



# Forms and Functions of Aggression in Young Adults: The Polish Modified Version of the Peer Conflict Scale

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Accepted: 30 May 2023 / Published online: 5 June 2023  
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## Abstract

The goal of the present study was an initial validation of the Peer Conflict Scale (PCS) for Polish young adults (ages 18–30 years). The PCS measures two forms (overt and relational) and two functions (proactive and reactive) of aggression enabling multidimensional assessment of aggressive behavior in early adulthood. Study 1 (N = 482) showed that the initially proposed 4-factor model provided the best fit for data, but the PCS required modifications which resulted in shortening of the measure. The modified version of the PCS was partially invariant by gender. Construct validity was examined through the analysis of gender differences and the investigation of the associations between forms and functions of aggression and emotion regulation strategies of cognitive reappraisal and emotion suppression. Study 2 (N = 220) confirmed the internal structure, reliability, convergent (by the examination of the associations with other measures of relational and overt aggression, and with the Dark Triad) and known-groups validity of the modified PCS. These initial results suggest that the modified PCS is a promising tool to assess aggression in young adults. However, there is a need of additional psychometric studies to further establish the internal structure and validity of this instrument.

**Keywords** Forms of aggression · Functions of aggression · Peer conflict scale · Young adults · Psychometrics

Aggressive behavior represents a behavior that is intentionally carried out with the proximate goal of causing harm to another person who is motivated to avoid that harm (Allen, et al., 2018). Much attention in psychological research is devoted to examine various forms (e.g. direct, indirect) and functions (e.g. reactive, proactive) of aggression (Archer & Coyne, 2005; Little, et al., 2003). Using a multidimensional approach to aggression is beneficial in understanding the development of aggressive conduct (Girard, et al.,

2019; Kokko & Pulkkinen, 2005), correlates of aggression (Card, et al., 2008), and the associations between aggressive behaviors and mental health problems (e.g., depression and anxiety; Hayes, et al., 2021) and personality disorders (Azevedo, et al., 2020; Schmeelk, et al., 2008). Currently, there are a number of measures designed to capture the multidimensionality of aggression in children or adolescents (Marsee, et al., 2011). However, fewer measures assess the forms and functions of aggression in later developmental periods (e.g., emerging adulthood). Given that numerous studies indicate that psychological difficulties and victimization in childhood and adolescence are associated with aggression and partner violence in young adulthood (Leadbeater, et al., 2017), it is important to have reliable and valid measurement of aggression during this period of life.

One psychometrically sound and valid measure of aggression, namely *the Peer Conflict Scale* (Marsee, et al., 2011), was recently modified for assessment of Portuguese young adults (Vagos, et al., 2021). The goal of the present study was to validate the Polish version of *the Peer Conflict Scale* (PCS) for young adults. We investigated the internal structure of the PCS, its reliability, invariance across gender, and

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its associations with emotion regulation strategies of cognitive reappraisal and emotional suppression (Gross & John, 2003) and the Dark Triad (Machiavellianism, psychopathy and narcissism) regarded as personality underpinning of aggression (Paulhus, et al., 2018).

## Forms and Functions of Aggression

Forms of aggression include mostly overt and indirect forms of aggression, while functions of aggression usually refer to proactive and reactive aggression (Bailey & Ostrov, 2008). Overt aggression consists of behaviors intended to physically or verbally hurt other people, e.g. hitting, kicking, threatening (Card, et al., 2008; Marsee, et al., 2011; Vagos, et al., 2021). Relational aggression – an indirect form of aggression (Archer & Coyne, 2005) – is intended to damage the social status of the victim (e.g. spreading rumors, excluding for the group activities, damaging another person's friendships; Card, et al., 2008; Marsee, et al., 2011; Vagos, et al., 2021). Regarding its function, aggression can be either reactive (i.e., impulsive) which is anger oriented response to a threat or provocation, or proactive (i.e., premeditated) which is instrumental, goal oriented and often unprovoked (Bailey & Ostrov, 2008; Marsee, et al., 2011). Combination of forms and functions of aggression results in four categories of aggressive behavior: proactive overt aggression, proactive relational aggression, reactive overt aggression, and reactive relational aggression. These types of aggression differ in intensity (Pechorro, et al., 2021; Vagos, et al., 2021), correlates with psychological and social adjustment (Card, et al., 2008; Evans, et al., 2021), but also regarding its potential predictors (Kokkinos, et al., 2020).

Regarding gender differences (Ostrov & Godleski, 2010), boys tend to report higher rates of overt aggression while girls tend to report higher tendency to be relationally aggressive (Card, et al., 2008). Further studies confirm the differences in overt aggression (Archer, 2004; Card, et al., 2008) and indicate that they were more pronounced for physical aggression compared to verbal aggressive behaviors (Card, et al., 2008). Differences in relational aggression were less pronounced (Archer, 2004; Card, et al., 2008), but some studies find that girls report higher reactive relational than proactive relational aggression compared to boys (Marsee, et al., 2011). Among young adults, men tend to report more aggression compared to women and the reactive function of aggression prevails for both sexes (Vagos, et al., 2021).

Emotional states and their regulation play an important role in aggressive conduct (Allen, et al., 2018). Aggression is associated with both adaptive (e.g. cognitive reappraisal) and maladaptive (e.g. emotion suppression) emotion regulation strategies (Robertson, et al., 2012; Vega, et al., 2022).

