Personality and Individual Differences 74 (2015) 159–164

Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

Personality links to anger: Evidence for trait interaction and differentiation across expression style

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ARTICLE INFO

Article history:
Received 21 June 2014
Received in revised form 30 September 2014
Accepted 13 October 2014

Keywords:
Personality
Anger
Aggression
Moderation
Interactive effects
Big Five

ABSTRACT

Anger is a commonly experienced emotion, although marked individual differences in the expression of anger are observed. Basic dimensions of personality (e.g., Big Five traits) have been shown to predict the experience of trait anger; however, little work has addressed the personality correlates of broader conceptualisations of trait anger (e.g., inward or outward expressions). Additionally, while some recent work has suggested that basic personality traits may show interactive influences on anger expression this work has yet to be independently confirmed. In a large sample of adults we examined, firstly, how Big Five traits associated with several components of anger as measured by the State-Trait Anger Expression Inventory. Secondly, we examined whether these associations were further qualified by interactions between Big Five traits. Results indicated neuroticism and, to a lesser extent, (low) agreeableness, were the traits most associated with components of trait anger. Conscientiousness and extraversion were also noted to show links to more focal components of anger. Moderation was observed: conscientiousness moderated neuroticism's relationship with anger control, and agreeableness and conscientiousness, in a three-way interaction, moderated neuroticism's relationship with trait anger. These observations help to further clarify the role of Big Five personality traits as a foundation for the experiences of anger, demonstrating how anger style varies across personality configuration.

1. Introduction

The etiology of anger (and related constructs such as aggression) has been a topic of enduring interest for behavioral scientists. Much work has unveiled the situational (Anderson & Bushman, 2002; Anderson, Deuser, & DeNeve, 1995; Venable, Carlson, & Wilson, 2001), dispositional (Edmunds, 1977; Miller, Zeichner, & Wilson, 2012), and cognitive (Anderson & Bushman, 2002; Hoaken, Shaughnessy, & Pihl, 2003; Wilkowski & Robinson, 2008) factors that give rise to anger. More recently, this research has extended to basic traits of personality (e.g., the Big Five: Martin et al., 1999). However, anger is known to be a complex construct and the Big Five traits that shape the different experience or expression of anger are less well understood. Furthermore, recent work suggests that interactions between Big Five traits may be an additional source of prediction for anger (Jensen-Campbell, Knack, Waldrip, & Campbell, 2007; Ode, Robinson, & Wilkowski, 2008), although these claims have also received limited attention to date. The goal of the current study, then, was to clarify associations between Big Five traits and several aspects of trait anger expression. Moreover, we sought to test whether interactions between Big Five traits provided incremental validity in the prediction of anger expression. To this end we analysed data from a large, representative sample of US adults (Ryff et al., 2012; Ryff, Seeman, & Weinstein, 2013) who had completed measures of Big Five traits along with a comprehensive anger expression measure. Next we detail previous work linking components of anger and Big Five personality traits, before moving to tests of our hypotheses.

1.1. Personality and anger: a brief overview

While much of the personality research to date addressing trait anger has focused on higher-order constructs (e.g., narcissism, psychopathy: Blair, Mitchell, & Blair, 2005; Locke, 2009), in recent years a move toward understanding anger through basic dimensions of personality (e.g., Big Five traits) has emerged (Jones, Miller, & Lynam, 2011). This approach is important, as it allows theories of anger to be situated in a rich body of work that examines the more foundational factors or constructs that may contribute to a temporally stable disposition toward anger. This perspective is in line with a number of major personality models that conceptualize basic traits (e.g., the Big Five) as the output of stable psychobiological systems reflecting low-level processes

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http://dx.doi.org/10.1016/j.paid.2014.10.018
0191-8869/

such as reward-sensitivity, sensitivity to punishment, and impulse control (e.g., DeYoung, 2010; McCrae & Costa, 2008). In turn, these systems are argued to have downstream consequences either in additive or interactive ways on more complex trait constructs, such as trait anger.

