



Similarities and differences in impulsive/premeditated and reactive/proactive bimodal classifications of aggression



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ABSTRACT

Despite broad consensus regarding the value of the impulsive/premeditated and reactive/proactive aggression classifications, confusion as a result of imprecise language and the exact nature of subtypes have threatened its utility for clinical and research purposes. In order to increase the usefulness of these subtypes in research, prevention, and treatment, the current review examines whether differences in these two subtype classifications are theoretical, semantic or empirical. Correlates of impulsive, premeditated, reactive, or proactive aggression measures were examined for consistency. Based on the different conceptual roots, we expected that each subtype pair would evidence only partial correspondence such that the classification systems may actually be capturing different constructs. The findings of a targeted and selective review suggest there is more correspondence between reactive and impulsive aggression than there is between proactive and premeditated aggression. An agenda for future research is outlined.

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Contents

1.	Introduction	252
1.1.	Definitions	252
1.2.	Historical development of bimodal aggression scales	253
2.	Measurement of bimodal classifications	253
2.1.	Differences in classifications: an empirical comparison	255
3.	Correlates and predictors	255
3.1.	Overlap between premeditated and proactive subtypes	256
3.2.	Psychopathy	256
3.3.	Impulsiveness	256
3.4.	Psychophysiology	256
3.5.	Non-overlap between premeditated and proactive subtypes	256
3.6.	Overlap between impulsive and reactive subtypes	256
3.7.	Social/interpersonal	256
3.8.	Attentional problems	256
3.9.	Emotions/affect	256
3.10.	Psychopathy	257
3.11.	Suicide	257
3.12.	Verbal processing	257
3.13.	Social information processing	257
4.	Non-overlap between premeditated and proactive subtypes	257
4.1.	Areas of mixed evidence within aggressive subtype—premeditated and proactive	257
4.1.1.	Social/interpersonal	257
4.1.2.	Emotions/affect	257

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4.1.3.	Extraversion	258
4.1.4.	Verbal processing	258
4.2.	Areas of mixed evidence within aggressive subtype—impulsive and reactive	258
4.2.1.	Delinquency	258
4.2.2.	Substance abuse	258
4.2.3.	Psychophysiological	258
5.	Areas examined only for impulsive/premeditated or reactive/proactive classification systems	258
5.1.	Delinquency	258
5.2.	Hyperactivity/attentional problems	259
5.3.	Substance abuse	259
5.4.	Suicide	259
5.5.	Neurochemical	259
6.	Discussion	259
6.1.	Limitations	259
6.2.	Recommendations for researchers	260
6.3.	Clinical and forensic implications	260
	References	260

1. Introduction

Violence and aggressive behavior result in substantial social, psychological, health, and economic consequences creating an impetus for understanding and treating aggressive individuals and preventing aggressive behavior (Gentile & Gellig, 2012; Patel & Taylor, 2012). Great variability exists in the cause and expression of aggressive acts, and multiple methods of defining aggression have been used to account for the variability. One method defines subtypes of aggression based on characteristics of the aggressive act and the aggressor's cognitive processes. Two subtypes have been identified among animals and humans (Weinshenker & Siegel, 2002): The first subtype denotes a spontaneous lack of control that occurs with little if any thought and has been called reactive, impulsive, affective, or hostile aggression. The second subtype denotes a planned violent response and has been referred to as proactive, premeditated, predatory, or instrumental aggression. Bimodal classification systems have been developed that utilize specific subtypes, the most studied of which are the impulsive/premeditated and reactive/proactive aggression classifications.

These aggression subtypes may have significant implications for applied forensic and clinical work. For example, forensic research reveals that premeditated offenders are at greatest risk for reoffending (Antonius et al., 2013; Cornell et al., 1996) and that the typology predicts different kinds of criminal reoffenses (Walters, Frederick, & Schlauch, 2007). Clinical research suggests that tailoring treatment to distinct subtypes of violent behavior may yield more efficacious violence prevention and intervention programs (Antonius et al., 2010; Volavka & Citrome, 2008). For example, impulsively violent offenders tend to respond better to antipsychotic medications (Swanson et al., 2008) and anger management training programs (Walters et al., 2007) than do premeditated offenders (Antonius et al., 2013). Premeditated offenders, on the other hand, may benefit more from cognitive restructuring (Walters et al., 2007). Despite the potential utility of tailoring violence interventions by function of violence, prevention and treatment programs instead tend to be tailored to the target (e.g., child maltreatment, intimate partner violence) and nature (e.g., psychological, physical, sexual) of violence. This tendency may be in part a result of questions about the utility, definition, and correspondence of different aggression classifications.

