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RESEARCH ARTICLE OPEN ACCESS

Reactive and Proactive Aggression in Daily Life: An Exploratory Experience-Sampling Method Study

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Received: 18 January 2024 | **Revised:** 5 December 2024 | **Accepted:** 18 December 2024

ABSTRACT

Trait aggression is often separated into two functional dimensions: reactive and proactive tendencies. Reactive aggression is the tendency to engage in emotionally driven aggressive responses to perceived provocation, whereas proactive aggression is the tendency to engage in premeditated aggressive behaviors in the service of goal attainment. To date, the majority of empirical investigations examining these interrelated constructs have done so using cross-sectional data that have important limitations (e.g., recall bias). In the current study, we used an experience-sampling approach to investigate similarities and differences in reactive and proactive aggression's relations with affective and interpersonal constructs in a sample of 477 US undergraduate students. Our results indicated that baseline reactive and proactive aggression scores were predictive of aggression-related behavior, cognition, and affect in real-world dyadic encounters. Additionally, although reactive aggression showed stronger relations with investigated maladaptive outcomes (e.g., negative affectivity, lack of interpersonal warmth), profile similarity analyses indicated that these trait aggression dimensions shared substantial overlap in their nomological nets.

1 | Introduction

Human aggression is often defined as any proximate, intentional, and harmful behavior an individual performs in a targeted manner toward someone who is motivated to avoid the behavior (e.g., Baron and Richardson 1994; Anderson and Bushman 2002). This broad construct encompasses a variety of forms (e.g., physical, verbal, relational) and functions (e.g., retaliation, revenge), and it exists as a core feature of a number of mental disorders housed predominantly within the externalizing psychopathology spectrum (e.g., intermittent explosive disorder, conduct disorder) and the trait domain of Agreeableness-Antagonism (Chester and West 2020). Aggression is predictive of adverse outcomes for the (a) enactor (e.g., violent recidivism), (b) those affiliated with the enactor (e.g., child abuse), (c) victims of aggressive behavior (e.g., mortality), (d) witnesses of aggressive behavior (e.g., posttraumatic stress disorder), and (e) society in general. For example, a recent estimate of the total monetary cost of violence was $9.4 trillion, which reflects about 11% of global gross domestic product (Hoeffler 2017).

Decades of research have resulted in various theories (e.g., Social Learning Theory; Bandura and Walters 1977; Frustration-Aggression Hypothesis; Berkowitz 1989) and operationalizations (e.g., Chester et al. 2024) of aggression that attempt to specify its underlying causes to inform its prevention, assessment, and treatment. One of the most common classifications of aggression is its split into two functional dimensions: reactive and proactive aggression. This distinction was initially theorized by Dodge and Coie (1987), who posited that the separation of trait reactive and proactive aggression reflected important differences in the intentions, expectations, and self-efficacy of the individual aggressor. In this classification, reactive aggression is conceptualized as the tendency to exhibit emotionally driven responses to perceived provocation, whereas proactive aggression is understood as the tendency to engage in

premeditated behaviors in which aggression serves as a means to meet goals (e.g., demonstrate dominance, secure resources). Existing empirical accounts of these dimensions have argued that they show differential relations with important outcomes. In children, for example, proactive aggression is more strongly related to positive peer relations (e.g., leadership, sense of humor; Dodge and Coie 1987) whereas reactive aggression is associated with peer victimization (e.g., Poulin and Boivin 2000). Additionally, proactive aggression has been shown to be a stronger predictor of later criminality and substance use in children compared to reactive aggression (e.g., Brendgen et al. 2001). However, the extent to which these dimensions reflect truly distinct constructs has been a source of debate (see Bushman and Anderson 2001; Miller and Lynam 2006). One of the most common critiques of this literature is whether it is appropriate to statistically disaggregate such highly correlated constructs. Card and Little (2006), in their meta-analysis across 36 studies ($N = 17{,}360$), found that the correlation between proactive and reactive aggression in children and adolescents ranged from 0.66 to 0.68 across teacher-, peer-, and self-reports. To address this shared overlap, researchers often apply statistical techniques that control for or remove their covariance (e.g., partial correlations, simultaneous regression).[1] However, as Lynam, Hoyle, and Newman (2006) demonstrated, the "partialling" of proactive and reactive aggression to investigate their unique nomological nets fundamentally changes these constructs and limits the utility of findings (Hoyle et al. 2023 for a detailed discussion). This fundamental change can be observed in reactive and proactive aggression's relations with general personality traits before and after their "partialling." Before "partialling," both proactive and reactive aggression show strong relations with trait antagonism (e.g., distrust, immodesty, noncompliance), and reactive aggression shows a stronger, positive relation with trait neuroticism (e.g., anger, emotional reactivity). These unpartialled variables are quite similar to one another in terms of their trait profiles ($r_{ICC} = 0.79$); however, after "partialling" (i.e., controlling for their covariance), the absolute similarity of the trait profiles becomes negative, and nonsignificant ($r_{ICC} = -0.14$; Miller and Lynam 2006). While the correlational profiles of unpartialled and partialled reactive aggression are similar ($r_{ICC} = 0.91$), the profiles for unpartialled and partialled proactive are much less similar ($r_{ICC} = 0.53$). These results indicate that these constructs have been altered in meaningful but difficult to specify ways. Still, others contend that these trait aggression dimensions and their residuals possess meaningfully different neurobiological correlates (Waltes et al. 2016) and distinct affective, cognitive, and behavioral processes (Merk et al. 2005).

To date, the vast majority of empirical investigations assessing the differential correlates of proactive and reactive aggression have centered around retrospective accounts that may be subject to memory-related biases (e.g., partial recall; Bradburn, Rips, and Shevell 1987; Robinson and Clore 2002). The limits of autobiographical memory, however, may be attenuated by asking survey respondents to reflect on current and recent behaviors, thoughts, and emotions (Shiffman, Stone, and Hufford 2008). One such approach is the experience sampling method (ESM), which allows researchers to systematically capture self-report data using mobile technology. This method is particularly salient for the examination of reactive and proactive aggression, as a foundational underpinning of their distinction can be found in their differential associations with momentary affect. For example, reactive aggression is thought to be more associated with momentary anger-based reactivity and affective intensity (e.g., Dodge et al. 1990). Purely cross-sectional, concurrent examinations of these constructs, however, are limited in their capacity to test these differences.

Several studies have used ESM to understand trait aggression dimensions without partialing these constructs. For example, in a sample of adolescents ($N = 144$), Moore et al. (2019) found that trait reactive aggression was associated with greater levels of daily negative affect and affective reactivity to both positive and negative life events, while trait proactive aggression bore null relations with individuals' daily emotions. Similarly, Slaughter et al. (2020), using a community sample of children ($N = 96$), found that negative emotional lability (i.e., within-day lability of negative affect) was significantly related to reactive aggression at baseline ($r = 0.35$) and 6-month follow-up visits ($r = 0.37$) but bore small to null relations with proactive aggression. Most other ESM studies to date, however, have (a) focused exclusively on child and adolescent populations, and (b) have "partialled" these constructs without acknowledging the consequences of this methodological decision, such that the aggression dimensions may only bear passing resemblance to their original constructs.