Of this research, a number of key findings are apparent. Firstly, neuroticism is a strong predictor of anger and hostility (Hofmans, Kuppens, & Allik, 2008; Ode et al., 2008; Sharpe & Desai, 2001; Tremblay & Ewart, 2005), but less so of aggression (Egan & Campbell, 2009; Sharpe & Desai, 2001). These observations support the fact that trait anger is often considered to be a facet of neuroticism (Costa & McCrae, 1992); however, of relevance to the current study, differentiating between styles of anger expression (i.e., anger-in, anger-out) demonstrates variation in neuroticism's relationship, with increased correlations with inwardly expressed anger compared to outwardly-expressed anger-out (Martin et al., 1999).

Secondly, agreeableness shows a consistent inverse relationship with anger (Egan & Campbell, 2009; Graziano & Tobin, 2002; Hofmans et al., 2008; Meier & Robinson, 2004), as well as related constructs such as aggression (Fossati et al., 2009; Jones et al., 2011; Miller et al., 2012; Seibert, Miller, Pryor, Reidy, & Zeichner, 2010), in line with aggression often featuring as a facet of agreeableness (Costa & McCrae, 1992). Of the single study to address the role of agreeableness to sub-components of trait anger, agreeableness was seen to be inversely related to both internal ($r = -.36$) and external expressions ($r = -.55$; Martin et al., 1999), suggesting that not only does (low) agreeableness serve as a predictor for anger, but it also influences the affective style of anger with emphasis on avoiding outward expressions of anger.

Thirdly, several studies have demonstrated an inverse relationship between conscientiousness and both anger and aggression (Burton, Hafetz, & Henninger, 2007; Lee & Dow, 2011; Miller et al., 2012; Tremblay & Ewart, 2005). Moreover, Martin et al. (1999) reported an inverse relationship between conscientiousness and both inwardly-expressed anger ($r = -.20$) and outwardly-expressed anger ($r = -.24$).

The remaining two Big Five traits' links to trait anger are less well established. Extraversion has rarely shown links to anger and aggression, although Martin and colleagues (1999) found an inverse relationship between inwardly-expressed anger and extraversion, with the facet of excitement seeking having a significant relationship to reactive aggression ($r = .31$). Finally, openness has received only modest attention with regards to anger and aggression, with limited evidence for an association (Bettencourt, Talley, Benjamin, & Valentine, 2006; Jones et al., 2011; Miller et al., 2012).

1.2. Multifaceted anger

While associations between Big Five personality traits linking to broad-based anger dispositions have been examined in several studies, to date there has been a lack of recognition of the fact that anger is a multi-faceted construct, with anger able to be expressed and experienced in multiple ways. For example, the Spielberger State-Trait Anger Expression Inventory (STAXI; Spielberger, 1996) fractionates anger into state and trait components, as well as tapping inward/outward expressions of anger and anger control. It is notable that while Big Five personality associations with trait anger have been examined, this work has rarely addressed these different components of anger, with the sole study (Martin et al., 1999), of which we are aware, being limited to a student sample.

1.3. Personality trait interactions and anger

In addition, almost no attention to date has been focussed on whether Big Five personality traits show interactive influences with regards to their effects on anger expression. This is unfortunate as several models of anger (and aggression) explicitly contain such interactive elements in ways that directly implicate Big Five traits (DeWall, Anderson, & Bushman, 2011; Slotter & Finkel, 2011; Wilkowski & Robinson, 2008). Recent work that has begun to address these concerns led to observations that agreeableness moderated the influence of neuroticism on anger (Ode et al., 2008), and conscientiousness moderated anger's pathway to aggression and agreeableness's relationship with anger (Jensen-Campbell et al., 2007). Both of these studies, however, were conducted with undergraduate samples and/or samples of modest size.