Bushman and Anderson (2001) raised questions about the validity and utility of aggressive subtypes, arguing that it is “time to pull the life-support plug” (p. 278) on the bimodal classification. However, most agree that the bimodal categories have different emotional, cognitive and behavioral antecedents and consequences (Berkowitz, 2008; Fontaine, 2006; Merk, de Castro, Koops, & Matthys, 2005) and

have implications for diagnosis, prevention, and intervention (Kempes, Matthys, de Vries, & van Engeland, 2005). Implicit in this dialogue was ambiguity about the correspondence of different conceptualizations of aggressive behavior. For example, Bushman and Anderson (2001) criticized the *hostile/instrumental* dichotomy and Berkowitz (2008) countered with a discussion of *impulsive* aggression. This non-specificity is common; research either broadly defines classifications (Ramírez & Andreu, 2006) such that the multiple bimodal systems are assumed equivalent. Most reviews of bimodal classifications of violence treat these terms as if they are interchangeable, assuming that impulsive violence (Stanford et al., 2003; Tweed & Dutton, 1998) is the same as reactive (Cornell et al., 1996), hostile (Bushman & Anderson, 2001), emotional (Gottman et al., 1995), angry (Buss, 1961), affective (Meloy, 2005), or expressive (Campbell, Muncer, McManus, & Woodhouse, 1999). Premeditated violence is treated as if it is equivalent to proactive (Crick & Dodge, 1996), instrumental (Antonius et al., 2013; Bushman & Anderson, 2001; Buss, 1961) or cold-blooded (Woodworth & Porter, 2002) violence. Most researchers choose one bimodal term, focus on only one classification system, and administer only one measure to classify aggressive acts. In fact, research on reactive/proactive and impulsive/premeditated aggressors, the two most studied bimodal classifications, is almost completely separate, and few studies examine both.

It is possible that some of the disagreement over the nature and utility of aggressive classifications results from slight differences in the definition of the two subtypes and variation in fundamental underlying construct characteristics. Imprecise language around exactly what subtype is being discussed and how that subtype is defined may threaten the clarity and utility of subtypes. In order to increase the usefulness of subtypes in prevention and treatment, using impulsive/premeditated and reactive/proactive aggression as examples, the current review examines whether differences in these two subtype classifications are theoretical, semantic or empirical. While measures may have been developed with the same overarching theory in mind, the measures may actually be capturing different constructs.

1.1. Definitions

Impulsive aggression has been defined as a reactive or emotionally charged aggressive response distinguished by a loss of behavioral control (Barratt, 1991; Stanford et al., 2003). However, research on impulsive aggression often captures the construct more broadly than Barratt's original definition. Impulsive aggression is thought to be an uncontrolled, emotionally charged aggressive act that results from minimal provocation (Lake & Stanford, 2011). Impulsive aggression, like impulsiveness, is thought to have a genetic component, specifically the genes

that regulate serotonin, as impulsivity and impulsive aggression are inversely related to serotonin levels (Meltzer & Arora, 1988). Similarly, reactive aggression has been defined as a defensive response to a perceived threat, fear, or provocation, and evidenced by a hostile attributional bias (Brown, Atkins, Osborne, & Milnamow, 1996; Dodge & Coie, 1987). Reactive aggression's evolutionary basis is thought to be one of self-protection (Meloy, 2005).

On the other hand, premeditated aggression has been defined as a “planned or conscious aggressive act, not spontaneous or related to an agitated state” (Stanford et al., 2003, p. 183). It is not preceded by autonomic arousal and is characterized by the absence of emotion and threat (Meloy, 2005). Proactive aggression refers to aggression which contains both hostile and goal-directed components (Dodge & Coie, 1987). Proactive aggression is manipulative, callous and is often “instrumental”, in that used in pursuit of attaining a goal (Antonius et al., 2013). Its evolutionary basis is thought to be hunting for food (Meloy, 2005).