Adaptive emotion regulation strategies could be regarded as inhibitors, while maladaptive emotion regulation strategies play a role of eliciting factors in aggressive behavior (Finkel & Hall, 2018). In general, emotion dysregulation is associated with higher tendency to aggressive conduct (Holley, et al., 2017; Robertson, et al., 2012). Although stronger associations were found between emotion dysregulation and physical aggression, the associations between emotion dysregulation and relational aggression were also positive (Hayes, et al., 2021). Emotion dysregulation was associated with emotion suppression (Westerlund, et al., 2021), which was higher among individuals reporting high proactive overt and relational aggression (Vagos, et al., 2021). On the other hand, cognitive reappraisal was associated with less proactive relational aggression (Vagos, et al., 2021) and less overall intimate partner violence (Maldonado, et al., 2015). Cognitive reappraisal was also considered as one of the most promising methods of reducing reactive forms of aggression (Denson, 2015).

Individual differences in aggression are also proposed to be strongly correlated with the Dark Triad (Machiavellianism, narcissism, psychopathy) or tetrad (including also sadism) personality traits (Paulhus, et al., 2018). Although all dark traits share a common core which is callous manipulation (Paulhus, et al., 2018) or low honesty-humility (Kowalski, et al., 2021), they differently predicted various forms of aggression (Paulhus, et al., 2018). Psychopathy tends to correlate with physical aggression, while Machiavellianism was associated more strongly with relational aggression (Paulhus, et al., 2018). Narcissism was less associated with dispositional aggression, but predicted aggression in ego-threat situations (Jones & Paulhus, 2010). Psychopathy and Machiavellianism were similarly correlated with higher levels of proactive and reactive aggression (Muris, et al., 2013). Callous and unemotional traits (similar to psychopathy and Machiavellianism) predict proactive aggression, while reactive aggression was more linked to impulsivity (Vaughan, et al., 2023).

## The Peer Conflict Scale

The *Peer Conflict Scale* (PCS) was developed by Marsee et al. (2011) to assess proactive and reactive types of overt aggression and proactive and reactive types of relational aggression. The PCS consists of forty items (10 items per subscale) assessed on five-point Likert-type scale ranging from 1 (*never*) to 5 (*always*). Previous studies confirmed the correlated four-factor structure of the PCS in long form (40 items; Marsee, et al., 2011; Vagos, et al., 2021) and in short form of the PCS (20 items; Pechorro, et al., 2021). Initially the PCS was designed for adolescents, however it was recently considered valid using young adults sample

(Vagos, et al., 2021). The multidimensional measurement of aggression seems to be important also in this developmental age. For example, both proactive and reactive overt aggression were associated with young adults' well-being and adjustment (Thomas, 2019). However, the research using a multidimensional approach to aggression in young adulthood are rare (Thomas, 2019) also due to a lack of valid measures of aggression for this age group.

## The Present Studies

The goal of the first study was to prepare and validate the Polish version of the PCS for young adults. We investigated the internal structure of the scale testing various models present in the literature for both the long and short form of the PCS (Marsee, et al., 2011; Pechorro, et al., 2021; Vagos, et al., 2021). Following the previous validation studies, we examined the measurement invariance between men and women and investigated gender differences in mean practice of all four forms of aggression. Based on the previous findings, we expected that the four-factor structure of the PCS will have the best fit to data. We also predicted higher reports on aggression among men compared to women (Ostrov & Godleski, 2010). According to the literature on the associations between emotion regulation and aggression, we predicted positive associations between emotion suppression and reactive aggression (Maldonado, et al., 2015) and negative associations between cognitive appraisal and proactive aggression (Denson, 2015; Maldonado, et al., 2015; Vagos, et al., 2021).

The goal of the second study was to confirm the internal structure of the Polish version of the PCS. We aimed also at confirmation of invariance across gender and at investigate the gender differences in aggression. A goal of Study 2 was also to examine its validity by examination of the associations between the PCS and other measures of relational and overt aggression, and the associations between functions and forms of aggression and the Dark Triad (Paulhus, et al., 2018).

## Study 1

### Method

#### Participants

Data were collected from 529 individuals who respond to invitations posted on social media. After applying inclusion criteria (age between 18 and 30) four individuals were excluded due to age below 18, and 43 individuals were

excluded due to age higher than 30 years. The final sample included 482 participants (356 women, 121 men, 5 non-binary). The mean age of the participants was 23.0 years old ( $SD=3.10$ ). Men were significantly older ( $M=23.6$ ;  $SD=3.10$ ) compared to women ( $M=22.80$ ;  $SD=3.07$ ;  $t = -2.045$ ;  $p = .02$ ; Cohen's  $d = -0.26$ ). Most participants reported average socioeconomic status (SES;  $n = 366$ ; 75.9%), 10.6% reported SES lower than average ( $n = 51$ ), and 13.5% reported higher than average SES ( $n = 65$ ). The majority of the participants reported secondary education ( $n = 328$ ; 68.1%), followed by higher education ( $n = 136$ ; 28.2%), primary education ( $n = 9$ ; 1.9%), vocational education ( $n = 6$ ; 1.2%) or post-secondary education ( $n = 2$ ; 0.4%). Participants were invited to the study via invitations posted on social media and were non remunerated for their participation.