1.4. The current study

Anger is a multi-faceted construct, as evidenced by the diversity of scales and sub-scales present in the literature (Suris et al., 2004). In addition, the importance of trait interactions in determining anger have been examined in only a handful of studies to date, and none to our knowledge capturing a broad-based assessment of anger. With this in mind, the core goals of the current study were as follows. First, we sought to examine the role of Big Five traits across anger expressions. To this end we utilized the well-characterized State-Trait Anger Expression Inventory (STAXI; Spielberger, 1996). This self-report measure examines anger at both the state and trait levels (although state anger was omitted in the current study: see Section 2), as well as measuring intra-directed anger expressions, inter-directed anger expressions, and the capability of controlling one's anger. Second, we sought to assess how Big Five traits might interact to predict anger.

We predicted that neuroticism and (low) agreeableness would reflect anger expression of all types with an emphasis on anger-in and anger-out, respectively. In addition, we hypothesized that conscientiousness would specifically predict anger control, but also reduced levels of other expressions. Finally, we predicted that the strength of neuroticism's association with anger would be moderated by agreeableness, in line with Ode et al. (2008). We also explored whether the strength of agreeableness's association with anger was moderated by conscientiousness, in line with findings by Jensen-Campbell et al. (2007). Although no work, to our knowledge, has demonstrated a role for conscientiousness as a moderator on the effects of neuroticism to anger, we also examined whether this effect as well as whether a three-way interaction between variables (agreeableness × neuroticism × conscientiousness) was present, in line with the broader arguments noted above. Finally, in line with the close links between anger and aggression, and the availability of an aggression measures in the dataset we used in this study, we also extended our analyses to include a test of how Big Five trait interactions predicted aggression.

2. Methods

2.1. Participants

To test our predictions we used a large, representative sample of US adults. Data was available for 1631 participants selected from the main sample of the National Survey of Midlife Development in the United States II (MIDUS II; Ryff et al., 2012, 2013) who were assessed on the Big Five personality traits and trait aggression, among other measures. Of this sample, a sub-sample of 615 participants also completed the STAXI. Demographic information pertaining to the STAXI sub-sample is presented here in parentheses after the main sample. The sample consisted of 901(285) males (mean age = 56.85, SD = 12.64; mean age = 57.11, SD = 12.05) and 730 (330) females (mean age = 57.53, SD = 12.53; mean

age = 55.94, SD = 11.57). By race, 88.9% (88.9%) of the sample was comprised of individuals identifying as White, 4.3% (3.3%) as Black, 0.5% (0.7%) as Native American or Aleutian Islander/Eskimo, 0.7% (0.3%) ($n = 12$; $n = 2$) as Asian or Pacific Islander, 1.5% (2.0%) as Other, 0.6% (1.1%) as Multiracial, and 3.5% (3.7%) refused or were missing data on this question.

2.2. Measures

2.2.1. Big Five personality traits

Big Five personality traits were measured as part of a larger personality assessment examining neuroticism, agreeableness, extraversion, openness to experience, and conscientiousness (Lachman & Weaver, 1997). Traits were measured by asking participants to use a four-point scale to rate the degree to which self-descriptive adjectives related to neuroticism (i.e., moody, worrying, nervous, calm [R]), agreeableness (i.e., helpful, warm, caring, softhearted, sympathetic), extraversion (i.e., outgoing, friendly, lively, active, talkative), openness to experience (i.e., creative, imaginative, intelligent, curious, broad-minded, sophisticated, adventurous), and conscientiousness (i.e., organized, responsible, hardworking, careless [R], thorough) described them. While anger and aggression are considered facets of neuroticism and agreeableness, respectively (Costa & McCrae, 1992) the Big-Five personality measurement used here did not include such descriptors, reducing the likelihood of content overlap between self-reported Big Five traits and the anger/aggression measures used. The mean from each set of items was then calculated to define the trait scales. Cronbach's alpha for each of the personality measures neuroticism, agreeableness, extraversion, openness to experience, and conscientiousness are .74, .81, .77, .78, .70, respectively.