On the basis of these original definitions, impulsive and reactive on the one hand, and premeditated and proactive aggression on the other, one may suggest that any differences are just ‘splitting hairs.’ However, inspection of the wording of items in the respective scales tapping into these constructs, reveal slight differences in definition which suggest they may be capturing different aspects of the aggressive act. Impulsive/premeditated aggression emphasizes what happens in the moment of the aggressive act or the “aggressive state”, whereas reactive/proactive aggression also includes characteristics or “aggressive traits” of the individual, such as hostile attributional biases. Based on these issues of face validity, a more thorough evaluation of the historical development of the constructs as well as differential or overlapping correlates is warranted.

1.2. Historical development of bimodal aggression scales

Understanding components and types of aggression has been a longstanding endeavor of psychological research. Considering the function of aggression, some theorists focused on the factors “pushing” the individual to retaliate when provoked (Berkowitz, 1963), while others focused on aggression, coercion, dominance, and bullying that is “pulled” by the expectation of positive outcomes (Bandura, 1973; Olweus, 1978). Dodge and Coie (1987) tried to reconcile these two functions of aggression, incorporating social/personality (Buss, 1966; Feshbach, 1964, 1970) and ethology research (Moyer, 1976; Scott, 1972). Dodge and Coie (1987) developed teacher-rating instruments to distinguish between reactive (push) vs. proactive (pull) aggression of children in the classroom. More recently, peer ratings (Hubbard, Dodge, Cillessen, Coie, & Schwartz, 2001; Marsee & Frick, 2007) and self-report instruments (Raine et al., 2006) have spawned new research on children's proactive and reactive aggression beyond the confines of the classroom.

Simultaneously, research on impulsive vs. premeditated aggression focused on adults in institutional settings. Citing the work of Buss (1961) and Berkowitz (1988), early attempts to delineate impulsive vs. premeditated aggression were applied to prisoners (Heilbrun, Heilbrun, & Heilbrun, 1978; Linnoila et al., 1983). While early research informally coded impulsive and non-impulsive crimes based on criminal records (Heilbrun et al., 1978; Linnoila et al., 1983), more formal assessment of impulsive/premeditated aggression constructs began with Barratt, Kent, Bryant, & Felthous (1991), Barratt, Stanford, Felthous, et al. (1997). Barratt, an impulsiveness researcher, became interested in impulsive aggression as an extension of his personality research with adults. Citing Buss and Plomin (1975) and other personality theorists (Cone, 1978; Eichelman & Hartwig, 1990), Barratt originally delineated three types of aggression: impulsive, premeditated and medically related aggression. Later, medically related aggression, aggression caused by head injuries, for example, was seen as a confound to be controlled for in studies of impulsive vs. premeditated aggression (Barratt, Stanford,

Dowdy, Liebman, & Kent, 1999). In developing the first self-report measure of impulsive/premeditated aggression—the Aggressive Acts Questionnaire—Barratt et al. (1999) mentioned that Dodge and Coie (1987) had “verified the independence of two similar types of aggression” among non-clinical samples of children (p. 165).

From the beginning, Barratt's research was clinical and applied in nature, setting out to understand and differentiate aggression in forensic settings and psychiatric wards (Barratt, 1991). Legally, it is important to understand an aggressor's *mens rea*, or mental state at the time of the crime, to establish guilt. It was probably no coincidence that Barratt used a legal term, premeditated, and that his conceptualization addressed state rather than trait aggression, or mental state during the aggressive act. It was also no coincidence that Barratt used the term impulsive aggression, as impulsive aggression is a direct extension of his personality research and is the primary interest among psychiatrists and researchers working on inpatient wards. Many psychiatrists and researchers today still focus primarily on impulsive aggression to the exclusion of its premeditated counterpart (e.g., Coccaro & Kavoussi, 1997), although both impulsive and premeditated aggression have been documented in psychiatric wards (Barratt et al., 1999; Frijda, 2010; Nolan et al., 2003). With the advent of an empirically-sound questionnaire, the Impulsive/Premeditated Aggression Scales (IPAS; Stanford et al., 2003) to classify aggressive acts, research on impulsive and premeditated aggression has extended beyond institutional settings, to adults in outpatient, community, and college settings.

Considering some shared early references on which both typologies were based, one may argue that there are only semantic differences between the impulsive/premeditated and the proactive/reactive distinctions. However, Barratt's impulsive/premeditated typology was founded on personality theory whereas Dodge and Coie's proactive/reactive distinction appears to have more firmly rooted in the psychology of aggression. Moreover, Barratt's impulsive/premeditated appears to be more applied in nature, designed from the beginning to find ways to decrease aggression in prisons and hospitals. Regardless of historical underpinnings, both typologies have generated different lines of research on different samples in different settings and have generated different sets of measurement tools. While generated from some shared ideas, these two lines of research may have evolved over time such that, in practice, they assess subtly different forms of aggressive behavior.