### Measures

**The Peer Conflict Scale** (Marsee, et al., 2011) consists of 40 items measuring proactive overt aggression (e.g. "I have hurt others to win a game or contest"), reactive overt aggression (e.g. "When someone hurts me, I end up getting into a fight"), proactive relational aggression ("I enjoy making fun of others"), and reactive relational aggression (e.g. "I spread rumors and lies about others when they do something wrong to me"). Items are rated on a 4-point scale (0 – not at all true, 1 – somewhat true, 2 – very true, and 3 – definitely true), and scores are calculated by summing the items to create the four subscales (range: 0–30). The items were translated by three psychologist fluent in English and then back-translated by a professional English editor with expertise in psychological scales. The back-translation procedure was consulted with Dr. Monica Marsee, the author of the PCS, in order to achieve the closest translation of the content of items. Similarly to Vagos et al. (2021), we included small modifications in order to adapt items for young adults. All modifications were consulted with the Authors of the PCS. In the current study, the internal consistency of original subscales of the PCS was acceptable: proactive overt aggression ( $\alpha = 0.80$ ), reactive overt aggression ( $\alpha = 0.82$ ), proactive relational aggression ( $\alpha = 0.78$ ), and reactive relational aggression ( $\alpha = 0.81$ ).

**The Emotion Regulation Questionnaire** (ERQ; Polish version: Śmieja and Kobylińska, 2011) consists of 10 items rated on a scale from 1 (*Strongly disagree*) to 7 (*Strongly agree*). Six items measure reappraisal (e.g. "I control my emotions by changing the way I think about the situation I'm in") and four items load on the expression suppression factor (e.g. "I control my emotions by not expressing them"). Cognitive reappraisal and expression suppression had high internal consistency in Polish version (0.77 and

0.74, respectively; Śmieja and Kobylińska, 2011), and in the current sample (0.87 and 0.73, respectively).

## Analytic Plan

We first used confirmatory factor analysis (CFA) to investigate the goodness of fit of competing models of the PCS. The commonly accepted criteria of goodness of fit were used in the present study, Comparative Fit Index (CFI)  $\geq 0.90$  combined with Root Mean Square Error of Approximation (RMSEA)  $\leq 0.08$  (Hair, et al., 2005). The competing models were compared with chi-square difference test. Next, we investigated measurement invariance of the best fitting model of the PCS across men and women using a forward approach (Dimitrov, 2010). Then, we investigated differences in means of forms and functions of aggression using mixed ANOVA with forms and functions of aggression as within-subject variable and gender as between-subjects variable. Lastly, we investigated bivariate correlations between forms and functions of aggression, and emotion regulations strategies.

## Results and Discussion

### Internal Structure of the Polish Version of the PCS

Prior to the CFA and measurement invariance testing, the “very true” and “definitely true” categories of the PCS were collapsed into one category because not all categories were

represented in each group (see Marsee, et al., 2011; Vagos, et al., 2021). Since data were not multivariate normal (Mardia’s multivariate normality test = 53459.94,  $p < .001$ ), the weighted least square mean and variance adjusted estimator was used for the internal structure and measurement invariance analyses as in previous validation studies of the PCS (Marsee, et al., 2011; Vagos, et al., 2021). CFA results for competing models are presented in Table 1.

The four-factor model had the best fit to the data and was significantly better compared to all other examined models. Compared with the second closest fit (model with two forms of aggression: overt and relational), the four-factor structure was better fitted to data ( $\Delta\chi^2(2) = 29.36$ ;  $p < .001$ ). This result is in line with previous findings that favor the measurement model of the PCS with four factors of reactive overt aggression, proactive overt aggression, reactive relational aggression, and proactive relational aggression (Marsee, et al., 2011; Vagos, et al., 2021).

However, in the present research some fit indices for four-factors model were poor, CFI  $< 0.90$ , and loadings of 16 items on the designed factors were considerably lower than expected level of practical significance ( $< 0.50$ ; Hair, et al., 2005). Thus, we re-ran the CFA for the four-factor model removing items with loadings lower than 0.50. Then, we repeated the CFA using threshold of 0.50 loading in proactive overt aggression (removing item 1;  $\lambda = 0.491$ ) and reactive proactive overt scale (removing item 30;  $\lambda = 0.490$ ). In order to obtain at least three indices per latent variable (Kline, 2005) we used cutoff of 0.45 (Comrey & Lee, 1992) in case of proactive relational aggression (removing item 26 [When I gossip about others, I feel like it makes me popular];  $\lambda = 0.441$  and item 13 [I tell others’ secrets for things they did to me a while back] which had  $\lambda = 0.467$ , but keeping it in the model resulted in poor fit of the model, namely CFI = 0.87). The final model was estimated for 20 items in total (proactive overt aggression: items 12, 18, 21, 24, 27, 28; reactive overt aggression: items 3, 11, 16, 20, 36; proactive relational aggression: 2, 9, 29, 32; reactive relational aggression: 7, 15, 17, 22, 40). It should be noted that 20-item version of the PCS was previously developed (Pechorro, et al., 2021), but the model had also poor fit to our data. Thus, the 20-item model of the present study included different items compared to the previous brief version of the PCS. Overall, the model fit data well,  $\chi^2(164) = 301.07$ ;  $p < .001$ ; CFI = 0.90; RMSEA = 0.042 [0.034; 0.049]; SRMR = 0.057, and significantly better compared to the model for full 40 items,  $\Delta\chi^2(570) = 762.65$ ;  $p < .001$ . The analysis resulted in shortened measure, yet the four-factor structure reproduced in the data. The items had at least fair loadings (0.45) on the respective latent variables (Comrey & Lee, 1992). The internal consistency for the factors ranged from 0.60 for the shortest scale of proactive relational aggression (4