2.2.2. Anger and anger expression

Data was available from participants' self-administration of the Spielberger State-Trait Anger Expression Inventory (STAXI; Spielberger, 1996), and reported scores for the scales Trait Anger (T-Ang: 15 items), Anger Expression-In (AX/IN: 8 items), Anger Expression-Out (AX/Out: 8 items), and Anger Control (AX/C: 4 items). The scale of T-Ang contains two subscales, which are also briefly reported on here: Angry Temperament (T-AngT) and Angry Reaction (T-AngR), each consisting of four items. The STAXI scales consisted items which participants rated on a four-point scale. Scale scores were constructed by the summing across items for which there was no or only one missing value. Mean substitution was used for cases which had only one missing value (Ryff et al., 2013). The State Anger subscale was not measured as part of the STAXI within the MIDUS II. Cronbach's alpha for the T-Ang, T-AngT, T-AngR, AX/IN, AX/Out, and AX/C were .82, .80, .73, .81, .75, and .68, respectively.

2.2.3. Aggression

Aggression was measured as a subscale of the self-administered Multidimensional Personality Questionnaire (MPQ: Tellegen, 1985). The aggression subscale consisted of four items which participants rated using a four-point scale. The sum of the value of the items constructed the scale with higher scores reflecting increased amounts of aggression. Cronbach's alpha for the aggression facet of the MPQ was .65.

3. Results

Descriptive statistics and correlation coefficients for each of the variables are presented in Tables 1 and 2. In short, all scales were most highly correlated with neuroticism, except for the subscale AX/IN which most strongly related (inversely) to extraversion.

To test for unique effects of Big Five personality on anger, we used linear regression analyses with T-Ang, AX/IN, AX/Out, AX/C, and aggression as dependent variables. Age and gender were included as covariates in each model. Full model outputs are presented in Table 3. In brief, T-Ang was most strongly predicted by

Table 1
Descriptive statistics for study variables.

	Mean	SD	*N*
N	2.08	.63	1621
A	3.44	.51	1622
E	3.10	.58	1622
O	2.91	.54	1609
C	3.38	.47	1621
T-Ang	24.04	5.18	612
T-AngT	5.11	1.61	614
T-AngR	7.77	2.41	614
AX/IN	14.77	4.11	614
AX/Out	12.94	3.21	615
AX/C	9.99	2.25	615
Aggression	5.46	1.82	1622
Age	57.15	12.59	1631

Note: N = Neuroticism; A = Agreeableness; E = Extraversion; O = Openess; C = Conscientiousness; T-Ang = Trait Anger; T-AngT = Trait Anger: Angry Temperament; T-AngR = Trait Anger: Angry Reaction; AX/IN = Anger Expression: Anger-In; AX/Out = Anger Expression: Anger-Out; AX/C = Anger Expression: Anger-Control.

Table 2
Correlations among personality, anger, aggression, and demographic variables.

Measure	N	A	E	O	C	T-Ang	T-AngT	T-AngR	AX/IN	AX/Out	AX/C	Agg	Age
A	−.10												
E	−.19	.52											
O	−.20	.34	.51										
C	−.18	.28	.28	.33									
T-Ang	.37	−.19	−.18	−.12**	−.16								
T-AngT	.34	−.11**	−.03	−.04	−.10**	.64							
T-AngR	.20	−.12**	−.14	−.06	−.03	.83	.27						
AX/IN	.32	−.22	−.32	−.17	−.15	.47	.18	.41					
AX/Out	.24	−.14	.00	.02	−.14	.55	.57	.33	.19				
AX/C	−.32	.11**	.10**	.14	.18	−.27	−.32	−.13	−.12	−.30			
Aggression	.30	−.29	−.15	−.12	−.21	.43	.40	.26	.30	.31	−.21		
Age	−.21	.09	.03	−.02	−.03	−.12	−.09**	−.11	−.26	−.25	.02	−.11	
Gender	.16	.32	.09	−.08	.09	.04	.00	.06	−.05	.01	−.08*	−.17	−.03

Note: N = Neuroticism; A = Agreeableness; E = Extraversion; O = Openess; C = Conscientiousness; T-Ang = Trait Anger; T-AngT = Trait Anger: Angry Temperament; T-AngR = Trait Anger: Angry Reaction; AX/IN = Anger Expression: Anger-In; AX/Out = Anger Expression: Anger-Out; AX/C = Anger Expression: Anger-Control; $n = 612–1631$; Gender: Male = 1; Gender: Female = 2; Bolded = $p < .001$.