1.1 | Present Study

The current preregistered study examines the relations between trait aggression dimensions across daily outcomes related to affectivity, interpersonal perceptions, and aggression. This investigation consisted of three primary aims. First, we assessed the nomological net of trait proactive and reactive aggression in their prediction of daily affect, interpersonal perceptions in dyadic encounters, and occasion-specific aggression. Second, we assessed the degree to which trait proactive and reactive aggression diverged in their relations with these daily outcomes. Third, we examined whether trait proactive and reactive aggression moderate the relations between momentary affective experiences and forms of interpersonal aggression in the context of dyadic encounters. Given the aforementioned concerns regarding the large overlap between trait reactive and proactive aggression, all models were run using one trait aggression dimension at a time. Per the preregistration, the first and second aims were exploratory in nature. Regarding the third aim, we hypothesized that trait proactive and reactive aggression will differentially moderate the relation between approach-based negative affect (i.e., anger, irritability) and interpersonal aggression. Specifically, we posited that the relation between approach-based negative affect and interpersonal aggression will be greater in those with higher levels of trait reactive aggression.

2 | Methods

2.1 | Participants

Using data first reported on by Du et al. (2024), 727 undergraduate students from a large, public university in the midwestern US were recruited to participate in an ESM study. The study occurred over a 10-day period in which participants were prompted to respond to short surveys four times per day. Participants had a two-hour window to submit their responses for each prompt. Following the exclusion of participants who (a) provided invalid data as measured by the validity scales of the Elemental Psychopathy Assessment (Lynam et al. 2011), (b) only completed baseline measures, (c) and provided fewer than two social interaction data points over the 10-day period, the final sample consisted of 477 students with an average age of 18.66 (SD = 1.11). Of the final sample, 59.4% identified as women, 40.0% identified as men, and less than 0.5% identified as nonbinary or preferred not to report this information. Additionally, 76.8% of the participants identified as White, 16.9% identified as Asian, 1.9% identified as Black, and 4.4% identified as other or mixed racial identity. The average number of experience-sampling prompts that participants completed was 26.53 out of 40 (66%; i.e., 12,653 prompts were completed out of 19,080 sent, and 6427 prompts were missed). Previous methodological investigation of EMA responses found that compliance rates typically range from 66% to 86% across 4- to-7-day studies with five to seven random assessments per day (e.g., Courvoisier, Eid, and Lischetzke 2012; Green et al. 2006). The present study's response rate is within this range. Missing prompts occurred evenly across different days of the week, days into the study, and times of the day. The percentage of prompts in which participants reported experiencing an interaction was 69.56%. This was calculated as the total number of interactions divided by the total number of prompts to which participants responded. The average interaction rate across participants (i.e., the mean of each participant's individual interaction rate) was 72.32%.

2.2 | Measures

2.2.1 | Reactive Proactive Aggression Questionnaire (RPQ)

The RPQ (Raine et al. 2006) is a 23-item self-report measure that assesses dispositional aggression on a three-point Likert scale ranging from 0 (never) to 2 (often). Two trait aggression dimensions are scored from these items: reactive ($\omega = 0.84$) and proactive ($\omega = 0.82$) aggression. The present study included all items from this measure, which was administered only at baseline. These trait aggression dimensions were used as predictor variables in the present study's analyses.

2.2.2 | Positive Affect Negative Affect Schedule-Expanded Form (PANAS-X)

The PANAS-X (Watson and Clark 1994) is a self-report measure that assesses state-level affective experiences on a 5-point Likert scale ranging from 1 (very slightly or not at all) to 5 (extremely). The present study included nine items from the PANAS-X. Of these nine items, six pertained to negative affective experiences (i.e., nervous, sad, guilty, angry, irritable, ashamed), and three pertained to positive affective experiences (i.e., happy, proud, relaxed). This measure was administered in every prompt over the 10-day period in which the participants indicated that they had engaged in a dyadic interaction since the previous prompt. In total, we created six affect variables. We created two higher-order domains: total negative affect (within-person $\omega = 0.76$; between-person $\omega = 0.89$) and total positive affect (within-person $\omega = 0.75$; between-person $\omega = 0.85$). Then, based on existing research demonstrating differential emotional and motivational processes underlying experiences of negative affect (e.g., Harmon-Jones and Gable 2018), we created two distinct composites of negative affect: approach-based negative affect (i.e., composite of anger and irritability; within-person $\omega = 0.79$; between-person $\omega = 0.81$) and withdrawal-based negative affect (i.e., composite of sad, guilty, ashamed, and nervous; within-person $\omega = 0.67$; between-person $\omega = 0.85$). Additionally, we parsed total positive affect into high-arousal positive affect (i.e., composite of happy and proud; within-person $\omega = 0.67$; between-person $\omega = 0.78$), and low-arousal positive affect (i.e., relaxed).

2.2.3 | Visual Interpersonal Analogue Scale (VIAS)

The VIAS (Woods et al. 2023) is a self-report measure that assesses participants' perceptions of themselves and others following a dyadic interaction from the perspective of the interpersonal circumplex. The measure includes two sliding bars measuring interpersonal warmth and interpersonal dominance. The measure of interpersonal warmth exists on a 10-point scale ranging from cold/distant/hostile (−5) to extremely warm/friendly/caring (5). The measure of interpersonal dominance exists on a 10-point scale ranging from extremely accommodating/submissive/timid (−5) to assertive/dominant/controlling (5). The present study included individuals' ratings of their own interpersonal behaviors and their partners' interpersonal behaviors. This measure was administered in every prompt over the 10-day period in which the participants indicated that they had engaged in a dyadic interaction since the previous prompt.

2.2.4 | Daily Personality Pathology Manifestations (DPPM)

The DPPM (A. G. C. Wright and Simms 2016) is a self-report measure that assesses daily expressions of personality disorders. The present study included the nine items comprising the measure's Hostility scale, with each item on the scale ranging from 0 (not at all) to 7 (very much so). This scale served as the present study's measure of total interpersonal aggression (within-person $\omega = 0.67$; between-person $\omega = 0.78$), and it can be further reduced to three distinct subscales: aggressive temper (e.g., "I lost my temper"; within-person $\omega = 0.72$; between-person $\omega = 0.85$), aggressive urges and behavior (e.g., "I felt like I wanted to hurt someone," "I acted aggressively toward someone"; within-person $\omega = 0.57$; between-person $\omega = 0.91$),

and verbal aggression (e.g., "I said something offensive to someone"; within-person $\omega = 0.47$; between-person $\omega = 0.97$). This measure was administered in every prompt over the 10-day period regardless of whether someone engaged in a dyadic interaction since the previous prompt.[2]

2.3 | Analyses

We conducted three sets of preregistered analyses corresponding to our primary aims[3]: (1) assessing the nomological nets of trait aggression dimensions among daily affective experiences, interpersonal perceptions, and interpersonal aggression, (2) assessing the degree to which trait proactive and reactive aggression diverge in their relations with these daily outcomes, and (3) examining how trait proactive and reactive aggression differentially moderate the relation between momentary affective experiences and forms of interpersonal aggression in the context of dyadic encounters. Given the exploratory nature of the present study, we preregistered that all inferential tests would be interpreted using a significance threshold of $p < 0.01$. This decision balances potential Type I and II error while aligning with calls suggesting that multiple test correction is unnecessary within exploratory studies (Bender and Lange 2001; Lazic 2024; Rubin 2024). All analyses were conducted using R (Version 4.3.1; R Core Team 2023) and RStudio (Version 2023.06.0 + 421; Posit Team 2023).[4]

2.3.1 | Aim 1

The first aim was to examine the nomological net of trait aggression dimensions in the prediction of daily outcomes (i.e., PANAS affective outcomes, VIAS interpersonal perceptions, and interpersonal aggression outcomes). In total, we conducted 28 generalized linear mixed models,[5] with proactive and reactive aggression separately predicting each of the 14 outcome variables. We estimated linear mixed effect models for the PANAS and VIAS variables and negative binomial mixed models for the DPPM variables. Because PANAS Negative Affect composites (i.e., approach-based, withdrawal-based, and total negative affect) were positively skewed (> 2), we log-transformed these variables before estimating their respective linear mixed effect models. We used negative binomial mixed modeling for the DPPM variables, as they were zero-inflated and overdispersed (see Du et al. 2024 for details). All analyses were conducted using the preregistered threshold of $p < 0.01$.