**Table 1** Fit indices for competing model of internal structure of the PCS

Model	$\chi^2$ (df)	CFI	RMSEA [90% CI]	SRMR	Comparisons
M1: Unidimensional	1499.31 (740)	0.49	0.046 [0.043; 0.050]	0.10	vs. M2: $\Delta\chi^2 = 307.29^{***}$ vs. M3: $\Delta\chi^2 = 68.86^{***}$ vs. M4: $\Delta\chi^2 = 435.59^{***}$
M2: Two- forms (overt vs. relational)	1192.02 (739)	0.70	0.036 [0.032; 0.039]	0.087	vs. M3: $\Delta\chi^2 = 238.43^{***}$ vs. M4: $\Delta\chi^2 = 128.30^{***}$
M3: Two-func- tions (proactive vs. reactive)	1430.45 (739)	0.54	0.044 [0.041; 0.048]	0.095	vs. M4: $\Delta\chi^2 = 366.73^{***}$
M4: Four-factors	1063.72 (734)	0.78	0.031 [0.026; 0.035]	0.077	

*Note.* All  $\chi^2$  values were significant at  $p < .001$ . CI = confidence interval; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual. \*\*\*  $p < .001$



items), through 0.73 for reactive relational aggression, 0.78 for proactive overt aggression, to 0.81 for reactive overt aggression (Table 1 in Supplementary material). The shortened subscales correlated significantly with original 10-item versions of the respective subscales of the PCS ( $r = \{0.86; 0.96\}$ ; see Table 3 in Supplementary material).

### Measurement Invariance

Measurement invariance was tested for the modified model of the PCS regarding gender (Table 2). We conducted the analysis only for those participants who described themselves as men or women ( $n=477$ ). The four-factor model had good fit for women,  $\chi^2(164)=225.17$ ; CFI=0.94; RMSEA=0.032 [0.021; 0.042]; SRMR=0.057, but poor for men,  $\chi^2(164)=199.33$ ; CFI=0.88; RMSEA=0.042 [0.014; 0.062]; SRMR=0.084. We examined modification indices (MI) for the CFA model in men. MIs indicated that item 11 [I threaten others when they do something wrong to me] had significant cross-loadings on proactive overt aggression factor ( $MI=21.08$ ), proactive relational aggression ( $MI=16.74$ ), and reactive relational aggression ( $MI=10.81$ ). Thus, we re-ran the CFA model excluding item 11 in men which resulted in good fit,  $\chi^2(146)=163.61$ ;  $p=.15$ ; CFI=0.93; RMSEA=0.032 [0; 0.055]; SRMR=0.08. Similarly, among women the model excluding item 11 had good fit,  $\chi^2(146)=185.08$ ;  $p=.02$ ; CFI=0.96; RMSEA=0.027 [0.013; 0.039]; SRMR=0.053. The final model tested for measurement invariance had 19 items (the loadings for the trimmed model are given in Table 1 in Supplementary material). All loadings in the models for both gender met the minimal level of contribution to the interpretation of the latent variable (i.e.,  $\lambda > 0.30$ ; Hair, et al., 2005).

Constraining loadings did not result in worse fit,  $\Delta \chi^2(15)=13.48$ ;  $p=.56$ . which pointed to metric invariance. The scalar model resulted in worsened fit,  $\Delta \chi^2(15)=41.94$ ;  $p < .001$ . After releasing constraints for intercepts of items

2, 18, and 40, the partial scalar model did not result in worsened fit,  $\Delta \chi^2(12)=16.36$ ;  $p=.18$ .

### Gender Differences

Mixed ANOVA was conducted, including gender as between subject variable and two within-subject factors, namely the forms (overt vs. relational) and functions (proactive vs. reactive) of aggression. Results revealed a significant main effect of form of aggression ( $F(1, 475)=106.74$ ;  $p < .001$ ;  $\eta^2=0.03$ ) and of function of aggression ( $F(1, 475)=322.62$ ;  $p < .001$ ;  $\eta^2=0.09$ ). Overt aggression was reported more frequently ( $M=2.29$ ;  $SE=0.08$ ) compared to relational ( $M=1.38$ ;  $SE=0.08$ ,  $t=10.33$ ;  $p_{\text{holm}} < 0.001$ ). Reactive aggression was reported more frequently ( $M=2.58$ ;  $SE=0.08$ ) compared to proactive ( $M=1.09$ ;  $SE=0.08$ ,  $t=-17.96$ ;  $p_{\text{holm}} < 0.001$ ). The main effect of gender was non-significant ( $F(1, 475)=1.15$ ;  $p=.28$ ;  $\eta^2=0.001$ ). Gender interacted with function of aggression ( $F(1, 475)=18.58$ ;  $p < .001$ ;  $\eta^2=0.005$ ). Men and women did not differ significantly in reactive aggression ( $t=1.11$ ;  $p_{\text{holm}}=0.27$ ). However, men reported higher proactive aggression compared to women ( $t=-3.00$ ;  $p_{\text{holm}}=0.006$ ; Table 3 in Supplementary material). Form and function of aggression also interacted significantly ( $F(1, 475)=12.61$ ;  $p < .001$ ;  $\eta^2=0.003$ ). The participants reported highest levels of reactive overt aggression ( $M=3.17$ ;  $SE=0.10$ ), followed by reactive relational aggression ( $M=1.99$ ;  $SE=0.10$ ), proactive overt aggression ( $M=1.41$ ;  $SE=0.10$ ), and proactive relational aggression ( $M=0.77$ ;  $SE=0.10$ ). All differences were significant ( $p < .001$ ). We noted also significant three-way interaction of function x form x gender ( $F(1, 475)=6.25$ ;  $p=.013$ ;  $\eta^2=0.001$ ). Generally, men and women did not differ in reactive relational aggression ( $t=0.18$ ;  $p_{\text{holm}}=1.00$ ), overt reactive aggression ( $t=1.68$ ;  $p_{\text{holm}}=0.56$ ), and proactive relational aggression ( $t=-1.47$ ;  $p_{\text{holm}}=0.72$ ), but differ significantly in proactive overt aggression ( $t=-3.53$ ;  $p_{\text{holm}}=0.003$ ). Significant differences between reactive forms of aggression and proactive forms of aggression were identified in all comparisons excluding men's proactive overt aggression did not differ from both men's and women's reactive relational aggression ( $t=-1.24$ ;  $p_{\text{holm}}=1.00$ , and  $t=-0.95$ ;  $p_{\text{holm}}=1.00$ , respectively).