* $p < .05$.

** $p < .01$.

Table 3
Linear regression analyses (with standardized beta coefficients) showing personality and demographic effects on the seven outcome variables.

	T-Ang (n = 598)	T-AngT (n = 600)	T-AngR (n = 600)	AX/IN (n = 600)	AX/Out (n = 601)	AX/C (n = 601)	Aggression (n = 1591)
N	**.33**	**.34**	**.16**	**.24**	**.19**	**−.29**	**.29**
A	−.12**	−.09*	−.08	−.02	−.15**	.08	**−.21**
E	−.06	.09	−.09	**−.27**	.11*	−.04	.05
O	.04*	.02	.05	.05	.09	.04	.00
C	−.08*	−.04	.01	−.07	−.13**	.13**	**−.10**
Age	−.03	−.01	−.05	**−.19**	**−.20**	−.06	−.06*
Gender	.04	−.03	.06	−.06	.02	−.08	**−.15**
F	**17.40**	**12.44**	**5.52**	**25.24**	**13.92**	**13.49**	**53.41**
R^2	**.17**	**.13**	**.06**	**.23**	**.14**	**.14**	**.19**

Note: N = Neuroticism; A = Agreeableness; E = Extraversion; O = Openess; C = Conscientiousness; T-Ang = Trait Anger; T-AngT = Trait Anger: Angry Temperament; T-AngR = Trait Anger: Angry Reaction; AX/IN = Anger Expression: Anger-In; AX/Out = Anger Expression: Anger-Out; AX/C = Anger Expression: Anger-Control; n refers to the number of participants for whom complete data was available after listwise deletion; Gender: Male = 1; Gender: Female = 2; Bolded = $p < .001$.
* $p < .05$.
** $p < .01$.

neuroticism. AX/IN was most strongly predicted by (low) extraversion, closely followed by neuroticism. AX/Out was most strongly predicted by neuroticism, closely followed by (low) agreeableness. AX/C was most strongly predicted by neuroticism. Finally, aggression was most strongly predicted by neuroticism, followed by (low) agreeableness.

To test our hypotheses concerning moderation we used a series of hierarchical linear regression models with anger styles and aggression as dependent variables. Big Five traits were entered in step 1, two-way interaction terms (neuroticism × agreeableness, neuroticism × conscientiousness, conscientiousness × agreeableness) were entered in step 2, and the three-way interaction term (neuroticism × agreeableness × conscientiousness) was entered in step 3. Age and sex were included as covariates. Continuous predictor variables were mean centred, and interaction terms were created as the product of the relevant mean-centred variables. As above, we tested each of dependent variables in separate analyses. Interactions were probed across values of moderator variables (±1SD from the mean) according to techniques described by Preacher, Curran, and Bauer (2003). Unstandardized coefficients are the preferred metric in moderation modelling (Hayes, 2008), and as such are reported here. A 2-way interaction was observed in which conscientiousness moderated neuroticism's pathway to AX/C; such that the inverse relationship between neuroticism and AX/C was significantly more pronounced at lower levels of conscientiousness (see Fig. 1). Three 3-way interactions were observed in which conscientiousness moderated agreeableness's influence on neuroticism's pathway to T-Ang, the pathway to AX/Out, and the pathway to aggression (see Figs. 2–4).

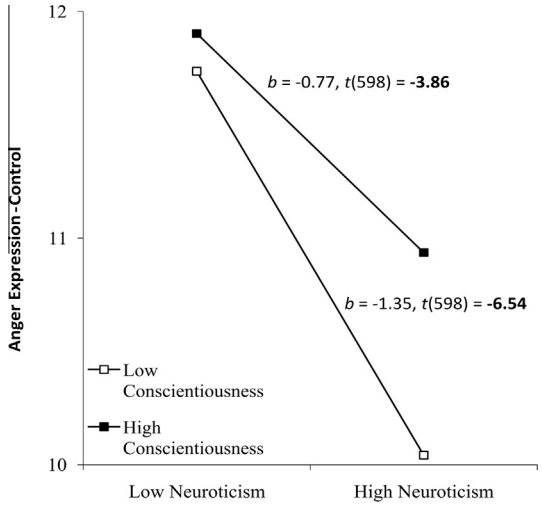

Fig. 1. Conscientiousness's moderating effect on neuroticism's pathway to Anger Expression-Control. Bolded = $p < .001$; **$p < .01$; *$p < .05$.