2.3.2 | Aim 2

The second aim was to assess the divergence between trait aggression dimensions in their relations with daily outcomes (i.e., PANAS affective outcomes, VIAS interpersonal perceptions, and interpersonal aggression outcomes). Specifically, we conducted two-tailed Steiger's z-tests (1980) based on the between-person Spearman's correlation coefficients (ρ) that described the bivariate relations between trait aggression dimensions and the 14 daily outcomes. Spearman's ρ has been shown to provide a more robust estimate of nonlinear bivariate relations compared to Pearson's r (e.g., Yue, Pilon, and Cavadias 2002). Because of the substantial skew among variables (i.e., PANAS Negative Affect composites, DPPM interpersonal aggression composites) and the nonlinearity present in the relations between variables, Spearman's ρ was used to estimate the monotonic bivariate relations in the current study. Additionally, existing research has shown that using Spearman's ρ instead of Pearson's r when conducting Steiger's z-tests provides a sufficiently robust estimate of significant differences among dependent correlations (Myers and Sirois 2014). These analyses were conducted using the preregistered threshold of $p < 0.01$. Additionally, we conducted a double-entry intraclass correlational (ICC) analysis across all 14 daily outcomes to estimate the similarity of empirically observed trait proactive and reaction aggression profiles in daily outcomes.

2.3.3 | Aim 3

The third aim was to assess whether trait proactive and reactive aggression differentially moderated the relation between momentary affective experiences and forms of interpersonal aggression in dyadic encounters. Thus, we used negative binomial mixed modeling to assess the cross-level interaction of within-person momentary affect and between-person trait aggression in predicting occasion-specific forms of interpersonal aggression (see Figure 1). Before entering predictors in the model, we ran null models to examine the proportion of variance in our outcome variables that was attributable to variability at the between-person level. After establishing that these models were best estimated using multilevel modeling, the

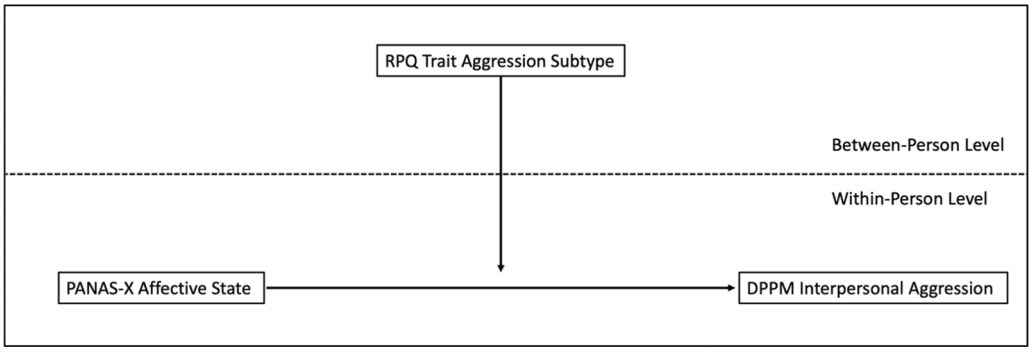

FIGURE 1 | Cross-level interaction analysis diagram.

main analyses included the estimation of 24 cross-level interaction models to predict four outcome variables (i.e., total interpersonal aggression, aggressive temper, aggressive urges and behavior, and verbal aggression). The predictor variables of each model consisted of (a) one of the two grand-mean-centered trait aggression dimensions (i.e., reactive or proactive), (b) one of the three person-mean centered (i.e., within-person) affective states (i.e., approach-based negative affect, withdrawal-based negative affect, and total positive affect), and (c) the product term of the respective trait aggression dimension and within-person affective state (e.g., proactive aggression × withdrawal-based negative affect). We accounted for random effects by including a random intercept in each model and a random slope of our Level 1 person-mean centered state affect variable. We included time, day, and the aggregated grand-mean centered affect variable (i.e., between-person variable) as covariates within each model. Additionally, we conducted preregistered exploratory supplementary analyses of 16 cross-level interaction models in which we parsed total positive affect into high-arousal positive affect and low-arousal positive affect. All analyses were conducted using the preregistered threshold of $p < 0.01$.

To contextualize our statistically significant cross-level interaction effects, we interpreted them in their natural response scale (e.g., probabilities and counts) as opposed to their transformed response scale (e.g., log-odds and log-counts). There have been increased calls across the social sciences to probe and explicitly visualize nonlinear interactions in their natural scale (e.g., McCabe et al. 2022). Thus, to improve the interpretation of these effects, we probed each significant interaction term by plotting the marginal predictions of our model at ±1 standard deviation (SD) of its respective moderating variable (i.e., trait aggression dimension).[6,7]

3 | Results

Table 1 shows the estimated nonparametric bivariate relations across all variables assessed in the present study at both the between- and within-person levels using Spearman's ρ. Trait reactive and proactive aggression were correlated at $\rho = 0.40$ at the between-person level. Both between- and within-person positive and negative affect composites showed negative, small to moderate associations with one another. Between-person negative affect composites showed moderate to strong relations with all interpersonal aggression outcomes, ranging from 0.33 (withdrawal-based negative affect—verbal aggression) to 0.76 (approach-based negative affect—aggressive temper). Additionally, between-person interrelations among aggression outcomes ranged from 0.59 (verbal aggression—aggressive temper) to 0.93 (aggressive temper—total aggression), while within-person interrelations ranged from 0.37 (aggressive temper—verbal aggression) to 0.85 (aggressive temper–total aggression).

3.1 | Aim 1: Trait Aggression Dimensions' Relations With Daily Outcomes

Tables 2–4 show the results of the 28 generalized linear mixed models estimating the relations between trait aggression dimensions and daily outcomes. Overall, 15 of the 28 models were significant at the $p < 0.01$ threshold. Among momentary affect variables (i.e., PANAS-X; Table 2), reactive aggression showed significant positive relations with approach-based negative affect ($\log\beta = 0.05$; $p < 0.001$) and total negative affect ($\log\beta = 0.03$; $p < 0.001$). Proactive aggression showed significant positive relations with approach-based negative affect ($\log\beta = 0.03$; $p < 0.001$), withdrawal-based negative affect ($\log\beta = 0.02$; $p = 0.004$), and total negative affect ($\log\beta = 0.03$; $p < 0.001$). Neither reactive nor proactive aggression showed significant relations with positive affect variables.

Among the interpersonal perception variables (i.e., VIAS; Table 3), only reactive aggression was a significant predictor, showing negative relations with self-perceived warmth ($\beta = -0.20$; $p < 0.001$) and positive relations with self-perceived dominance ($\beta = 0.21$; $p = 0.002$). Both trait aggression dimensions significantly predicted all of the interpersonal aggression outcomes (i.e., DPPM; Table 4). Both reactive and proactive aggression dimensions showed their largest relations with verbal aggression ($\beta = 0.67$, $p < 0.001$; $\beta = 0.54$, $p < 0.001$, respectively) and weakest relations with aggressive temper ($\beta = 0.55$, $p < 0.001$; $\beta = 0.28$, $p < 0.001$, respectively).