The obtained results are only partially in line with findings indicating higher aggression among men (Bailey & Ostrov, 2008). In the present study, results showed that men report more proactive aggression compared to women, but the levels of reactive aggression did not differ between men and women. Also, regarding the form of aggression, men and women did not differ. Gender differences in aggression diminished with age (Hyde, 1984). Thus, the possible explanation could result from the older mean age of the present

**Table 2** Fit indices for measurement invariance analyses

Measurement invariance	$\chi^2$	df	CFI	RMSEA [90% CI]	SRMR
Configural	342.50*	292	0.96	0.027 [0.011; 0.038]	0.057
Metric	333.78	307	0.98	0.019 [0; 0.032]	0.061
Scalar	366.21*	322	0.96	0.024 [0.004; 0.035]	0.064
Partial scalar	348.44	319	0.97	0.020 [0; 0.032]	0.062

Note. \*  $p < .05$ . CI=confidence interval; CFI=Comparative Fit Index; RMSEA=Root Mean Square Error of Approximation; SRMR=Standardized Root Mean Square Residual

group compared to previous studies (Bailey & Ostrov, 2008; Vagos, et al., 2021).

## Emotion Regulation, Forms, and Functions of Aggression

Correlation analyses (Table 2 in Supplementary material) indicated that emotional suppression was positively associated with proactive overt aggression ( $r = .12$ ;  $p = .01$ ), while cognitive reappraisal correlated negatively with proactive relational aggression ( $r = -.10$ ;  $p = .03$ ). Other correlation coefficients were non-significant. These results are in line with Vagos et al. (2021). Since proactive overt aggression refers to actions that are frequently delayed regarding the moment of provocation or insult, emotional suppression could be useful to suppress the immediate negative emotion but not in resigning from retaliation in the future (vanOyen Witvliet, et al., 2011). Some previous studies showed that emotion suppression was higher among proactively relationally aggressive individuals (Kokkinos & Voulgaridou, 2017). The current study indicated the role of emotion suppression for proactive form of overt aggressive behavior. Cognitive reappraisal is related to less hostility, anger, and physical aggression (Kim, et al., 2022). The present study showed that individuals with higher ability to use cognitive reappraisal present less tendency to use relational aggression in an instrumental and premeditated manner.

## Study 2

The goals of Study 2 were to verify the fit of the four-factor model of the Modified Peer Conflict Scale to the data and to further examine the validity of the scale. Thus, we used confirmatory factor analysis for investigating the competing models of the modified PCS. We predicted that four-factor model of the modified PCS will have the best fit to the data.

In order to establish validity of the scale, we examined its correlations with other measures of direct aggression and relational aggression, but also with the Dark Triad (Machiavellianism, psychopathy and narcissism) which is regarded as personality basis for aggression (Jones & Neria, 2015; Paulhus, et al., 2018). In the lens of theories of aggression, the Dark Triad could be regarded as impellance factor for aggressive conduct (Finkel & Hall, 2018). Thus, we expected that proactive types of aggression measured by the modified PCS will be positively correlated with other measures of proactive aggression and the Dark Triad (mostly psychopathy), while the reactive forms of aggression measured by the modified PCS will be positively associated with other measures of reactive aggression, but also with psychopathy and Machiavellianism (e.g. Dinić and Wertag,

2018). We also expected that overt forms of aggression will be correlated with verbal aggression, while relational aggression will be positively correlated with other measures of relational aggression.

Additionally, we recruited the participants with a history of detention as known-groups validation analysis of the scale. According to the previous studies (Marsee, et al., 2011), we expected that individuals with a history of detention will report higher levels of proactive and reactive overt aggression and reactive relational aggression.

## Method

### Participants

Data were collected from 220 individuals who respond to invitations posted on Ariadna research panel (110 women, 107 men and 3 non-binary). The inclusion criteria were age between 18 and 30. The mean age of the participants was 25.7 ( $SD = 3.41$ ). Men did not differ in age ( $M = 25.9$ ;  $SD = 3.48$ ) compared to women ( $M = 25.4$ ;  $SD = 3.33$ ;  $t = -1.14$ ;  $p = .02$ ; Cohen's  $d = -0.15$ ). The majority of the participants reported average socioeconomic status (SES;  $n = 181$ ; 82.3%), 10% reported SES lower than average ( $n = 22$ ), and 7.7% reported higher than average SES ( $n = 17$ ). Most participants reported higher education ( $n = 103$ ; 46.8%), followed by secondary ( $n = 72$ ; 32.7%), primary education ( $n = 12$ ; 5.5%), vocational education ( $n = 14$ ; 6.4%), or post-secondary education ( $n = 19$ ; 8.6%). Participants recruited via Ariadna received points that could be exchanged for small prizes. The sample size of  $N \approx 200$  is regarded as fair for factor analysis particularly if the item loadings are 0.50 or higher (Comrey & Lee, 1992; MacCallum, et al., 1999; Wolf, et al., 2013).