2. Measurement of bimodal classifications

The commonly used instruments to measure each subtype reflect the original definitions of the subtypes as well as the age groups with which they primarily have been examined—impulsive/premeditated with adults and reactive/proactive with children and adolescents. Because the expression of aggressive behavior (McKay & Halperin, 2001) and the valid measurement of aggression (Little, Brauner, Jones, Nock, & Hawley, 2003) changes across the lifespan, different methods (e.g., self-reports, interviews, observations) have been used to measure aggression with each age and classification system.

Assessment of impulsive vs. premeditated aggression began with single item ratings based on police records of criminal assaults (Heilbrun et al., 1978). More comprehensive file audit ratings were later developed to classify institutionalized persons' aggression as either impulsive or premeditated aggression (Felthous et al., 2009; Frijda, 2010; Nolan et al., 2003). Some scales, typically applied to psychiatric patients, capture impulsive aggression only, for example the six-item Impulsive Aggression Scale (Edwards, Scott, Yarvis, Paizis, & Panizzon, 2003). Barratt and colleagues also developed semi-structured interviews with individuals to typify aggressive acts as premeditated or impulsive (Barratt, Stanford, Felthous, et al., 1997; Barratt, Stanford, Kent, et al., 1997). More recently, impulsive and premeditated aggressive subtypes are being assessed using self-report instruments. The original Aggressive Acts Questionnaire (Barratt et al., 1999) has been supplanted by the most commonly used self-report tool, the Impulsive Premeditated Aggression

Table 1

Instrument	Source article	Cronbach's alpha	# Items	Comments
Impulsive/premeditated				
Impulsive Aggression Scale	Edwards et al. (2003)		6	Impulsive aggression only Based on semi-structured interviews (Barratt, Stanford, Felthous, et al., 1997; Barratt, Stanford, Kent, et al., 1997) to classify aggressive acts as impulsive or premeditated.
Aggressive Acts Questionnaire (AAQ)	Barratt et al. (1999)	Factor 1 Impulsive 0.75; Factor 3 Premeditated 0.48;	22	
Aggressive Acts Records Review	Stanford and Barrett (2001)	N/A	17	Yes/no items 2 Methods of scoring
Impulsive/Premeditated Aggression Scales (IPAS)	Stanford et al. (2003)	Impulsive 0.77 Premeditated 0.82	30	
Aggressive Acts Interview	Barratt, Stanford, Felthous, et al. (1997); Barratt, Stanford, Kent, et al. (1997)	N/A	11	Semi-structured interview not restricted to 11 prompting questions
Impulsivity Rating Scale	Heilbrun et al. (1978)	N/A	1	Interrater agreement $r = .94$ Aggressive incidents coded as predatory or impulsive
Incident Report Coding	Frijda (2010); Nolan et al. (2003)	No alphas reported		
Reactive/Proactive				
Reactive–Proactive Questionnaire (RPQ)	Raine et al. (2006)	Reactive—.84 Proactive—.86	23	
Teacher Rating Instrument	Dodge and Coie (1987)	Reactive—.90 Proactive—.91	12	
Peer Rating Instrument	Hubbard et al. (2001)	0.73	6	Four 10 item subscales
Peer Conflict Scale	Marsee and Frick (2007)	Overt—.90 REA-O—.87 PRO-O—.82 Relational—.87 REA-R—.80 PRO-R—.76.	40	
Behavioral Observations	Price and Dodge (1989)	Kappa reactive aggression—.84 Kappa instrumental aggression—.96	6 aggression variables 5 play activity variables	
Revised Teacher Rating Scale for Reactive and Proactive Aggression	Brown et al. (1996)	PRO—.94 REA—.92	28	
Coding Scheme for Partner Violent Men	Chase et al. (2001)	N/A	3	Coding of semistructured interview
Psychological Inventory of Criminal Thinking Styles (PICTS) Proactive and Reactive Composite Scales	Walters (2006); Walters et al. (2007)	Proactive—.80–.83 Reactive—.89–.91	80	3 Weighted and summed subscales comprise each subtype

Scale (IPAS; Stanford et al., 2003). Although it is a relatively new scale, the IPAS has been widely used (cited in over 130 citations according to a recent Web of Science search) and has breathed new life into research on impulsive vs. premeditated aggression.

