at? Anger and revenge in obsessive-compulsive symptoms during adolescence

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ABSTRACT

Previous research has extensively explored the role of anxiety, disgust, guilt, and shame in obsessive-compulsive (OC) symptoms, but few studies have investigated anger and associated vengeful motivations, especially during adolescence, when OC symptoms typically onset. This is unfortunate as anger is a key human emotion linked to various aspects of behaviour. Our aim was to explore how anger and revenge motivations were associated with the most common OC subtypes in adolescents. Participants were 1035 high school students who completed a battery of questionnaires including the Obsessive-Compulsive Inventory-Child Version, the Children's Depression Inventory, the Transgression-Related Interpersonal Motivations Inventory-18 and the State-Trait Anger Expression Inventory for children and adolescents. Even when accounting for different aspects of anger, TRIMs and depression, trait anger (i.e., a stable tendency to experience anger) was uniquely associated with all types of OC symptoms (doubting/checking, obsessing, and ordering). Unique associations were also found between revenge motivations and doubting/checking and obsessing. Our findings show that adolescents with high OC symptoms may experience not only intense anger, but also vengeful feelings and motivations. Future research should examine how anger, vengeful motivations and OC symptoms co-develop over time. Clinicians should be aware that anger and vengeful motivations can be part of the clinical presentation of OCD, which can inform assessment and treatment.

Obsessive-Compulsive Disorder (OCD) is a highly debilitating mental illness, characterised by recurrent obsessions and compulsions, with a prevalence ranging from 1% to 3% (American Psychiatric Association, 2013) and subclinical symptoms ranging from 2% to 19%. Early-onset OCD can be severely handicapping and impair adolescent development (Geller et al., 2021). Moreover, many individuals suffering from obsessive-compulsive symptoms either delay for years the request for help to professionals or do not resort at all to mental health services: OCD has one of the longest durations of untreated illness, up to ten years (Walitza et al., 2020). Subclinical symptoms of this disorder are common in youth (Politis et al., 2017; Zijlmans et al., 2017) and are considered a very useful proxy for studying mechanisms involved in OCD (Abramowitz et al., 2014; Barzilay et al., 2019; Gibbs, 1996), especially considering progression from initial manifestations to full-blown obsessive-compulsive disorder (Coles et al., 2012; Stavropoulos et al., 2017). Along these lines, Brakoulias et al. (2018) highlight the importance of early detection of subclinical OCD symptoms in students.

Anger is one of the least investigated emotions in the study of obsessive-compulsive (OC) symptoms and OCD (Jessup et al., 2019). Compared to the number of studies on the role of anxiety, guilt, and disgust in OCD (see, e.g., Barcaccia et al., 2015; Knowles et al., 2018; Mancini & Gangemi, 2015; Rachman, 1993; Shafran et al., 1996), little research has focused on the role of anger. The few studies that have explored anger in individuals with OCD and in subclinical samples, show that OC symptoms are associated with increased levels of anger (Cludius et al., 2021; Liu et al., 2017; Moscovitch et al., 2008; Painuly et al.,

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2011; Whiteside & Abramowitz, 2004, 2005).

Anger is a basic emotion typically experienced as a justified response to a perceived injustice or harm (Taylor & Novaco, 2018), thus motivating disadvantageous behaviours towards others (Van Doorn et al., 2014). Spielberger and colleagues proposed a multi-dimensional model of anger and developed the State-Trait-Anger Inventory (STAXI)(Spielberger, 1983; Spielberger et al., 1983). According to the authors (Spielberger et al., 1983), trait anger is a dimension related to the individual's stable tendency to experience the emotion of anger, across time and situations. The STAXI also measures anger control, evaluating how much effort an individual invests in controlling their anger and in preventing the outward expression of anger by calming down and trying to quickly decrease their anger. Another important facet of anger measured by the STAXI is suppressed anger, where angry feelings are experienced by individuals, but not overtly expressed.

Previous studies with both community and clinical samples have started to shed light on the role played by anger in the aetiology and maintenance of OC symptoms and OCD (Cludius et al., 2021; Jessup et al., 2019; Painuly et al., 2011; Radomsky et al., 2007; Whiteside et al., 2005). In a recent study, Cludius and colleagues (2021) found that individuals with OCD had higher anger suppression and trait anger when compared to non-clinical participants, a finding confirming previous results (Whiteside & Abramowitz, 2004). Similarly, Moscovitch et al. (2008) showed that OC patients showed higher scores on both latent aggression and inflated responsibility compared to non-clinical participants, suggesting that the experience of anger, but not its overt expression, is increased in patients with OCD. The authors argue that the manifestation of anger into overt behaviour may be offset by the strict moral standards held by individuals with OCD. The origins of this theory can be traced back to psychoanalysis (Freud, 1909, 1913). According to Rachman (1993), individuals with OCD experience anger, but are unable to cope with it effectively, due to their inflated sense of responsibility and a tendency to blame themselves instead of others. Radomsky et al. (2007) found that adult patients with OCD with the checking subtype had higher levels of trait anger, compared to non-clinical participants. Along the same line, Piacentino et al. (2016) found that anger correlated with contamination, sexual, and aggressive obsessions in adult patients.