In order to investigate known-groups validity of the modified PCS, we recruited 35 female offenders from Lubliniec Prison. Inmates were excluded from participating in the study if they had more than 30 years, were currently physically ill, were mentally disordered or returned incomplete surveys. Nine inmates were not included in the further analyses due to incomplete surveys. The final group consisted of 26 female inmates with mean age,  $M = 28.1$  years ( $SD = 1.15$ ). Eleven of the offenders had one previous conviction (e.g. community services), fifteen had between 2 and 3 convictions. Regarding offenses, 16 inmates were sentenced due violent crimes, and 20 due to non-violent crimes. This group was asked to respond do the modified PCS only.

## Measures

**The Modified Peer Conflict Scale** (Marsee, et al., 2011), developed in Study 1, consists of 19 items measuring proactive overt aggression (e.g. “I have hurt others to win a game or contest”), reactive overt aggression (e.g. “When someone hurts me, I end up getting into a fight”), proactive relational aggression (“I enjoy making fun of others”), and reactive relational aggression (e.g. “I spread rumors and lies about others when they do something wrong to me”). Items are rated on a 4-point scale (0 – not at all true, 1 – somewhat true, 2 – very true, and 3 – definitely true), and scores are calculated by summing the items to create the four subscales.

**Proactive and reactive relational aggression scales** (Murray-Close, et al., 2010; Polish version: Moroń and Biolik-Moroń, 2021) consist of 4 items measuring peer-directed proactive relational aggression (e.g. “My friends know that I will think less of them if they do not do what I want them to do”) and 5 items measuring peer-directed reactive relational aggression (e.g. “When I am not invited to do something with a group of people, I will exclude those people from future activities”). The items are rated on 5-point scale to range from 0 (“never”) to 4 (“very often”). The reliability of the scales was satisfactory in original study ( $\alpha$  ranged from .69 to .72; Murray-Close, et al., 2010) and in previous Polish studies ( $\alpha$  for reactive relational aggression was .85; Moroń and Biolik-Moroń, 2021). In the present study, reliability of the proactive relational scale was  $\alpha = .79$ , while reactive relational scale was  $\alpha = .92$ .

**Verbal aggression subscale of Buss-Perry Aggression Questionnaire** (Buss & Perry, 1992) was used to measure overt verbal aggression. The subscale consists of 5 items (e.g. “When people annoy me, tell them what I think of them”) scored on a five-point scale ranging from 1 (“extremely uncharacteristic of me”) to 5 (“extremely characteristic of me”). The reliability and validity of the verbal aggression scale was shown also in Polish samples (Krukowski, et al., 2012). Reliability of the scale in the present study was  $\alpha = 0.66$ .

**The Dirty Dozen Scale** (Jonason & Webster, 2010; Polish version: Czarna, et al., 2016) was used to measure the Dark Triad. Each dark trait was measured with four items: Machiavellianism (e.g. “I tend to manipulate others to get my way”), narcissism (e.g. “I tend to want others to admire me”), and psychopathy (e.g. “I tend to lack remorse”). The scales were reliable and valid in previous studies in Polish samples (Czarna, et al., 2016). In the present study, all subscales were reliable (Machiavellianism:  $\alpha = 0.89$ ; narcissism:  $\alpha = 0.89$ ; psychopathy:  $\alpha = 0.79$ ).

## Results and Discussion

### Internal Structure

Fit indices for competing models of internal structure of the modified PCS are shown in Table 4 in Supplementary materials. The present study shows that four-factor solution had good fit to data ( $\chi^2(150) = 184.09$ ;  $p < .001$ ; CFI = 0.96; RMSEA = 0.035 [0.015; 0.049]; SRMR = 0.036) and was better than other models of internal structure of the modified PCS ( $\Delta \chi^2(1) = 54.60$ ;  $p < .001$ ). All loadings of the items on the respective latent variables were higher than 0.68. This indicated that the items were very good or excellent indicators of the latent variables (Comrey & Lee, 1992). The internal consistency of the subscales was acceptable for all scales, proactive overt aggression,  $\alpha = 0.94$ , reactive overt aggression,  $\alpha = 0.87$ , proactive relational aggression,  $\alpha = 0.89$ , and reactive relational aggression,  $\alpha = 0.93$ . Thus, Study 2 showed that internal structure of the modified PCS and internal consistency of its subscales were appropriate.

### Measurement Invariance

Although the samples of women and men were relatively small, we tested for the measurement invariance for the modified PCS. Loadings for each item in both gender are presented in Table 5 in Supplementary materials. Loadings for both genders exceeded 0.61 which pointed to their good reliability. Internal consistency of all subscales is also appropriate ( $\alpha > 0.87$ ). Table 6 in Supplementary materials includes goodness of fit statistics for measurement invariance analysis. Constraining loadings did not result in worse fit,  $\Delta \chi^2(15) = 16.39$ ;  $p = .36$ , which pointed to metric invariance. Constraining loadings and intercepts also did not result in worsened fit,  $\Delta \chi^2(15) = 15.77$ ;  $p = .040$  which pointed to scalar invariance.