3.2 | Aim 2: Divergence of Trait Aggression Dimensions Among Daily Outcomes

Tables 2–4 show the results of Steiger's z-tests that were conducted to assess the divergence of trait aggression dimensions in their nonparametric between-person bivariate relations with daily outcomes. Of the 14 conducted z-tests, eight were significant at the $p < 0.01$ threshold. Among daily affect variables (i.e., PANAS-X; Table 2), trait reactive aggression was more robustly related to approach-based negative affect compared to proactive aggression ($z = 4.13$; $p < 0.001$). Additionally, trait aggression dimensions significantly diverged in their relations with all positive affect variables. Specifically, reactive aggression showed nonsignificant negative relations and proactive aggression showed nonsignificant positive relations with high-arousal positive affect ($z = -3.39$; $p < 0.001$), low-arousal positive affect ($z = -2.99$; $p = 0.003$), and total positive affect ($z = -3.59$; $p < 0.001$), respectively. Among interpersonal perception variables (i.e., VIAS; Table 3), trait reactive aggression showed stronger negative relations with self-perceived warmth ($z = -3.20$; $p = 0.001$) and other-perceived warmth ($z = -2.80$; $p = 0.005$) compared to proactive aggression. Among interpersonal aggression variables (i.e., DPPM; Table 4), trait reactive aggression showed significantly stronger relations with an aggressive temper ($z = 4.27$; $p < 0.001$) and total aggression ($z = 3.03$; $p = 0.002$) compared to proactive aggression. Across all 14 daily outcomes, ICC analysis demonstrated moderate convergence ($r_{icc} = 0.66$).

3.3 | Aim 3: Moderating Role of Trait Aggression Dimensions

Before entering predictors into the models, four null models (one for each outcome variable) were run to examine the

TABLE 1 | Between- and within-person Spearman's correlation coefficient matrix of all examined variables.

	Variable	Mean (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Reactive	1.59 (0.33)	—	—	0.04	−0.01	0.01	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.03	0.02	0.04	0.02
2	Proactive	1.10 (0.16)	**0.40**	—	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	−0.01	0.07	0.01	0.06	0.03
3	ABNA	1.29 (0.67)	**0.32**	0.12	—	**0.37**	**0.68**	**−0.33**	**−0.30**	−0.28	**−0.37**	**−0.35**	0.02	0.08	**0.33**	**0.55**	0.25	**0.50**
4	WBNA	1.31 (0.53)	0.16	0.12	**0.62**	—	**0.88**	**−0.30**	−0.23	**−0.33**	−0.25	−0.22	−0.07	0.08	0.17	0.23	0.13	0.23
5	NA	1.31 (0.50)	0.23	0.14	**0.82**	**0.95**	—	**−0.40**	**−0.33**	**−0.39**	**−0.37**	**−0.33**	−0.03	0.11	0.26	**0.41**	0.19	**0.39**
6	PA	3.17 (1.08)	−0.11	0.07	−0.28	−0.22	−0.27	—	**0.93**	**0.77**	**0.58**	**0.53**	0.05	−0.07	−0.10	−0.22	−0.05	−0.19
7	HAPA	3.00 (1.14)	−0.09	0.08	−0.21	−0.11	−0.16	**0.96**	—	**0.50**	**0.55**	**0.50**	0.06	−0.05	−0.09	−0.21	−0.05	−0.18
8	LAPA	3.51 (1.30)	−0.12	0.03	**−0.33**	**−0.35**	**−0.37**	**0.88**	**0.71**	—	**0.44**	**0.40**	0.02	−0.09	−0.08	−0.18	−0.03	−0.15
9	Self warmth	2.97 (2.02)	−0.17	−0.01	**−0.34**	−0.20	−0.28	**0.63**	**0.61**	**0.57**	—	0.71	0.02	−0.08	−0.14	−0.28	−0.09	−0.24
10	Other warmth	3.03 (2.07)	−0.14	0.00	**−0.33**	−0.21	−0.28	**0.62**	**0.59**	**0.57**	**0.86**	—	−0.01	−0.10	−0.11	−0.23	−0.07	−0.20
11	Self dom	0.09 (2.22)	0.15	0.15	0.05	0.07	0.07	−0.03	−0.01	−0.03	−0.1	−0.06	—	0.22	0.04	0.04	0.06	0.06
12	Other dom	0.44 (2.21)	0.06	0.03	0.06	0.13	0.12	−0.08	−0.07	−0.07	−0.11	−0.06	**0.72**	—	0.03	0.05	0.03	0.06
13	Aggr. U & B	0.42 (1.48)	**0.31**	0.27	**0.53**	**0.41**	**0.50**	−0.12	−0.07	−0.17	−0.21	−0.17	0.14	0.11	—	**0.48**	**0.49**	**0.66**
14	Aggr. temper	1.05 (2.47)	**0.40**	0.20	**0.76**	**0.51**	**0.66**	−0.23	−0.19	−0.26	−0.27	−0.21	0.13	0.12	**0.65**	—	**0.37**	**0.85**
15	Aggr. verbal	0.53 (1.83)	**0.31**	0.28	**0.47**	**0.33**	**0.42**	−0.03	0.00	−0.06	−0.21	−0.17	0.15	0.13	**0.68**	**0.59**	—	**0.64**
16	Aggr. total	2.00 (4.90)	**0.40**	0.26	**0.72**	**0.49**	**0.62**	−0.18	−0.13	−0.21	−0.26	−0.21	0.16	0.12	**0.81**	**0.93**	**0.79**	—

Note: All values ≥ |0.30| are bolded. All values were estimated using Spearman's rank correlation coefficient. All values above the diagonal are within-person correlations, and all values below the diagonal are between-person correlations.

Abbreviations: ABNA, approach-based negative affect; Aggr., aggression; Dom, dominance; Other, other-perceived; PA, positive affect; Proactive, trait proactive aggression; Reactive, trait reactive aggression; Self, self-perceived; U & B, urges and behavior; WBNA, withdrawal-based negative affect.

TABLE 2 | Momentary affect composites regressed onto trait proactive and reactive aggression and Steiger's *Z*-tests of significant differences.

	Log (approach-based NA)			Log (withdrawal-based NA)			Log (total NA)			High-arousal PA			Low-arousal PA			Total PA		
	β	SE	*p* value	*β*	SE	*p* value	*β*	SE	*p* value	*β*	SE	*p* value	*β*	SE	*p* value	*β*	SE	*p* value
Reactive	**0.05**	**0.01**	**< 0.001**	0.02	0.01	0.028	**0.03**	**0.01**	**< 0.001**	−0.06	0.03	0.095	−0.06	0.04	0.091	−0.06	0.03	0.071
Proactive	**0.03**	**0.01**	**< 0.001**	**0.02**	**0.01**	**0.004**	**0.03**	**0.01**	**< 0.001**	0.05	0.03	0.113	0.00	0.03	0.959	0.03	0.03	0.275
Z statistic		**4.13**			0.81			1.83			**−3.39**			**−2.99**			**−3.59**	
Z p value		**< 0.001**			0.420			0.067			**< 0.001**			**0.003**			**< 0.001**	

Note: All *p* values significant at the a priori threshold ($p < 0.01$) are bolded. Proactive and reactive aggression were estimated in separate regression models. Steiger's *z*-tests were conducted using the between-group dependent Spearman's correlation coefficients presented in Table 1. Negative affect composites were positively skewed and consequently log-transformed before regression estimation. Trait aggression dimensions were scaled before regression estimation to ease interpretation across models.