Regarding adolescence, Guzick et al. (2021) recently investigated the role of irritability in children and adolescents with OCD, considering that behavioural manifestations of irritability are frequently found in paediatric OCD Irritability, a construct close to anger but not overlapping with it, was measured by summing three items from the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001), and it was not found to be associated with OCD severity nor with other typical features of OCD, such as exaggerated threat estimation, responsibility for harm, need for certainty, or perfectionism.

When confronted with a perceived interpersonal wrong, anger may activate the behavioural approach system *(BAS)* (Rajchert & Winiewski, 2016) and consequently raise the likelihood of vengeful behaviours (Chester & DeWall, 2018). Individuals with high trait anger are more vengeful than those with low trait anger (Sindermann et al., 2018). Indeed, the transgression-related interpersonal motivations (TRIMs) include motivations to either forgive, take revenge, or avoid the transgressor (McCullough et al., 2013). Several studies have shown that while forgiveness is associated to adjustment and wellbeing (Barcaccia et al., 2018, 2019, 2020a, 2022; Brown, 2003; Pareek et al., 2016; Webb & Toussaint, 2019), revenge is associated with maladjustment and can be detrimental for psychological health (Schumann & Ross, 2010). Accordingly, vengeful motivations have been linked to higher levels of rumination, negative emotions, lower life satisfaction (McCullough et al., 2001; Ysseldyk et al., 2007), are associated with anxiety and depression and can act as a predictor of psychopathology (Barcaccia et al., 2020b, 2021, 2022; Grobbink et al., 2015; Yoshimura, 2007).

Indeed, only one study has explored the potential role of revenge in OCD (Fatfouta & Merkl, 2014). This study showed that both dispositional revenge and motivations to retaliate against an actual offender were positively associated with OC symptoms in a sample of adult patients, with the strongest relationship emerging between revenge and obsessing.

Among adolescents, while the role of depressive symptoms in OCD has been widely explored (see, e.g., Jones et al., 2018), the role of anger and TRIMs is under-studied. In such examinations, it is important to account for depressive symptoms, which in previous studies have been found to be related to both anger and OCD (Moscovitch et al., 2008). In actual fact, it has been highlighted that heightened anger experiences in OCD, when compared to control participants, could be an artefact of depression (Jessup, 2019).

In addition, a deeper understanding of how anger and TRIMs are related to OC subtypes could improve prevention strategies for OC symptoms, not the least since OC symptoms do not represent a unitary phenomenon but are best conceptualised as interrelated, yet distinct, subtypes (Cervin et al., 2020d).

Considering the above-reviewed evidence, the aim of this study was to investigate whether and how anger and motivations to either take revenge, avoid, or forgive were associated with different OC symptom subtypes in adolescents, taking into account depressive symptoms. Based on the preliminary findings from previous studies (Cludius et al., 2021; Fatfouta & Merkl, 2014; Moscovitch et al., 2008; Piacentino et al., 2016; Radomsky et al., 2007), we expected that: (1) trait anger would be related to checking and contamination symptoms; (2) anger suppression and control would be related to all OC subtypes; (3) revenge motivations would be related to obsessing symptoms.

1. Method

1.1. Participants and procedures

Participants included 1035 high school students (58.3% girls) attending five different high schools. The participants had a mean age of 16.68 years ($SD = 1.82$). We used a convenience sampling method. The principal investigator contacted by email the high schools' headmasters, presenting the aims and the methodology of the study. The schools that were available to take part in the survey were included in the study. Written informed consent was obtained from parents of underage pupils, whereas students aged 18 or older signed their own consent forms. Participants did not receive any compensation. Rates of missing data were very low (0.1%–0.6% across measures) and was handled within the statistical models using pairwise deletion. Data were collected via an anonymous battery of instruments through collective measurement data during regular class hours. After reading the instructions and signing an informed consent form, participants completed several paper-version questionnaires within 15 min. The project was approved by the Ethical Committee of the Department of Developmental and Social Psychology, Sapienza University of Rome.

1.2. Measures

The Children's Depression Inventory (CDI; Kovacs, 1992) is a self-report questionnaire for assessing depressive symptoms in children and adolescents. Each item is scored on a three-point Likert scale indicating increasing severity of symptoms (e.g., "I feel like crying once in a while" = 0; "I feel like crying many days" = 1; "I feel like crying everyday" = 2). The 27 item scores are usually summed into a total depression score. The psychometric properties of CDI were examined as part of the present study.