### Gender Differences

A 2 (form: overt vs. relational; within-subject factor)  $\times$  2 (function: proactive vs. reactive; within-subject factor)  $\times$  2 (gender: women vs. men; between subject factor) ANOVA was conducted. The main effects of aggression form ( $F(1, 215) = 36.93$ ;  $p < .001$ ;  $\eta^2 = 0.006$ ) and function ( $F(1, 215) = 27.94$ ;  $p < .001$ ;  $\eta^2 = 0.004$ ) were significant. Overt aggression was reported more frequent ( $M = 2.80$ ;  $SE = 0.22$ ) compared to relational ( $M = 2.29$ ;  $SE = 0.22$ ;  $t = 6.08$ ;  $p_{\text{Holm}} < 0.001$ ). Reactive aggression was higher ( $M = 2.77$ ;  $SE = 0.22$ ) compared to proactive ( $M = 2.32$ ;  $SE = 0.22$ ;  $t = -5.29$ ;  $p_{\text{Holm}} < 0.001$ ). The main effect of gender was also significant ( $F(1, 215) = 7.19$ ;  $p = .008$ ;  $\eta^2 = 0.028$ ). Men reported higher aggression ( $M = 3.11$ ;  $SE = 0.30$ ) compared

**Table 3** Correlations between study variables (Study 2)

Criterion variable	The Modified PCS			
	Proactive Overt	Reactive Overt	Proactive Relational	Reactive Relational
Proactive relational aggression <sup>a</sup>	0.74***	0.62***	0.72***	0.76***
Reactive relational aggression <sup>a</sup>	0.76***	0.63***	0.75***	0.79***
Verbal aggression	0.17*	0.27***	0.22**	0.19**
Machiavellianism	0.68***	0.60***	0.71***	0.69***
Narcissism	0.47***	0.42***	0.53***	0.49***
Psychopathy	0.66***	0.53***	0.63***	0.61***

Note. <sup>a</sup> measured with Murray-Close et al. (2010) scales. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

to women ( $M = 1.98$ ;  $SE = 0.30$ ;  $t = -2.58$ ;  $p_{\text{Holm}} = 0.008$ ). Two-way interaction of function  $\times$  gender was significant ( $F(1, 215) = 5.22$ ;  $p = .023$ ;  $\eta^2 < 0.001$ ), but it was qualified by three-way interaction of form  $\times$  function  $\times$  gender ( $F(1, 215) = 4.97$ ;  $p = .027$ ;  $\eta^2 = 0.002$ ). In general, women reported less proactive overt aggression compared to men ( $t = -3.37$ ;  $p_{\text{Holm}} = 0.018$ ). Men reported less proactive relational aggression compared to proactive overt aggression ( $t = 4.28$ ;  $p_{\text{Holm}} < 0.001$ ). The means and standard deviations for men and women in all subscales are given in Table 7 in Supplementary materials.

### Convergent Validity

Convergent validity of the modified PCS was assessed by correlation analysis with proactive and reactive relational aggression, verbal aggression and the Dark Triad. The results are given in Table 3.

Proactive overt aggression as measured by the modified PCS was positively correlated with scores of both proactive and reactive relational aggression, but also with Machiavellianism and psychopathy. Reactive overt aggression was positively correlated with all criterion variables, and showed higher correlations with verbal aggression compared to other subscales of the modified PCS. Proactive relational aggression was strongly correlated with proactive and reactive relational aggression, Machiavellianism and psychopathy. Reactive relational aggression was positively correlated with both forms of relational aggression and

Dark Triad. Both proactive forms appeared to be more pronounced among individuals with high intensity of the Dark Triad than reactive aggression forms. However, this analysis indicated that in terms of convergent validity particularly relational aggression subscales were similar to each other in terms of their association with the Dark Triad and other measures of proactive and reactive relational aggression.

### Known-groups Validity Analyses

We investigated the known-groups validity by comparing the scores on the modified PCS of a detained to a non-detained sample. We matched a random subsample of 26 women out of the participants of Study 2 in the comparable age range to female offenders ( $M_{\text{age}} = 27.7$ ;  $SD = 1.60$ ;  $t = 1.04$ ;  $p = .31$ ). Table 4 presents the comparisons between non-detained and detained women.

Detained women reported higher levels of proactive overt, proactive relational and reactive relational aggression. The effect size of these differences was high (Cohen's  $d = \{1.07; 1.16\}$ ). However, the difference in reactive overt aggression was non-significant. The results were only partially consistent with previous studies, in which detained and non-detained individuals did not differ in proactive relational aggression. The lack of significant differences in reactive overt aggression could be due to socially desirable responding of detained women or to the fact that most of the offenders was sentenced due to non-violent crimes.

### General Discussion

Recent research has shown the PCS to be a reliable and valid measure of the forms and functions of aggression in young adults (Vagos, et al., 2021). The present study showed that in young adult Polish sample, the PCS required some modifications in order to maintain the four-factor structure of the instrument. The modifications included removing several items from the original pool of 40 items. The final modified Polish version of the PCS consists of 19 items measuring four types of aggression: proactive overt aggression, reactive overt aggression, proactive relational aggression and reactive relational aggression. Although the internal consistency for proactive relational aggression was low in

**Table 4** Known-groups validity analysis of the modified PCS

Variable	Female offenders ( $n = 26$ )		Female subsample ( $n = 26$ )		$t$	$d$
	$M$	$SD$	$M$	$SD$		
Proactive Overt	4.38	3.91	1.00	2.15	3.86***	1.07
Reactive Overt	2.88	2.08	2.46	2.72	0.36	0.17
Proactive Relational	3.08	2.06	0.96	1.56	4.22***	1.16
Reactive Relational	3.92	2.87	1.19	2.17	3.87***	1.07

Note. \*\*\*  $p < .001$



the Study 1 (0.60), that value for the other subscales was acceptable. Moreover, the follow-up study indicated that the internal consistency of the proactive relational scale was acceptable for men and women.