Simultaneously, the measurement of reactive and proactive aggression has evolved, beginning with observational measurement of children administered by teachers, parents or peers (e.g., Dodge & Coie, 1987; Hubbard et al., 2001) to self-report measures. Two frequently used self-report questionnaires are the Reactive Proactive Questionnaire (RPQ; Raine et al., 2006) and the Peer Conflict Scale (PCS; Marsee & Frick, 2007). The most frequently used instruments of both bimodal classifications and their psychometric qualities are presented in Table 1.

The two self-report instruments used most frequently for each subtype (IPAS and RPQ) differ in their instructions, item content and scoring, which may have an influence in how the subtypes are captured. Differences in instructions could affect severity of aggression being reported. For example, the IPAS uses a screening question, so that only individuals who have perpetrated physical or verbal aggression (striking, verbally insulting another person, or breaking or throwing objects out of anger or frustration) in the past 6 months complete the scale. On the other hand, the RPQ is completed by all participants whether they have been recently aggressive or not. High scores are based on frequency of acting out in anger. Items on the IPAS reflect mood at the time of the aggressive act (e.g., “I was confused during the acts:” “I was in a bad mood the day of the incident”) whereas no consideration of mood other than anger is reflected in the RPQ items. Similarly, the IPAS asks the participant to reflect back and judge oneself, e.g., “My behavior was too extreme for the level of provocation” and “I feel I acted out aggressively more than the average person did over the last six months” whereas the RPQ is more behaviorally-specific and less mentalistic. Premeditated aggression as measured by the IPAS includes items assessing planning and revenge where proactive aggression does not. Proactive aggression as measured by the RPQ includes items about the use of violence to “win a game” or “to be cool”—items related to social connectedness that are not reflected in the premeditated aggression scales.

An often ignored problem is the high correlation between the two types of aggression. For example, correlations between PRO and RA range from .60 to .80 (Dodge & Coie, 1987; Miller & Lynam, 2006; Polman, Orobio de Castro, Koops, van Boxtel, & Merk, 2007) and between PM and IA range from -0.02 to 0.51 and researchers may correct for this overlap in different ways. For example, the RPQ scale developers recommend creating standardized residuals of each subscale; the IPAS authors suggest using raw factor subscales (Stanford, unpublished manual). Miller and Lynam (2006) suggest that, even though residualized RA and PRO scores were more strongly correlated to the variables of interest than were raw scores, residualizing is problematic, as “partialled variables are abstractions, existing only in the statistical ether” (Miller & Lynam, 2006, p. 1472). Differences in how researchers handle construct overlap, i.e. raw vs. standardized residual, may affect the associations between aggressive subtypes and their predictors or correlates across studies.

2.1. Differences in classifications: an empirical comparison

Although similarities exist between reactive/proactive and impulsive/premeditated subtypes, it becomes clear they have slightly different definitions, capture different aspects of the aggressive act, have been examined in different developmental phases, and are measured by different instruments. In light of these differences, our past work used a quantitative approach to examine correspondence of the subtypes (Teten Tharp et al., 2011). A sample of young adults completed the Impulsive Premeditated Aggression Scale (IPAS), the Reactive Proactive Questionnaire (RPQ), and other aggression instruments to establish convergent and discriminant validity of the subtypes. Only 38% of participants were classified similarly on the IPAS and RPQ (e.g., reactive

classified as impulsive; proactive classified as premeditated). When cluster analyses were used to detect naturally occurring groups in the data, not two but six categories were identified. The groups suggested the subtypes complemented but did not correspond to each other. Similar results were also found in a comparison of the IPAS and RPQ in a Dutch sample (Kuyck, de Beurs, Barendregt, & van den Brink, 2014). To further explore the correspondence of impulsive/premeditated and reactive/proactive classifications, in the current paper we broadly reviewed existing empirical research to identify areas in which the correlates and predictors of reactive and impulsive or proactive and premeditated subtypes overlap and do not overlap.