Abbreviations: NA, negative affect; PA, positive affect; Proactive, trait proactive aggression; Reactive, trait reactive aggression.

proportion of variance of interpersonal aggression attributable to the between-person level (i.e., Level 2). ICC values for these four null models ranged from 0.44 (DPPM Total Interpersonal Aggression) to 0.55 (DPPM Aggressive Urges and Behavior), indicating that multilevel modeling was warranted for the present analyses.

Tables 5 and 6 show the results of the 24 negative binomial mixed models testing the main effects and cross-level interaction effects of momentary affect and trait aggression in predicting interpersonal aggression. Time (β's ranged from −0.25 to −0.10) and day (β's ranged from −0.17 to −0.09) showed small but significant effects in predicting interpersonal aggression variables, with greater levels of interpersonal aggression occurring at the beginning of the week and earlier in the day. Across all models, both trait proactive and reactive aggression demonstrated significant positive relations with all interpersonal aggression outcomes. Notably, both proactive and reactive aggression were more strongly related to aggression outcomes in models that controlled for within- and between-person total positive affect. Within- and between-person approach-based negative affect and withdrawal-based negative affect showed significant positive relations with all interpersonal aggression outcomes. Across all models, between-person main effects of negative affect composites (β's ranged from 1.65 to 2.23) appeared more robust than their within-person effects (β's ranged from 0.85 to 1.33). In contrast, within-person positive affect showed significant negative relations with all interpersonal aggression outcomes except for verbal aggression (β's ranged from −0.87 to −0.32) and appeared to be a stronger predictor of interpersonal aggression outcomes than between-person positive affect (β's ranged from −0.52 to −0.03).

Additionally, Supporting Information S1: Tables S1 and S2 show the results of the preregistered exploratory supplemental analyses examining the moderating role of trait aggression dimensions in the relation between positive affect subtypes and interpersonal aggression outcomes. Across the 16 cross-level interaction models testing these specific relations, zero interactions were significant at $p < 0.01$.

Regarding cross-level interaction hypotheses, reactive and proactive aggression significantly moderated the relation between within-person approach-based negative affect and interpersonal aggression. Specifically, trait reactive aggression significantly moderated the relation between within-person approach-based negative affect and all aggression outcomes except verbal aggression (β's ranged from −0.52 to −0.50), while trait proactive aggression significantly moderated the relation between within-person approach-based negative affect and aggressive urges and behavior ($\beta = -0.98$). However, the direction of these interactions ran counter to our a priori prediction. Figures 2a through 2d show the marginal predicted values of our aggression outcomes on their natural response scales across levels of within-person approach-based negative affect and ±1 SD of the model's respective trait aggression dimension. All plots show that the relations between within-person approach-based negative affect and interpersonal aggression were stronger at lower levels of trait aggression as opposed to higher levels. However, these effects appear to be driven by extremely elevated levels of

TABLE 3 | Interpersonal behavior subtypes regressed onto trait proactive and reactive aggression and Steiger's *Z*-tests of significant differences.

	Warmth (self)			Warmth (other)			Dominance (self)			Dominance (other)		
	β	**SE**	***p* value**	***β***	**SE**	***p* value**	***β***	**SE**	***p* value**	***β***	**SE**	***p* value**
Reactive	**−0.20**	**0.05**	**< 0.001**	−0.13	0.05	0.010	**0.21**	**0.07**	**0.002**	0.13	0.07	0.053
Proactive	−0.11	0.05	0.025	−0.10	0.05	0.032	0.15	0.06	0.016	0.03	0.06	0.613
Z-test statistic		**−3.20**			**−2.80**			0.00			0.60	
Z-test *p* value		**0.001**			**0.005**			0.999			0.550	

Note: Proactive and reactive aggression were estimated in separate regression models. All *p* values significant at the a priori threshold ($p < 0.01$) are bolded. Steiger's *z*-tests were conducted using the between-group Spearman's correlation coefficients presented in Table 1. Trait aggression dimensions were scaled before regression estimation to ease interpretation across models.
Abbreviations: Other, other-perceived; Proactive, trait proactive aggression; Reactive, trait reactive aggression; Self, self-perceived.

TABLE 4 | Aggression composites regressed onto trait proactive and reactive aggression and Steiger's *Z*-tests of significant differences.

	Aggressive urges and behavior			Aggressive temper			Verbal aggression			Total aggression		
	β	**SE**	***p* value**	***β***	**SE**	***p* value**	***β***	**SE**	***p* value**	***β***	**SE**	***p* value**
Reactive	**0.67**	**0.09**	**< 0.001**	**0.55**	**0.06**	**< 0.001**	**0.67**	**0.09**	**< 0.001**	**0.59**	**0.06**	**< 0.001**
Proactive	**0.53**	**0.08**	**< 0.001**	**0.28**	**0.05**	**< 0.001**	**0.54**	**0.08**	**< 0.001**	**0.39**	**0.01**	**< 0.001**
Z-test statistic		0.85			**4.27**			0.64			**3.03**	
Z-test *p* value		0.397			**< 0.001**			0.525			**0.002**	

Note: Proactive and reactive aggression were estimated in separate regression models. Standardized regression coefficients (i.e., *β*) are presented in log-counts. All *p* values significant at the a priori threshold ($p < 0.01$) are bolded. Steiger's *z*-tests were conducted using the between-group Spearman's correlation coefficients presented in Table 1. Trait aggression dimensions were scaled before regression estimation to ease interpretation across models.
Abbreviations: Proactive, trait proactive aggression; Reactive, trait reactive aggression.

within-person approach-based negative affect (i.e., +2 SDs above the within-person mean).

4 | Discussion

The aims of the present study were to (a) examine the nomological nets of trait aggression dimensions among daily outcomes related to affective experiences, interpersonal perceptions, and aggression, (b) assess the divergence of trait aggression dimensions in their relations with these daily outcomes, and (c) estimate the moderating role of trait aggression dimensions in the relation between momentary affect and interpersonal aggression. In general, trait reactive and proactive aggression were robustly predictive of momentary negative affect composites and forms of interpersonal aggression in real-world dyadic encounters. Existing investigations have demonstrated that trait aggression dimensions are associated with momentary negative affect across research modalities (e.g., Byrd et al. 2022). However, much of the empirical evidence supporting trait aggression's relations with interpersonal aggression relies on retrospective reporting that may be limited by memory recall, laboratory tasks that may be limited in their external validity, and survey questions that exhibit potential tautologies (i.e., historically informed reports of aggressive tendencies showing strong correlations with historical accounts of aggressive acts). This study, therefore, builds upon the existing literature by empirically demonstrating that trait aggression dimensions are predictive of interpersonal aggression in dyadic encounters within an ESM framework. Thus, the present study's findings provide meaningful evidence in support of the predictive and ecological validity of these two trait aggression dimensions.