The need for modifications of the PCS could be related to differences in the ages of the participants in previous studies. Vagos et al. (2021) adapted the PCS for a group of young adults with mean age of 20.86. In these present studies, the mean age of the participants was 23.0 (Study 1) and 25.7 (Study 2). Thus, the age of the participants of both studies on the modified version of PCS seemed to be more representative for a whole period of young adulthood which ranged from 18 to 30 years. The developmental period of emerging or young adulthood is internally complex and dynamic (Konstam, 2015). Due to developmental changes that occur in this period (in identity, fluidity of relationships, etc.), older young adults could express less aggression in all forms compared to individuals close to minimal age of this period (Odgers, et al., 2008). For example, relational aggression in the context of students' groups (e.g., sororities) could be expressed more commonly compared to the workplace aggression, which is more common in the context of everyday functioning of individuals after academic education. Some functions of proactive aggression could no longer be used in older age (e.g. using proactive relational aggression to become popular in the group). However, it is also possible that overt and relational aggression have different forms in later age. Thus, some of the items of the PCS could be not applicable as representative of the ways in which young adults actually practice aggression. Further analysis should investigate measurement invariance between age subgroup in young adulthood, for example by comparing students pre and post-graduation. Identification of more representative forms of aggression for young adults and adding them to the modified PCS could be also considered as necessary in future research.

The modified PCS was, overall, invariant by gender. Following the validity testing proposed by Vagos et al. (2021), we showed gender differences in proactive aggression and differences in function of aggression. Study 1 provides limited support for the association between emotion regulation strategies and aggression. These associations require further research with a focus on strategies particularly regarding anger and impulse control (Maloney, Eckhardt, & Oesterle, 2023). Study 2 provided additional data on the validity of the modified PCS. The proactive subscales of the PCS correlated stronger with the Dark Triad, while reactive overt aggression correlated considerably higher with verbal aggression. However, both relational aggression subscales appeared to be similar in terms of convergent validity. The current study also supported the known-groups validity of the modified PCS, by demonstrating significantly higher

reports of aggression among detained women compared to non-detained women. Future studies should investigate more in-depth the validity of all four scales of the modified PCS.

### Limitations

There were some limitation of the present studies. First, Study 1 indicated that a large number of items of the original PCS could be less applicable for older individuals. Thus, future studies should investigate different behaviors which could be more representative for aggression in young adulthood. Second, the participants in both studies differ in terms of age. Thus, future studies should aim at recruit groups which are more representative of the whole age range of the developmental period of young adulthood. Moreover, the validity and independence of subscales of the modified PCS should be also examined further. Particularly, the differences between proactive and reactive relational aggression. Despite these limitations, the present studies provided an initial support for the Polish modified version of the PCS. The brevity of the scale can enhance its usability in studies that treat aggression multidimensionally.

### Clinical Implications

The findings showed that the modified PCS was a reliable and valid measure that may also be helpful for clinical use. Previous studies indicated that emerging adults' reports on their proactive and reactive aggression was associated with personality traits or personality symptomatology (e.g., borderline disorder; Ostrov and Houston, 2008; Verona, et al., 2008), maladaptive anger regulation and interpersonal anxiety (Feiring, et al., 2022), rumination (Goldstein, 2011) and internalizing symptomatology (Wright & Benson, 2010). Thus, the modified PCS could be useful for detection of individuals at risk of emotion regulation difficulties (e.g., anger) and personality disorders, which might result and maintain aggressive behavior toward other people. Due to the confirmed validity in offenders, the modified PCS could be helpful as valid measure of aggression in forensic mental health assessment (Neal, et al., 2022).

The prevalence of relational aggression in emerging adulthood is worrisome (e.g. relational victimization was reported by 92% of the participants; Goldstein, et al., 2008) and may be expressed, later on, for example within romantic couples (e.g., relational victimization was reported by 97% of the participants; Carroll, et al., 2010). Relational aggression was also associated with a higher risk of overt aggression in adults (Wright & Benson, 2010). Given the high stability of aggression during the lifespan (Piquero, et al., 2012), the modified PCS could also help (a) in screening

for individuals at risk of increased aggressive responding, and (b) in prevention of the escalation from more subtle forms of aggression (e.g., relational) to more violent forms (such as physical violence; Wright and Benson, 2010). Improved screening might lead to tailor early interventions for those individuals. Thus, the modified PCS could be used i.e. in counselling centers and advising offices for students (Pedrelli et al, 2015).

**Supplementary Information** The online version contains supplementary material available at <https://doi.org/10.1007/s10862-023-10053-9>.

**CREDIT** Conceptualization: M.M., M.Ma.; Methodology: M.M., M.Ma., P.V.; Data collecting: M.M., M.R., M.B., M.L., K.S., W.K.; Formal analysis and investigation: M.M., M.B., M.Ma.; Writing - original draft preparation: M.M., L.M., M.Ma, P.V.; Writing - review and editing: M.M., M.Ma., P.V.

**Funding** This work was not supported by any funding.

**Data Availability** The data is available on-line: [https://osf.io/4mte3/?view\\_only=dd58bc91d6ba41cd9ecf264c573cbd4b](https://osf.io/4mte3/?view_only=dd58bc91d6ba41cd9ecf264c573cbd4b).

## Declarations

**Conflicts of Interest/Competing Interests** The authors declared no conflicts of interest with respect to the research, authorship, and/or publication of this article.

**Ethics Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee of University of Silesia in Katowice and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Consent to Participate** Consent was obtained from all participants included in the study.

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