The State-Trait Anger Expression Inventory for Children and Adolescents (STAXI-CA; Del Barrio et al., 2004; Lonigro et al., 2015) is a youth version of the State-Trait Anger Expression Inventory (STAXI-2; Spielberger et al., 1983) and measures various forms of anger and anger control. Responses to items are made on a 3-point Likert scale ranging from 1 ("*Hardly Ever*") to 3 ("*Often*"). There are four subscales, each

composed of eight items: (1) State-anger (e.g., "At this moment I feel furious"), (2) Trait-anger (e.g., "1 get angry very quickly") (3) Anger Expression (e.g., "When I'm angry I do things like slam doors"), and (4) Anger Control (e.g., "When I'm angry I do something to calm down"). Items for each dimension are usually summed. The psychometric properties of the STAXI-CA were evaluated as part of the present study.

The Transgression-Related Interpersonal Motivations Inventory- 18 (TRIM-18; McCullough et al., 1998; Barcaccia et al., 2021) is a self-report questionnaire assessing interpersonal transgression-related motivations towards the offender after a specific transgression. It encompasses three subscales. The Avoidance motivation subscale includes seven items (e.g., "I withdraw from him/her"). The revenge motivation subscale includes five items (e.g., "I want to see him/her hurt and miserable"). The Benevolence motivation subscale (i.e., forgiveness), includes six items (e.g., "Although he/she hurt me, I am putting the hurts aside so we can resume our relationship."). The 18 items are rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). Higher scores on each dimension correspond to higher avoidance, forgiveness and revenge and the psychometric properties of the questionnaire were evaluated as part of the present study.

The Obsessive-Compulsive Inventory-Child Version (OCI-CV; Foa et al., 2010; Pozza et al., 2017) is a 21-item self-report measure of obsessive-compulsive symptoms for youth, characterised by a six-factor structure encompassing six different subtypes of OCD: Doubting/checking, Pure obsessing, Hoarding, Washing, Ordering, and Neutralising. The 21 items are scored on a 3-point Likert scale (0 = never to 2 = always) and its psychometric properties were evaluated as part of the present study.

1.3. Statistical analysis

Establishing a measurement model. The main variables under investigation were different symptom subtypes of OCD (as measured via OCI-CV), depressive symptoms (as measured via CDI), different anger dimensions (as measured via STAXI-2) and different transgression-related interpersonal motivations (as measured via TRIM-18). We first conducted three separate confirmatory factor analyses (CFAs) to examine the psychometric properties of symptoms (OCD and depression), anger (the four scales of STAXI-2) and transgression-related interpersonal motivations (the three scales of TRIM-18). Fit indices, modification indices and internal consistency of scales were explored to find a good measurement model. To maximise the number of observations per estimated parameter, we used the short version of CDI entailing 10 items (Allgaier et al., 2012). Further, the neutralising subscale of OCI-CV was excluded because it has shown poor internal consistency in numerous previous studies (Aspvall et al., 2020; Jones et al., 2013) and did so also in the present sample ($\alpha = 0.54$).

1.4. Associations between anger, transgression-related interpersonal motivations and OCD

To estimate unique associations between anger, TRIMs and OCD, we added regression parameters between anger/TRIMs (multiple independent variable) and OC symptom subtypes (multiple dependent variables) using structural equation modelling (SEM). First, we regressed the OCD factors onto the anger factors with and without adjusting for depression, age, and sex. Last, we regressed the OCD factors onto the anger and TRIMs factors while adjusting for depression, age, and sex. Covariance between the OCD factors were included in all models. By examining the estimated regression parameters, we could evaluate whether certain aspects of anger and TRIMs were uniquely related to different symptom expressions of OCD.

Because we conducted multiple statistical models, an alpha level of 0.01 was used as an indicator of statistical significance. All analyses were carried out with R in R Studio version 1.1.447 using the packages *lavaan* and *semTools*. The statistical script is available as a Supplement.

2. Results

2.1. Measurement model

We first tested a model with the five proposed OCD scales of OCI-CV (doubting/checking, obsessing, hoarding, ordering, and washing – neutralising was excluded for reasons described above) and the 10-item depression scale of CDI. The model showed overall adequate fit but low CFI/TLI (RMSEA = 0.05, CFI = 0.92, TLI = 0.91, SRMR = 0.06). The washing and hoarding factors showed low internal consistency (*as* = 0.63 & 0.65). We omitted these factors and reran the CFA. Fit was improved and good (RMSEA = 0.05, CFI = 0.94, TLI = 0.93, SRMR = 0.06) and the internal consistency of all factors was above 0.70. Thus, we settled on a measurement model of symptoms that included doubting/checking, obsessing, and ordering for OCD and depression.