Overall, trait reactive aggression uniformly showed stronger relations with maladaptive daily outcomes compared to proactive aggression. Indeed, reactive aggression showed significantly stronger positive relations with daily anger/irritability and aggressive temper in dyadic encounters, and it manifested significantly stronger negative relations with daily positive affect and self- and other-perceived warmth in dyadic encounters. These findings are consistent with existing research in which trait reactive aggression is more strongly related to overall elevations of psychopathology (e.g., Helfritz and Stanford 2006), emotion dysregulation (e.g., Seah and Ang 2008), internalizing symptoms (e.g., Miller and Lynam 2006; Card and Little 2006), hostile attribution bias (Coccaro, Noblett, and McCloskey 2009), and impaired peer relationships (e.g., Camodeca et al. 2002). In contrast, trait proactive aggression showed weaker absolute relations with all outcomes. Notably, the effects of reactive aggression did not substantively differ when proactive aggression was included as a predictor variable in the regression models (see Supporting Information S1: Tables 4–6). Although the magnitude of reactive aggression's "partialed" effects tended to be weaker, the direction remained the same. Conversely, proactive aggression's "partialed" effects

TABLE 5 | Occasion-specific aggression composites regressed onto trait reactive aggression and momentary affect composites.

	Aggressive urges and behavior			Aggressive temper			Verbal aggression			Total aggression		
	β	SE	*p* value	*β*	SE	*p* value	*β*	SE	*p* value	*β*	SE	*p* value
Day	**−0.14**	**0.02**	**< 0.001**	**−0.09**	**0.02**	**< 0.001**	**−0.09**	**0.02**	**< 0.001**	**−0.11**	**0.01**	**< 0.001**
Time	**−0.18**	**0.04**	**< 0.001**	**−0.10**	**0.02**	**< 0.001**	**−0.14**	**0.04**	**< 0.001**	**−0.13**	**0.02**	**< 0.001**
WBNA.b	**2.27**	**0.28**	**< 0.001**	**1.66**	**0.19**	**< 0.001**	**1.92**	**0.27**	**< 0.001**	**1.72**	**0.19**	**< 0.001**
WBNA.w	**1.19**	**0.11**	**< 0.001**	**1.11**	**0.07**	**< 0.001**	**0.85**	**0.10**	**< 0.001**	**1.09**	**0.07**	**< 0.001**
Reactive	**1.85**	**0.26**	**< 0.001**	**1.60**	**0.16**	**< 0.001**	**1.88**	**0.26**	**< 0.001**	**1.68**	**0.17**	**< 0.001**
Reactive × WBNA.w	−0.29	0.25	0.238	−0.32	0.20	0.107	−0.06	0.26	0.803	−0.30	0.20	0.134
Day	**−0.15**	**0.02**	**< 0.001**	**−0.09**	**0.01**	**< 0.001**	**−0.09**	**0.02**	**< 0.001**	**−0.11**	**0.01**	**< 0.001**
Time	**−0.25**	**0.03**	**< 0.001**	**−0.16**	**0.02**	**< 0.001**	**−0.19**	**0.03**	**< 0.001**	**−0.18**	**0.02**	**< 0.001**
ABNA.b	**2.17**	**0.26**	**< 0.001**	**1.66**	**0.17**	**< 0.001**	**2.08**	**0.26**	**< 0.001**	**1.77**	**0.17**	**< 0.001**
ABNA.w	**1.28**	**0.07**	**< 0.001**	**1.33**	**0.05**	**< 0.001**	**1.02**	**0.06**	**< 0.001**	**1.28**	**0.05**	**< 0.001**
Reactive	**1.62**	**0.27**	**< 0.001**	**1.29**	**0.16**	**< 0.001**	**1.45**	**0.27**	**< 0.001**	**1.39**	**0.17**	**< 0.001**
Reactive × ABNA.w	**−0.51**	**0.15**	**0.001**	**−0.50**	**0.12**	**< 0.001**	−0.23	0.17	0.173	**−0.52**	**0.13**	**< 0.001**
Day	**−0.17**	**0.02**	**< 0.001**	**−0.12**	**0.01**	**< 0.001**	**−0.09**	**0.02**	**< 0.001**	**−0.13**	**0.01**	**< 0.001**
Time	**−0.17**	**0.04**	**< 0.001**	**−0.10**	**0.02**	**< 0.001**	**−0.13**	**0.04**	**< 0.001**	**−0.13**	**0.02**	**< 0.001**
PA.b	**−0.35**	**0.13**	**0.009**	**−0.44**	**0.08**	**< 0.001**	−0.03	0.13	0.838	**−0.30**	**0.09**	**0.001**
PA.w	**−0.72**	**0.09**	**< 0.001**	**−0.86**	**0.05**	**< 0.001**	**−0.32**	**0.08**	**< 0.001**	**−0.67**	**0.05**	**< 0.001**
Reactive	**2.16**	**0.30**	**< 0.001**	**1.73**	**0.20**	**< 0.001**	**2.11**	**0.29**	**< 0.001**	**1.86**	**0.20**	**< 0.001**
Reactive × PA.w	0.11	0.19	0.569	0.17	0.13	0.195	−0.24	0.19	0.218	0.09	0.13	0.475

Note: All *p* values significant at the a priori threshold ($p < 0.01$) are bolded. Standardized regression coefficients (i.e., β) are presented in log-counts.
Abbreviations: ABNA, approach-based negative affect; ".b", between-person variables; Day, day of the week; PA, positive affect; ".w", within-person variables; WBNA, withdrawal-based negative affect.

TABLE 6 | Occasion-specific aggression composites regressed onto trait proactive aggression and momentary affect variables.

	Aggressive urges and behavior			Aggressive temper			Verbal aggression			Total aggression		
	β	SE	*p* value	*β*	SE	*p* value	*β*	SE	*p* value	*β*	SE	*p* value
Day	**−0.14**	**0.02**	**< 0.001**	**−0.10**	**0.02**	**< 0.001**	**−0.10**	**0.02**	**< 0.001**	**−0.11**	**0.01**	**< 0.001**
Time	**−0.18**	**0.04**	**< 0.001**	**−0.10**	**0.02**	**< 0.001**	**−0.13**	**0.03**	**< 0.001**	**−0.13**	**0.02**	**< 0.001**
WBNA.b	**2.20**	**0.28**	**< 0.001**	**1.65**	**0.20**	**< 0.001**	**1.82**	**0.28**	**< 0.001**	**1.69**	**0.21**	**< 0.001**
WBNA.w	**1.21**	**0.11**	**< 0.001**	**1.11**	**0.07**	**< 0.001**	**0.86**	**0.10**	**< 0.001**	**1.09**	**0.07**	**< 0.001**
Proactive	**2.99**	**0.46**	**< 0.001**	**1.43**	**0.33**	**< 0.001**	**2.83**	**0.47**	**< 0.001**	**1.66**	**0.34**	**< 0.001**
Proactive × WBNA.w	−0.64	0.48	0.178	−0.21	0.38	0.575	0.36	0.49	0.460	0.10	0.39	0.799
Day	**−0.15**	**0.02**	**< 0.001**	**−0.10**	**0.01**	**< 0.001**	**−0.09**	**0.02**	**< 0.001**	**−0.11**	**0.01**	**< 0.001**
Time	**−0.25**	**0.03**	**< 0.001**	**−0.15**	**0.02**	**< 0.001**	**−0.18**	**0.03**	**< 0.001**	**−0.18**	**0.02**	**< 0.001**
ABNA.b	**2.23**	**0.25**	**< 0.001**	**1.79**	**0.17**	**< 0.001**	**2.09**	**0.25**	**< 0.001**	**1.86**	**0.17**	**< 0.001**
ABNA.w	**1.25**	**0.06**	**< 0.001**	**1.32**	**0.05**	**< 0.001**	**1.03**	**0.06**	**< 0.001**	**1.25**	**0.05**	**< 0.001**
Proactive	**2.99**	**0.46**	**< 0.001**	**1.34**	**0.30**	**< 0.001**	**2.94**	**0.47**	**< 0.001**	**1.71**	**0.31**	**< 0.001**
Proactive × ABNA.w	**−0.98**	**0.29**	**0.001**	−0.55	0.23	0.018	−0.64	0.30	0.031	−0.51	0.25	0.043
Day	**−0.17**	**0.02**	**< 0.001**	**−0.12**	**0.01**	**< 0.001**	**−0.09**	**0.02**	**< 0.001**	**−0.13**	**0.01**	**< 0.001**
Time	**−0.17**	**0.04**	**< 0.001**	**−0.10**	**0.02**	**< 0.001**	**−0.13**	**0.04**	**< 0.001**	**−0.13**	**0.02**	**< 0.001**
PA.b	**−0.44**	**0.13**	**0.001**	**−0.52**	**0.09**	**< 0.001**	−0.15	0.13	0.262	**−0.39**	**0.09**	**< 0.001**
PA.w	**−0.69**	**0.09**	**< 0.001**	**−0.87**	**0.05**	**< 0.001**	**−0.33**	**0.08**	**< 0.001**	**−0.67**	**0.05**	**< 0.001**
Proactive	**3.74**	**0.52**	**< 0.001**	**1.99**	**0.38**	**< 0.001**	**3.60**	**0.51**	**< 0.001**	**2.25**	**0.39**	**< 0.001**
Proactive × PA.w	0.25	0.36	0.482	0.00	0.24	0.988	−0.40	0.35	0.244	−0.12	0.25	0.637