The correspondence or non-correspondence of aggressive classifications has implications for the etiology, prevention, and treatment of aggressive behavior. Non-correspondence would suggest that unique etiologies exist for impulsive and reactive aggression, for example. Different etiologies may require different prevention strategies, and treatments effective for impulsive aggression may be less effective or ineffective for reactive aggression. Correspondence would allow for findings from one classification to be generalized to other classifications. By establishing parallels between reactive and impulsive aggression, developmental trajectories and the salient risk and protective factors across time could be examined. Partial correspondence would suggest that new models of aggression may be needed that can account for the shared and unique characteristics of the classification systems. Based on our quantitative research, we expected that our review would identify partial correspondence and provide information about construct differences based on the pattern of correspondence and non-correspondence.

3. Correlates and predictors

The aim of the current review was to determine whether the same constructs are implied in both classification approaches by investigating concurrent and divergent validity of the constructs. We examined correlates and predictors of subtypes across studies to investigate whether there is correspondence, partial correspondence or non-correspondence between the classification systems. As mentioned above, we expected partial correspondence, such that the nature or domain of the correlates that have been examined for each subtypes will vary and will reflect the theoretical underpinnings of each system, the disciplines that utilize each system will vary and the developmental phase in which system has been predominantly examined will vary. Based on our quantitative work, we expected each subtype pair would evidence some correspondence and some non-correspondence, such that the classification systems will complement rather than correspond to each other. Given the moderate correlation found between aggressive classifications, which could suggest some shared method variance or some true variance, some correlates will be common to impulsive-reactive and premeditated-proactive constructs.

Therefore, we searched for articles that examined correlates or predictors of impulsive, premeditated, reactive, or proactive aggression. Although the terms have been used in ways that do not conform to the original definitions, we were concerned with examining potential construct similarities and differences of the bimodal classifications, so in the current review we restricted our search to studies that used Barratt's (1991) conceptualization of impulsive/premeditated and Dodge's (Dodge & Coie, 1987) definition of reactive/proactive aggression. We conducted searches of these keywords in indexes, reviewed abstracts, selected those that used our definitions and examined correlates or predictors of the subtypes. Our goal in the literature review compile representative research that has been conducted in the area, including correlates of proactive/reactive and impulsive/premeditated aggression that have been examined in more than one study. Based on these searches we identified several key areas of overlap and non-overlap, in addition to some domains for which one classification has been studied and the other has not.

3.1. *Overlap between premeditated and proactive subtypes*

Several areas of overlap between Premeditated (PM) and Proactive (PRO) aggression across several correlates were identified. These areas include psychopathy, impulsivity, and psychophysiology. Each area is reviewed in the sections below.

3.2. *Psychopathy*

Theoretically, psychopathic individuals should be able to use proactive and premeditated aggression without much emotional arousal or remorse (Cornell et al., 1996). Empirically, both PM and PRO have been previously linked to psychopathic traits. PRO aggression has been associated with mothers' ratings of psychopathic personality (Lynam, 1997; Raine et al., 2006) and with higher levels of narcissism in children and adolescents (Seah & Ang, 2008). Partner violent men coded as PRO were significantly more likely to meet criteria for psychopathy and antisocial personality based on MCMI-II (Millon, 1987) cutoff scores (Chase, O'Leary, & Heyman, 2001). Similarly, partner violent men diagnosed with antisocial personality disorder were more likely to use violence against their partners proactively as compared to partner violent men who were not (Ross & Babcock, 2009). Additionally, PRO has been associated with the callous/unemotional traits and antisocial personality problems in early adulthood (Fite, Raine, Stouthamer-Loeber, Loeber, & Paridni, 2010). In adults, PM aggression has also been linked to psychopathy, however usually when the construct was operationalized in terms of the Psychopathy Checklist—Revised (PCL-R). PM has been correlated with interpersonal affective traits of psychopathy on the PCL-R studies (as cited in Kockler, Stanford, Nelson, Meloy, & Sanford, 2006) but sometimes only weakly (McDermott, Quanbeck, Busse, Yastro, & Scott, 2008). However, there appears to be a gender difference in how psychopathy relates to proactive aggression. Psychopathic traits as measured by the Psychopathic Personality Inventory (PPI; Lilienfeld & Andrews, 1996) did differ between premeditated or impulsive domestically violent men (Stanford, Houston, & Baldrige, 2008) but not women (Lake & Stanford, 2011). Similarly, manipulative and egocentric features of psychopathy were related to proactive physical aggression among men but to reactive, indirect aggression among women in an experimental task (Bobadilla, Wampler, & Taylor, 2012).