A CFA testing a 4-factor model that included the four anger scales of STAXI-2 showed poor model/data fit (RMSEA = 0.08, CFI = 0.84, TLI = 0.82, SRMR = 0.09) and the trait anger and anger-out scales were highly correlated (0.75). We reran the model but excluded the anger-out scale. Fit was improved but still poor (RMSEA = 0.08, CFI = 0.87, TLI = 0.85, SRMR = 0.09). One item loaded very weakly onto the anger-in scale (item 33; loading = 0.26) and was removed. Modification indices indicated that items 13 and 23 loaded clearly onto both trait anger and anger-in and that there was a substantial residual correlation between items 11 and 12. We removed items 13 and 23 and added a parameter capturing residual correlation between items 11 and 12 and reran the model. Data/model fit for this model was excellent (RMSEA = 0.05, CFI = 0.97, TLI = 0.96, SRMR = 0.06) and the internal consistency of all factors was above 0.70. Thus, by excluding one problematic scale and two problematic items, we had an excellent measurement model of trait anger, suppressed anger, and anger control.

A model containing the three scales of the TRIM-18 showed overall adequate model/data fit (RMSEA = 0.07, CFI = 0.94, TLI = 0.93, SRMR = 0.05). Modification indices indicated that item 10 loaded onto both the revenge and avoidance factor. This item was removed, and a new CFA was run that showed good fit (RMSEA = 0.05, CFI = 0.96, TLI = 0.95, SRMR = 0.04) and the internal consistency of all factors was above 0.70, generating a good measurement model of forgiveness, revenge, and avoidance motivations.

Last, we ran a model that included all the above factors (i.e., doubting/checking, obsessing, ordering, depression, trait anger, suppressed anger, anger control, forgiveness motivations, revenge motivations and avoidance motivations). The model/data fit was good (RMSEA = 0.03, CFI = 0.93, TLI = 0.93, SRMR = 0.05) and all factors showed adequate internal consistency (composite reliability, i.e., based on factor loadings): obsessing ($\alpha = 0.82$), doubting/checking ($\alpha = 0.72$), ordering ($\alpha = 0.73$), depression ($\alpha = 0.89$), trait anger ($\alpha = 0.78$), anger control ($\alpha = 0.76$), suppressed anger ($\alpha = 0.83$), forgiveness motivations ($\alpha = 0.87$), avoidance motivations ($\alpha = 0.88$) and revenge motivations ($\alpha = 0.88$). The covariance coefficients between the first-order factors in this model are presented in Table 1, showing the positive correlations of both trait anger and revenge with doubting/checking, ordering, and obsessing.

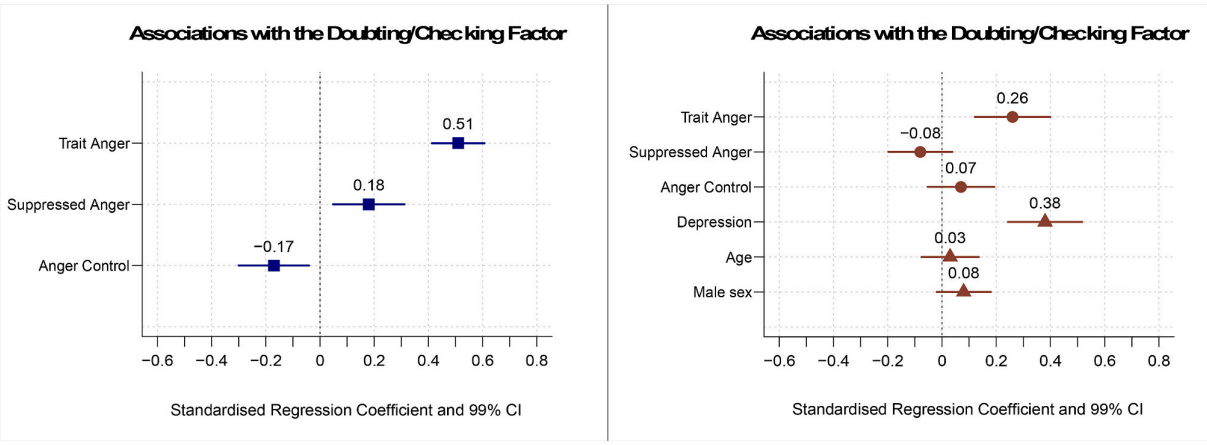
2.2. Structural regression models

Results of the structural regression models for the OCD factor of doubting/checking are presented in Fig. 1. We present regression parameters for each OCD factor separately, but note that results emerge from full models where all OCD factors were included as correlated dependent variables. Without adjusting for depression, age, sex and all three anger scales were associated with the doubting/checking factor and the model explained 28% of the variation in doubting/checking. When we adjusted for depression, age, and sex, only trait anger among the anger variables was associated with doubting/checking. Depression was also significantly associated with doubting/checking and the full

Table 1
Zero-order correlations (covariance coefficients) between anger, transgression-related interpersonal motivations (forgiveness, avoidance, revenge) and symptoms estimated as part of the confirmatory factor analysis.