Note: All *p* values significant at the a priori threshold ($p < 0.01$) are bolded. Standardized regression coefficients (i.e., β) are presented in log-counts.
Abbreviations: ABNA, approach-based negative affect; ".b," between-person variables; Day, day of the week; PA, positive affect; ".w," within-person variables; WBNA, withdrawal-based negative affect.

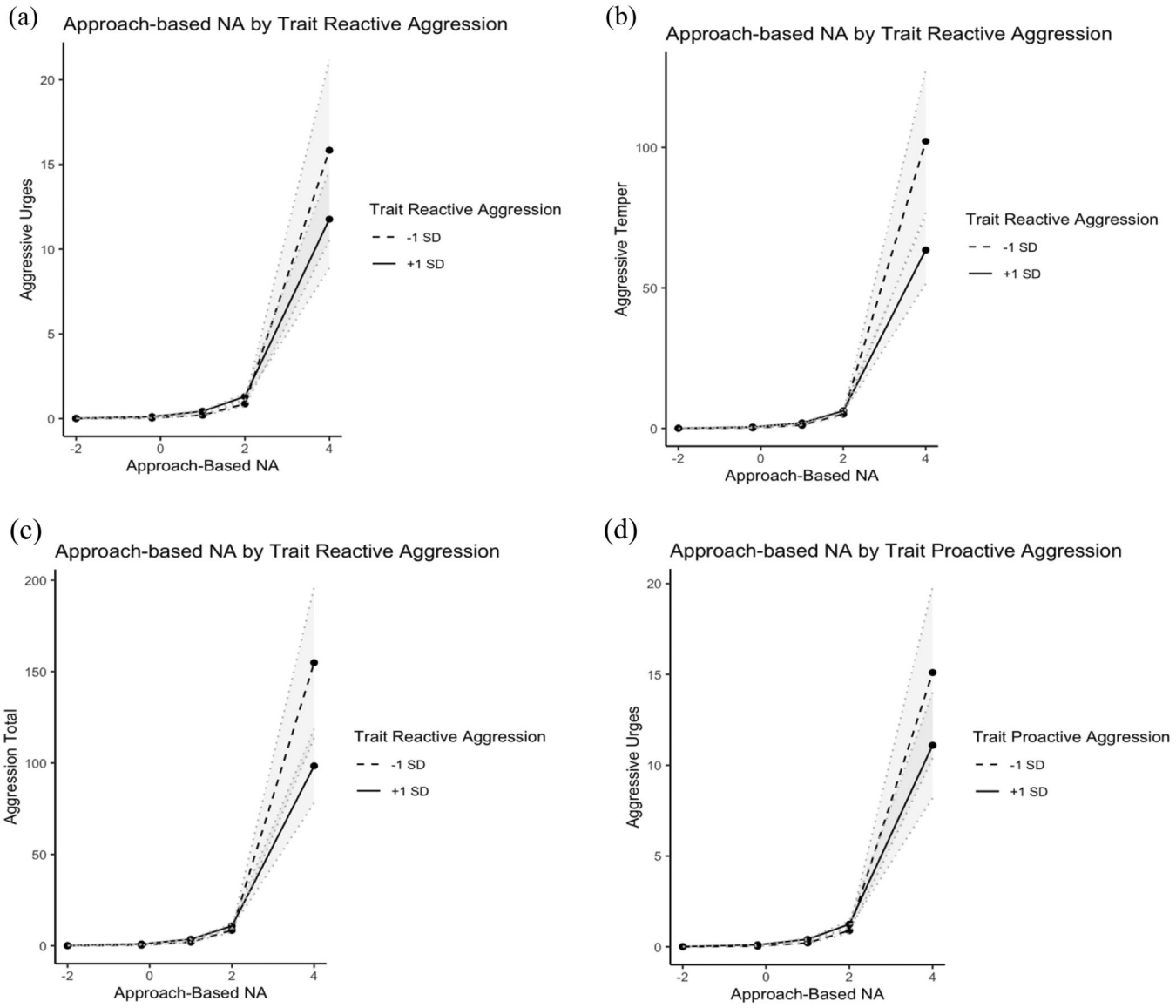

FIGURE 2 | Marginal predicted values of significant cross-level interaction effects.

were altered more substantively when reactive aggression was included as a predictor variable in the regression model. For example, its relations with aggressive temper in dyadic encounters weakened and became nonsignificant, and it evinced stronger positive relations with daily positive affect. These findings highlight the importance of explicitly pre-specifying how one plans to investigate and interpret these variables so that the statistical model aligns with its respective research question (see Yarkoni 2022).

Profile similarity analysis demonstrated substantial overlap between trait proactive and reactive aggression in their relations with daily affective, interpersonal, and aggression outcomes. Although significant differences in the nomological nets of these two trait aggression dimensions were identified, these differences were predominantly found in the magnitude of the effects rather than the direction of the effects, and the magnitude of these effects was relatively small, despite their statistical significance. For example, the largest differences between these traits were in their prediction of approach-based negative affect (reactive aggression $\rho = 0.32$; proactive aggression $\rho = 0.12$) and aggressive temper (reactive aggression $\rho = 0.40$; proactive aggression $\rho = 0.20$). These differences are expected, given that reactive aggression is characterized by heightened emotional responses to perceived threats or provocation and proactive aggression is characterized by unemotional, goal-directed behavior (see Hubbard et al. 2010). From a statistical significance perspective, the present study supports the discriminant validity between reactive and proactive aggression. However, the practical significance of these differences is less compelling. Indeed, the small differences in the nomological nets of trait reactive and proactive aggression suggest that these constructs may not be as distinct as some have proposed.

These findings align with previous research demonstrating substantial overlap in the nomological nets of these constructs. For example, Baker et al. (2008; $N = 1219$) found nearly complete overlap in the genetic and shared environmental influences on self and informant reports of reactive and proactive aggression in a childhood twin sample. Similarly, Poland,

Monks, and Tsermentseli (2016; $N = 116$) observed substantial overlap between relational and physical forms of reactive and proactive aggression in predicting various executive functioning tasks in children. In a sample of 211 young adults, Miller and Lynam (2006) also found near-total overlap between reactive and proactive aggression across social information processing vignettes. Thus, the present findings represent an important contribution to this existing literature by extending the evaluation of reactive and proactive aggression's discriminant validity to an ESM framework, which better captures the real-world variations in behavior and affect that should theoretically distinguish proactive and reactive aggression. However, even within this intensive approach to modeling interpersonal aggression, there appear only small distinctions between these trait aggression dimensions.