3.3. *Impulsiveness*

Impulsiveness, as measured by the Barratt Impulsiveness Scale (BIS 11; Patton, Stanford, & Barratt, 1995), is another area of overlap between PRO and PM aggression. PRO aggression was significantly associated with impulsivity in young adults (Bailey & Ostrov, 2008) and children (Connor et al., 2004), while PM aggression was correlated with impulsiveness across several adolescent and adult studies (Dougherty et al., 2007; Mathias et al., 2007; McDermott et al., 2008; Stanford et al., 2003).

3.4. *Psychophysiology*

PM and PRO aggression also demonstrated overlap in terms of physiological responses. PRO aggression has been significantly associated with decreased heart rate in children and adolescents (Kempes et al., 2005) while previous literature linked PM aggression and somatic complaints in adolescents (Mathias et al., 2007), decreased physiological arousal in adults (Kockler et al., 2006) and increased total cholesterol in men (Conklin & Stanford, 2008). Cardiovascular reactivity was differentially related to proactive and reactive partner violence among women: blunted cardiac reactivity was associated with proactive aggression and exaggerated cardiac reactivity was associated with reactive aggression, but only for those women who reported a history of sexual abuse (Murray-Close & Rellini, 2012). One study concluded that low SCR in

response to conditioned punishment was the most important predictor of proactive aggression, (Bobadilla et al., 2012), at least among men.

3.5. *Non-overlap between premeditated and proactive subtypes*

For all variables we examined either mixed results within a classification or gaps in the literature do not allow for comparison. For example, PRO is related to expectations of more positive emotional and material outcomes resulting from aggression among teens (Arsenio, Adams, & Gold, 2009). There appears to be no research to date expected outcomes as it relates to PM aggression.

3.6. *Overlap between impulsive and reactive subtypes*

Several areas of overlap between the impulsive aggression (IA) and reactive aggression (REA) subtypes were identified, including social/interpersonal, attentional problems, emotions/affect, psychopathy, suicide, verbal processing, and social information processing. Each area of overlap is reviewed below.

3.7. *Social/interpersonal*

Both categorizations of aggression are characterized by poor social adjustment. In children and adolescents, REA aggression was found to be related to social maladjustment and low self-perceived social competence (Polman et al., 2007; Seah & Ang, 2008), feelings of social anxiety and a lack of close friends (Raine et al., 2006), peer victimization and poor prosocial behavior (Card & Little, 2006; McAuliffe, Hubbard, Rubin, Morrow, & Dearing, 2006; Vitaro, Barker, Boivin, Brendgen, & Tremblay, 2006), and rejection by peers (Kempes et al., 2005; Vitiello & Stoff, 1997). IA aggression was also linked to poor social outcomes in adolescents and adults (Helfritz & Stanford, 2006; Mathias et al., 2007). Reactively aggressive children have been found to be more at risk for committing relationship violence as teens (Brendgen, Vitaro, Tremblay, & Lavoie, 2001).

3.8. *Attentional problems*

IA and REA aggression were both also associated with attention problems. REA was associated with poor attention (Card & Little, 2006; Dodge & Coie, 1987) and more ADHD symptoms in children (Scarpa, Tanaka, & Chiara Haden, 2008; Schippell, Vasey, Cravens-Brown, & Bretveld, 2003). Also in children and adolescents, IA was associated with ADHD (Jensen et al., 2007), with attentional problems (Mathias et al., 2007) and with time estimation problems (Dougherty et al., 2007). Even with medication, nearly half of children diagnosed with ADHD continue to manifest IA (MTA Cooperative Group, 1999). In addition, Connor, Steingard, Anderson, and Melloni (2003) suggest an especially strong link between REA and ADHD and conduct disorder among males.

3.9. *Emotions/affect*

Both REA and IA have been associated with poor emotional outcomes across several studies. REA has been linked to emotional dysregulation in children and adolescents (Card & Little, 2006; Marsee & Frick, 2007; Vitaro, Brendgen, & Tremblay, 2002; Vitiello & Stoff, 1997), and in adults (Conner, Tanaka, & Haden, 2008). Additionally, REA was associated with negative emotionality, including depressive symptoms in children (McAuliffe et al., 2006) and anxiety in adulthood (Fite et al., 2010) and in children and adolescents (Marsee, Weems, & Taylor, 2008). REA is associated with both internalizing and externalizing disorders among children (White, Jarrett, & Ollendick, 2012). REA has also been linked to anger in response to perceived provocation in children and adolescents (Marsee & Frick, 2007; McAuliffe et al., 2006; Xu, Farver, & Zhang, 2009). REA in children is also linked to rejection sensitivity (Jacobs & Harper, 2012). In observations of adult couples' interactions, partner violent