	Trait anger	Suppressed anger	Anger control	Forgiveness	Avoidance	Revenge	Doubting/ checking	Ordering	Obsessing	Depression
Trait anger	–	.09*	.07	−.10*	.26***	.22***	.42***	.36***	.50***	.49***
Suppressed anger		–	.37***	.10**	−.02	−.16***	.08	.01	.08	.22***
Anger control			–	.05	.02	−.15***	.02	.14**	−.07	−.14***
Forgiveness				–	−.54***	−.28***	.07	.01	−.03	.05
Avoidance					–	.51***	.07	.14**	.10*	.04
Revenge						–	.20***	.14**	.21***	.01
Doubting/ Checking							–	.60***	.59***	.41***
Ordering								–	.42***	.11**
Obsessing									–	.55***
Depression										–

Notes. *p < .05, **p < .01, ***p < .001.



Notes. Covariance between the doubting/checking factor and the two other OCD factors of obsessing and ordering is accounted for in both models.

Fig. 1. Associations between anger factors and doubting/checking with (right panel) and without (left panel) adjustment for depression, age and sex. Results are from a model that includes doubting/checking, obsessing and ordering as correlated dependent variables.
Notes. Covariance between the doubting/checking factor and the two other OCD factors of obsessing and ordering is accounted for in both models.

model (i.e., using trait anger, suppressed anger, anger control, depression, age, and sex as independent variables) explained 30% of the variation in doubting/checking.

All three anger factors were associated with obsessing when only the anger factors were included as independent variables and the model explained 46% of the variation in obsessing. Only trait anger remained significant in when depression, age and sex were accounted for. In this model depression was also significantly associated with obsessing and the model explained 40% of the variation in obsessing. Full results are in Fig. 2.

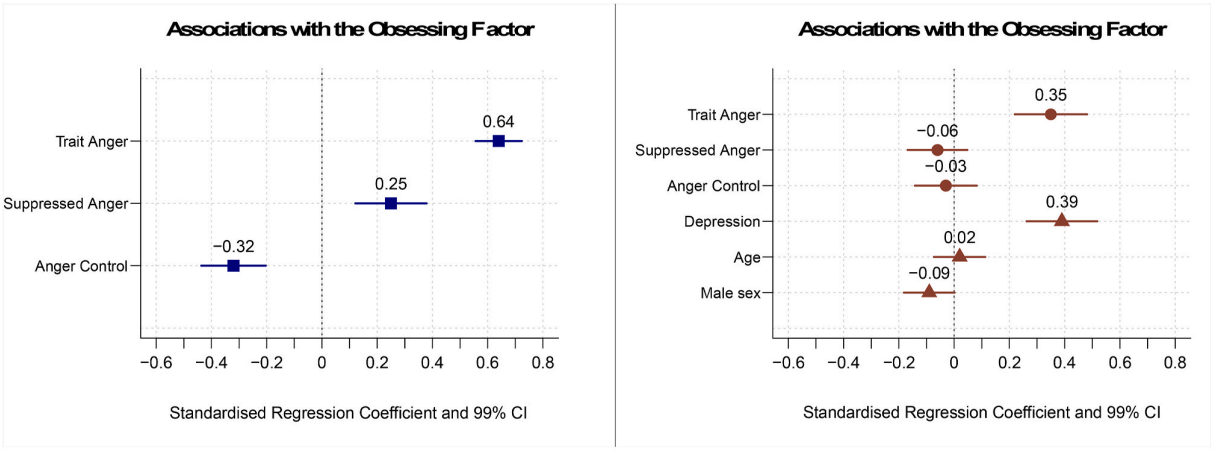
Trait anger and anger control were significantly associated with the ordering factor when only anger factors were included as independent variables and the model explained 16% of the variation in ordering. Of note, there was a positive association between anger control and ordering such that more control was associated with more ordering symptoms. Only trait anger remained significant in the model that accounted for depression, age, and sex, with age also being positively associated with ordering in this model. The model explained 18% of the variation in ordering and full results are in Fig. 3.

To examine whether TRIMs factors explained unique variance in OCD over and above the anger factors, age, sex, and depression, we added forgiveness, avoidance and revenge as independent variables. Full results are presented in Fig. 4. Results showed that (1) trait anger was uniquely associated with all three OC factors, (2) revenge was uniquely associated with doubting/checking and obsessing, (3) anger control was uniquely associated ordering, (4) depression was uniquely associated with doubting/checking and obsessing and (5) age was uniquely associated with ordering.