4. Discussion

As expected, neuroticism was a powerful predictor of all outcome variables and agreeableness was a significant inverse predictor of Anger-Out (AX/Out), aggression, and Trait Anger (T-Ang). Consistent with our second hypothesis, conscientiousness was a significant predictor of Anger Control (AX/C), as well as AX/Out, aggression, and T-Ang. Extraversion was a significant and inverse

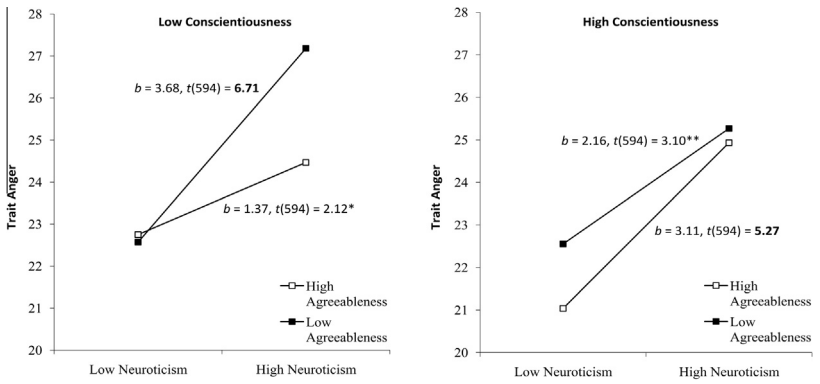

Fig. 2. Agreeableness's moderating effect on neuroticism's pathway to Trait Anger, at ±1 standard deviation from the mean for conscientiousness. Bolded = $p < .001$; **$p < .01$; *$p < .05$.

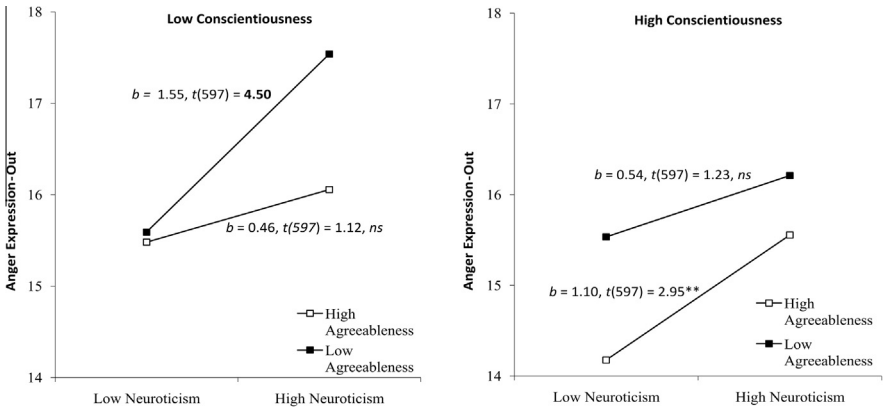

Fig. 3. Agreeableness's moderating effect on neuroticism's pathway to Anger Expression-Out, at ± 1 standard deviation from the mean for conscientiousness. Bolded = p<.001; $^{**}p < .01$; $^{*}p < .05$.