Finally, trait aggression dimensions significantly moderated the relations between approach-based negative affect and interpersonal aggression outcomes in half of the estimated models. Specifically, trait reactive aggression was a significant moderator in all models predicting interpersonal aggression outcomes except for verbal aggression, while proactive aggression served as a significant moderator only in the model predicting aggressive urges and behavior. In contrast, cross-level interaction effects in models, including withdrawal-based negative affect and positive affect composites, were null. The nature of these significant interaction effects, however, was contrary to our stated hypothesis and should be interpreted with caution. We expected trait reactive aggression and approach-based negative affect to synergistically predict higher levels of interpersonal aggression. Instead, results showed that approach-based negative affect had a stronger relation with interpersonal aggression at lower levels of both trait proactive and reactive aggression. This finding indicates that, among individuals with higher levels of trait reactive aggression, momentary experiences of anger/irritability may be less influential in the prediction of occasion-specific experiences of interpersonal aggression. Put differently, individuals with high levels of trait reactive aggression more consistently experienced aggressive urges/behavior and aggressive temper regardless of the intensity of their momentary anger/irritability. One interpretation of these results may be seen through an I-cubed (I^3) perspective (Finkel et al. 2013). Through this framework, individuals with high trait reactive aggression may have a lower threshold for aggressive responding because their reactivity acts as a chronic "impellor," making acute instigations of approach-based negative affect less important in driving interpersonal aggression. However, these interaction effects ran counter to our a priori hypothesis, were small in magnitude, largely driven by only 2.22% of observations (i.e., 196 of 8798 prompts were above +2 SDs of within-person approach-based negative affect), and visually diverged at high levels of the dependent variable partly as a function of the negative binomial distribution. Thus, these findings and their potential support of this theoretical framework require replication through a confirmatory approach.

4.1 | Limitations and Future Directions

There were several strengths to the present study, including the preregistration of the analytic plan, recruitment of a large sample through an ESM approach, and assessment of trait aggression dimensions across a number of affective and interpersonal outcomes. However, there were several important limitations to the present work. First, the current sample consisted of US undergraduate students who endorsed relatively low mean levels of interpersonal aggression. Therefore, it is unknown whether the current findings are generalizable to samples with different demographic features and rates of interpersonal aggression. Second, the present study relied entirely on self-report measures, which may inflate effects due to method variance. Future work could benefit from the inclusion of multimodal techniques, including informant reports and official records (e.g., arrest records). That said, the present study represents an improvement upon existing self-report studies in that items did not explicitly overlap in content (i.e., absence of criterion contamination), and the predictor and outcome variables in the present study were assessed at different timepoints and under different contexts (i.e., baseline survey vs. repeated time-contingent survey). Third, although the sample was sufficiently powered to detect cross-level interaction effects, the present sample was underpowered to detect between-person interaction effects, which would have been beneficial to explore in tandem with cross-level interactions. Fourth, the majority of endorsed dyadic interactions in the present study occurred among friends and romantic partners. Future research could benefit from assessing whether the nature of the dyadic relationship affects the manifestation of trait reactive and proactive aggression within an ESM approach. Fifth, both trait reactive and proactive aggression were negatively related to the reported number of social interactions ($\rho = -0.06$ and -0.13, respectively). While these effects were small, they suggest that participants with higher levels of trait aggression may have fewer social interactions, which could slightly skew the study's reflection of trait aggression in daily life. The extent to which these small negative effects reflect the intentions of the participant (e.g., participants with higher levels of trait aggression avoid interactions), the intentions of the potential interaction partner (e.g., others avoid interacting with participants with higher levels of trait aggression), or an unknown factor cannot be determined within the current study design. However, future ESM research reliant on reports of social interactions could benefit from further exploration of the individual differences that potentially bias these types of data collection efforts.

The present study builds upon the large body of existing empirical work assessing the correlates of trait reactive and proactive aggression in adults by evaluating them through a novel ESM approach. In sum, the present study finds that these traits robustly predict experiences of daily negative affect and interpersonal aggression in dyadic encounters. However, these trait aggression dimensions also significantly diverge across important outcomes, including experiences of anger/irritability, interpersonal perceptions of warmth in dyadic encounters, and experiences of aggressive temper in dyadic encounters. Additionally, they appear to largely align in their moderation of the relation between momentary anger/irritability and interpersonal aggression.

Ethics Statement

Purdue University Human Research Protection Program/Institutional Review Board approved all data collections, protocol number: IRB-2021-894.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Preregistration, analytic code, and deidentified data sufficient for reproduction of our analyses are available on the Open Science Framework: https://osf.io/m7s8a/?view_only=7bf1e05d55984b59b82be48ac8cedecd.

Endnotes

[1]One alternative approach to addressing shared variance among predictor variables is to use person-centered modeling techniques, such as latent profile analysis (e.g., Smeets et al. 2017; van Dijk et al. 2021). These approaches, too, bear meaningful limitations, as they often enforce categorical distinctions that mask the shared variance between constructs and can oversimplify the nature of the constructs (e.g., Achterhof et al. 2019).

[2]See Du et al. (2023) for a description of power and sensitivity analyses for the present sample. Overall, the present sample was well-powered to detect small main and interaction effects.

[3]Our preregistration describes Aims 1 and 2 as a single aim (i.e., Aim 1). To ease the interpretability of our findings, we elected to split these two sets of analyses into separate aims in the current manuscript. There were no deviations in the methods of these analyses beyond a reorganization of how we describe them.

[4]The following packages were used in addition to base R: glmmTMB (Brooks et al. 2017), sjPlot (Lüdecke 2023), psych (Revelle and Revelle 2015), and tidyverse (Wickham et al. 2019).

[5]This number of models represents a deviation from the original preregistration. We initially preregistered the estimation of 24 models. However, we mistakenly excluded PANAS Total Positive Affect and Total Negative Affect from this list. Thus, including these composites, we estimated 28 models in total.

[6]To contextualize our findings, we conducted a series of non-preregistrered supplementary analyses that assessed trait aggression dimensions' relations with daily outcomes when they are residualized (i.e., "partialed") before analyses. Supporting Information S1: Tables 3 and 7 show the results of these analyses. Notably, profile similarity analyses demonstrate that the moderate to strong nomological net overlap between trait aggression dimensions becomes null after "partialling" reactive and proactive aggression ($r_{icc} = 0.66$ before "partialling"; $r_{icc} = 0.04$ after "partialling"). This difference was especially notable in trait proactive aggression, which showed substantially weaker relations with all examined daily outcomes after controlling for trait reactive aggression. Additionally, the profile of residualized proactive aggression was dissimilar (ICC = −0.25) to the profile of its non-residualized counterpart.

[7]Supporting Information S1: Tables 8 and 9 show the relations between the number of interactions recorded and the investigated variables and the percentage breakdown of interaction partner, respectively. Overall, the strongest correlation among the number of interactions and an investigated variable was with baseline RPAQ Proactive Aggression, which was ρ of −0.13. Additionally, the majority of interactions occurred with friends (43.7%) and romantic partners (14.5%).

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.