3. Discussion

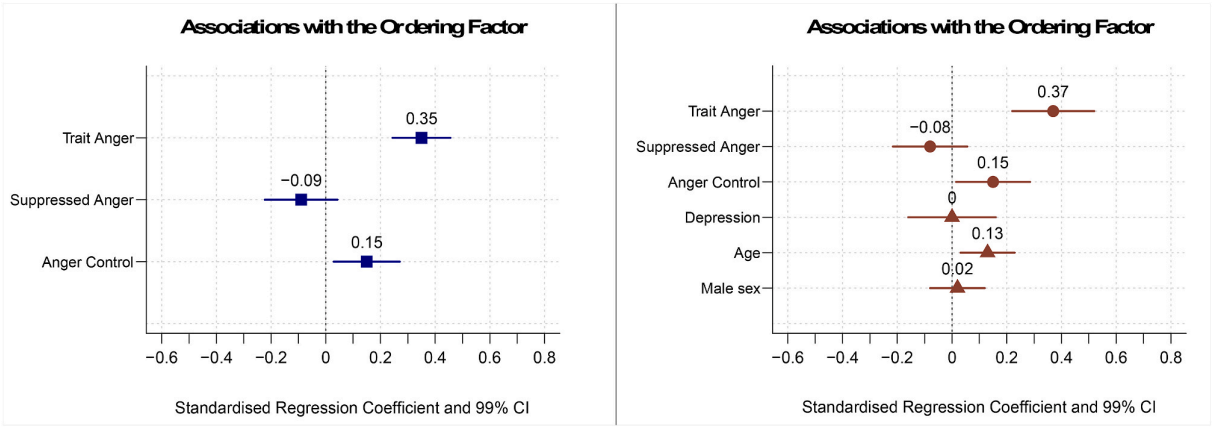
The present study is the first investigation of anger and transgression-related interpersonal motivations in relation to the major subtypes of OC symptoms during adolescence. A strength of this study was the inclusion of a measure of depression which allowed for the exploration of the effects of anger and TRIMs without the risk of observing a spurious effect potentially attributable to depressive symptoms, which have been generally found to be related to both anger and OC symptoms in previous investigations (Whiteside et al., 2004; 2005). Consistent with our first and third hypotheses, trait anger and revenge were respectively associated with checking and obsessing symptoms, and contrary to our second hypothesis, anger suppression and control were not found to be related to obsessing symptoms.

In the first step, the psychometric evaluation of the questionnaires showed robust fit and reliability indices respectively for three OC dimensions (doubting/checking, obsessing, and ordering), three anger



Notes. Covariance between the obsessing factor and the two other OCD factors of doubting/checking and ordering is accounted for in both models.

Fig. 2. Associations between anger factors and obsessing with (right panel) and without (left panel) adjustment for depression, age and sex. Results are from a model that includes doubting/checking, obsessing and ordering as correlated dependent variables.
Notes. Covariance between the obsessing factor and the two other OCD factors of doubting/checking and ordering is accounted for in both models.



Notes. Covariance between the ordering factor and the two other OCD factors of doubting/checking and obsessing is accounted for in both models.

Fig. 3. Associations between anger factors and ordering with (right panel) and without (left panel) adjustment for depression, age and sex. Results are from a model that includes doubting/checking, obsessing and ordering as correlated dependent variables.
Notes. Covariance between the ordering factor and the two other OCD factors of doubting/checking and obsessing is accounted for in both models.

factors (trait anger, anger suppression, anger control) and all the three TRIMs (forgiveness, avoidance, revenge). This result seems to be in line with the recent findings based upon network analyses suggesting that such OC dimensions would reflect more reliably the OC phenomenology in community and clinical samples of children and adolescents (Cervin et al., 2020b; 2020c). The poor fit of the OC washing scale was unexpected but suggests that the washing items included in the OCI-CV reflect partly distinct phenomena among adolescents in the general population, while youth with OCD clearly rates these items as being indicators of an overall OC symptom subtype (Aspvall et al., 2020; Foa et al., 2010).

In the second step, after adjusting for depression, age, and sex, partially confirming our first hypothesis, only trait anger among the anger factors was associated with all the OC subtypes (i.e., doubting/checking, obsessing, and ordering traits), with depressive features being related to doubting/checking and obsessing and age being associated with ordering traits. In the full regression model, where we examined the effects of all anger facets and TRIMs in relation to OC subtypes, trait anger was uniquely associated with all the OC subtypes. Interestingly, in line with our hypotheses, revenge was associated with doubting/checking and obsessing, as were depressive symptoms, while anger control was associated with ordering.