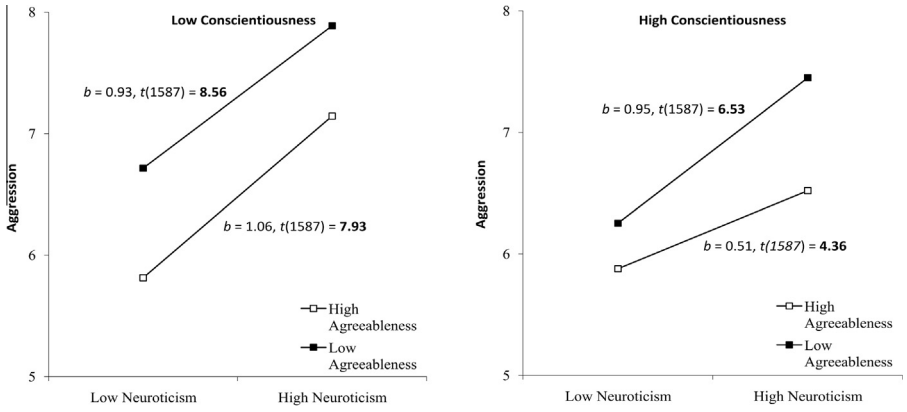

Fig. 4. Agreeableness's moderating effect on neuroticism's pathway to aggression, at ±1 standard deviation from the mean for conscientiousness. Bolded = $p < .001$; $^{**}p < .01$; $^{*}p < .05$.

predictor of both the style Anger-In (AX/IN) and AX/Out. Finally, openness was predictive, albeit modestly, of T-Ang levels. These findings broadly replicate previous work looking at anger expression (Martin et al., 1999) and suggest that anger expression is underpinned by multiple Big Five traits.

While the observed associations between neuroticism and anger expressions cohere with previous work (Martin et al., 1999), the link between neuroticism and aggression was more unexpected. Indeed, several of neuroticism's facets (i.e., anxiety, self-consciousness, vulnerability) seem intuitively opposed to the potential risks (e.g., physical assault) associated with confronting another individual. This result may reflect the nature of the MPQ aggression measure, with three of the four items tapping a more reactive form of aggression (e.g., "When people insult me, I try to get even"), which more closely coheres with the tendency of the neurotic individual to react more strongly to negative events.

Evidence for moderation was also observed. Conscientiousness had a moderating effect on the pathway between neuroticism and AX/C, such that the link between neuroticism and AX/C was stronger when levels of conscientiousness were lower. Moreover, we observed that agreeableness moderated neuroticism's link to T-Ang, AX/Out, and aggression as a function of conscientiousness. These findings support recent models of anger and aggression (DeWall et al., 2011; Slotter & Finkel, 2011; Wilkowski & Robinson, 2008) that emphasize a more interactive framework for understanding such behavior and indicate that personality researchers should undertake more systematic work of this kind.

While our study benefitted from the use of a large, nationally representative sample, specific limitations and recommendations for future work should be noted. Firstly, our measure of Big Five traits was a short-form instrument and so may have lacked comprehensive coverage of the domain space. Secondly, we relied on self-report for our measure. While this is not uncommon in the literature, it is possible that bias in reporting for socially sensitive measures such as anger expression may have limited the validity of our findings. Future work is recommended that uses independent anger scores, such as peer rating. Finally, moderation analysis requires theoretically driven placement of contributing effects. In the case of the three-way analysis we favoured the specification that conscientiousness moderated agreeableness's influence on neuroticism's pathway to T-Ang, the pathway to AX/Out, and the pathway to aggression. This formulation seems appropriate because agreeableness will plausibly only be able to moderate the path from neuroticism to anger if self-control and impulse inhibition (i.e., high conscientiousness) are also relatively high; however, further work is recommended to confirm this account.

In summary, we found Big Five personality traits to be significant predictors of anger expression and also of trait aggression. High neuroticism and low agreeableness were both linked with enhanced expressions of anger and aggression, alongside a role for conscientiousness on anger control and for (low) extraversion on inwardly-expressed anger. We also observed conscientiousness's moderation of neuroticism's pathway to anger control and several three-way interactions: conscientiousness was seen to moderate agreeableness' influence on neuroticism's pathway to

trait anger, outwardly-express anger, and aggression. This work provides support for recent theoretical models of anger and aggression emphasizing that interactive components underpin such behaviors and suggests that adopting this dynamical approach may be of value to the field.

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