Overall, the findings regarding trait anger support the notion that this facet of anger might play a relevant role in several expressions of OC symptoms, in line with previous research (e.g., Barrett et al., 2013; Cludius et al., 2021; Jessup et al., 2019; Painuly et al., 2011; Radomsky et al., 2007; Whiteside et al., 2005). The association between trait anger and doubting/checking is consistent with the results of a case-control study conducted on adult OCD patients with checking rituals and undergraduate controls (Radomsky et al., 2007) where trait anger, but not

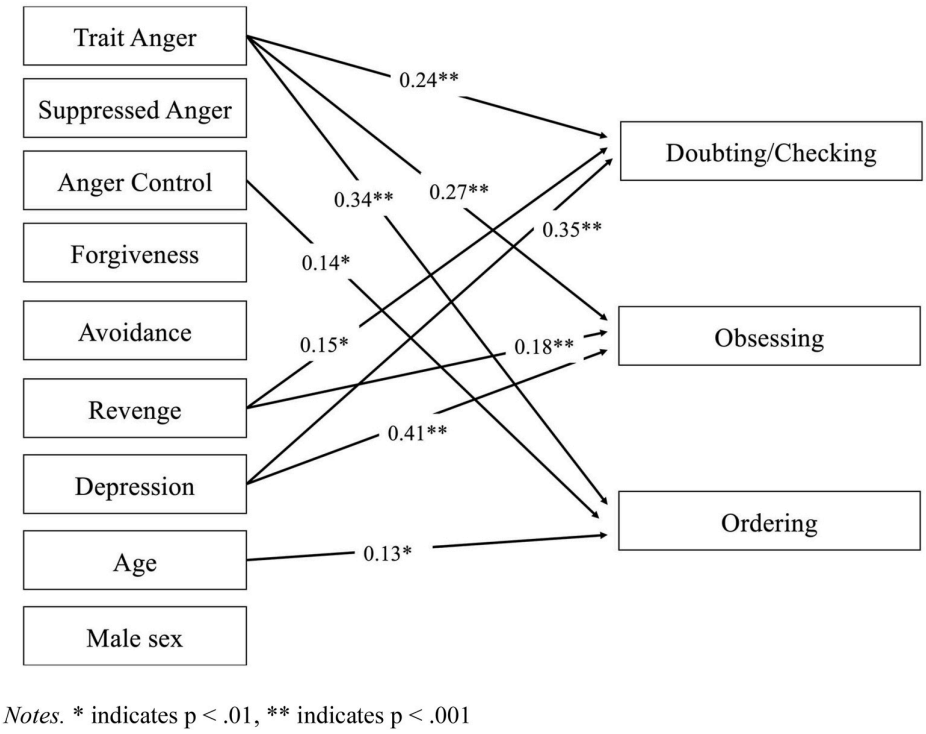


Fig. 4. Associations between anger factors, transgression-related interpersonal motivation factors (forgiveness, avoidance and revenge), depression, age and sex and the OCD factors of doubting/checking, obsessing and ordering.
Notes. * indicates p < .01, ** indicates p < .001.

the other anger dimensions, was higher in the OCD group than in the undergraduate control group. In addition, the relation between trait anger and all measured OC symptoms is in line with evidence provided by a recent case-control study of Cludius et al. (2021) showing that adult patients with any subtype of OCD had higher trait anger than controls. In addition, it is consistent with a study showing that trait anger was positively correlated with OC symptoms' severity in adult OC patients (Piacentino et al., 2016). Suppressed anger was associated with doubting/checking and obsessing when depression was excluded from the model, but these relations disappeared when we accounted for depressive symptoms, in line with the results by Cludius et al. (2021) who found that anger suppression was higher in OC patients than controls without controlling for depression. Moreover, the relation between trait anger and the OC dimensions appears to be different from the findings of another study conducted on children and adolescents with OCD, showing no significant correlations between irritability and OC symptoms' severity (Guzick et al., 2021), although irritability and anger cannot be considered interchangeable constructs.

The full regression model, that included all anger and interpersonal motivations factors, confirmed the findings of the previous analyses such that trait anger was uniquely associated with all the OC symptom types. Again, this result supports the expected link between trait anger and OC dimensions, consistent with the findings reported by Radomsky et al. (2007).

Interestingly, revenge motivations were associated with doubting/checking and obsessing even when accounting for anger factors and other interpersonal motivation factors. The role of revenge in doubting/checking and obsessing is consistent with the findings of Fatfouta and Merkl (2014), who showed that adults with high levels of OC symptomatology reported more positive attitudes towards revenge, had higher levels of trait revenge and reported increased revenge motivation regarding a real-life transgressor. Thus, we extend the evidence of the study by Fatfouta and Merkl (2014) into adolescence. An explanation for the role of trait anger and revenge in these OC symptoms might relate to the fact that youth with OC symptoms have been exposed to their relatives' high expressed emotion and/or accommodation, thus experiencing loss of autonomy, increased self-criticism, as found in previous studies (e.g., Chambless et al., 2007; De Berardis et al., 2008). On a more speculative note, anger and revenge could be explained considering that individuals with OC symptoms might be perhaps under the impression of being trampled down and belittled by others. These strong feelings could trigger vulnerable individuals to constantly experience increased anger and revenge, which in turn may lead to OC thoughts and behaviours as the only way to express negative feelings with other people. Another explanation for the clear associations between trait anger and all OC symptoms may be that adolescents high on OC symptoms feel frustrated about their symptoms. The cross-sectional design, the non-clinical nature of our sample and the lack of instruments to assess family experiences did not allow us to test the above hypothesis, which is only speculative and require further investigation using longitudinal designs.

Another interesting result is that anger control was associated with ordering; this is partially consistent with our hypotheses and in line with the findings of studies conducted with adult OC patients (e.g., Whiteside & Abramowitz, 2004, 2005). Perhaps this finding reflects the tendency of individuals with OC symptoms to be hyper-vigilant over their inner experiences and use control manoeuvres as a maladaptive coping strategy (Moritz et al., 2018; Purdon et al., 2005; Yap et al., 2018).

The unique relations between depressive features and certain OC dimensions, i.e., doubting/checking and obsessing, are in line with previous research and the cognitive-behavioural conceptualisation of OC symptoms, where depressive symptoms are viewed as a result but also as a trigger of intrusive thoughts and repetitive behaviours (Abramowitz, 2004; Pozza & Dèttore, 2014). An alternative explanation, however, might be that the relation between depressive symptoms and doubting/checking and obsessing reflects a measurement

methodological artefact, i.e., these OC dimensions would overlap with certain features of rumination, generally associated to depression (Cervin et al., 2020a; Tibi et al., 2018).

In conclusion, from an early intervention/prevention perspective, our findings suggest that trait anger and revenge could be taken into consideration both in the assessment and in the treatment phase, given their potential association with doubting/checking and obsessing.

3.1. Limitations and future directions

A first question that remains open, regards why adolescents with certain OC features would have a higher proneness to experience anger and revenge, regardless of their depressive symptoms. The cross-sectional design of the study did not allow us to draw reliable conclusions regarding the role of anger and revenge as vulnerability, onsetting, epiphenomenal and/or maintenance factors for OC symptoms from a temporal and causal perspective. Indeed, since our data are correlational, the causal direction between the observed variables cannot be inferred, i.e., whether anger and revenge lead to, or result from OC symptoms. Therefore, future prospective research using innovative assessment methodologies including ecological momentary assessment is required to explore more in depth the associations between these variables (Shiffman et al., 2008).

The present findings cannot be generalised to adolescents with OCD, since the sample was recruited from the general population. It would be interesting to examine whether the levels of anger and TRIMs are different across clinical and healthy/community groups, and also in other clinical groups. Similarly, the use of self-report measures should be combined with clinician-administered instruments or other scales completed by significant others such as parents or teachers. Another feature that could be added to the research protocol is a questionnaire measuring anxiety traits, given its role in OC symptoms (Derisley et al., 2008). In fact, other variables could account for the correlation between OC symptoms, anger and revenge, such as obsessive-compulsive personality traits, that could be investigated in future studies. Future research should refine the examination of the relation between trait anger and OC dimensions; it would be interesting to explore whether certain cognitive factors involved in the onset and maintenance of OC symptoms, such as obsessive beliefs (Albert et al., 2015; Pozza et al., 2014), might mediate the relation between anger factors and/or TRIMs and OC dimensions, or to some extent interact with them, as suggested in previous studies (Cludius et al., 2021; Radomsky et al., 2007).

Another valuable aspect to be examined could be the role of family relations and functioning, such as the level of family accommodation or antagonism as potential mediators of the link between anger and/or TRIMs and OC symptoms, since family accommodation/antagonism and other family functioning characteristics have been found to be correlated with trait anger (Guzick et al., 2021; Liu et al., 2017). It can be speculated that, a higher level of family accommodation or antagonism could predispose adolescents to the development of higher levels of trait anger and revenge, which in turn might increase the intensity of OC symptoms, and vice versa.

4. Conclusion

In conclusion, trait anger is clearly associated with major OC symptoms during adolescence and these associations remain while accounting for depression. Revenge motivations may also be important, particularly in relation to OC symptoms revolving around doubting/checking and obsessing. Clinicians should assess anger and vengeful motivations in adolescents with OCD and future research should examine the co-development of anger, revenge and OC symptoms during adolescence.

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Ethics approval

The study was approved by the ethics committee of the Department of Developmental and Social Psychology, Sapienza University of Rome. The study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments.

Consent to participate

Informed consent was obtained from all individual participants included in the study or from their legal guardians.

Authors' statement

Barbara Barcaccia: Conceptualisation; Investigation; Writing-original draft. Matti Cervin: Formal analysis; Data curation; Methodology. Susanna Pallini: Investigation; Resources; Writing - Review & Editing. Alessandro Couyoumdjian: Methodology; Validation. Francesco Mancini: Visualisation.Andrea Pozza: Conceptualisation; Writing - original Draft.

Declaration of competing interest

The authors declare no conflict of interest.

Data availability

Data will be made available on request.

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