men coded as being REA displayed more anger as compared to those coded as PRO (Chase et al., 2001). Generally speaking, REA was related to neuroticism (anxiety, anger, depression, self-consciousness, vulnerability, impulsivity) in adults (Miller & Lynam, 2006). IA was associated with poor emotion regulation in similar ways. IA has been linked to expression of anger in adults (Helfritz & Stanford, 2006; Stanford et al., 2003; Villemarette-Pittman, Stanford, & Greve, 2003), to bipolar disorder and depression in children and adolescents (Jensen et al., 2007; Mathias et al., 2007) and adults (Seo, Patrick, & Kennealy, 2008), as well as a marked inability to regulate affect in adults (Seo et al., 2008). Deficits in self-regulation and metacognitive skills may be the mechanisms through which such adjustment problems come about (White et al., 2012).

3.10. Psychopathy

IA has been associated with psychopathy and antisocial personalities in several studies (Helfritz & Stanford, 2006; McGirr, Paris, Lesage, Renaud, & Turecki, 2007; Swogger, Walsh, Houston, Cashman-Brown, & Conner, 2010). First, among adult criminal offenders, IA was associated with the impulsive-antisocial traits of psychopathy, however this relationship only held true for individuals with moderate to high levels of generalized anxiety (Swogger et al., 2010). Similarly, one study that found a relationship with REA aggression where adolescents who scored higher in psychopathy also exhibited higher frequencies of REA aggression than adolescents with lower levels of psychopathy (Stafford & Cornell, 2003).

3.11. Suicide

Associations between aggression and suicide are similar for IA and REA classifications. REA aggression during late adolescence has been associated with completed suicide by the age of 36 (Angst & Clayton, 1998; Fite, Stoppelbein, Greening, & Gaertner, 2009) and with both suicide attempts and suicidal ideations in adults (Conner et al., 2008). Similarly, IA aggression has predicted a greater number of suicide attempts (Soloff, Lynch, Kelly, Malone, & Mann, 2000), has been associated with suicide occurring among younger individuals (McGirr et al., 2007), and has predicted more violent methods of suicide when higher lifetime IA aggressive behaviors are present (Dumais et al., 2005). Finally, the familial transmission of suicidal behavior was found to be more likely if offspring demonstrated increased levels of IA (Brent et al., 2002).

3.12. Verbal processing

The interplay between verbal processing and REA have not been examined in many studies. However, REA aggression was uniquely related to lower verbal abilities in one investigation (Arsenio et al., 2009). IA has also been linked to poor verbal outcomes including general verbal impairment in adolescents and adults (Kockler et al., 2006; Stanford, Greve, & Gerstle, 1997), lower WASI verbal scores in adolescents (Dougherty et al., 2007), and alexithymia in veterans (Teten, Miller, Bailey, Dunn, & Kent, 2008).

3.13. Social information processing

Aggression in social situations involves situational cues that trigger attributions and scripts for how to react (Huesmann & Reynolds, 2001). REA and IA have been linked to attributional biases, although much more work has been conducted in this area for REA than for IA. Crick and Dodge (1996) demonstrated that children high in REA attributed hostile intent to peers' ambiguous social actions more frequently than their non-aggressive peers. Other studies and reviews confirm the link between REA and hostile attribution biases in children (Connor et al., 2003; Hubbard et al., 2001; Muñoz, Frick, Kimonis, & Aucoin, 2008; Schippell et al., 2003) and emerging adults (Bailey & Ostrov, 2008).

Along these lines, as reviewed above, both REA and IA are also linked to attentional problems or deficits; Giancola, Martin, Tarter, Pelham, and Moss (1996) suggest that impaired attentional skills may be one deficit that underlies hostile attribution biases. Reactive aggression is related to expected ease in enacting aggression, lower verbal abilities, and hostile attributional biases, may be mediated by teens' attention problems (Arsenio et al., 2009). For IA, direct evidence linking IA to hostile attribution bias was not found. However, hostile attribution biases were more predictive of aggressive behavior for adolescents high in IA (Fite, Goodnight, Bates, Dodge, & Pettit, 2008). Similar to Giancola et al. (1996), researchers have suggested that executive dysfunction (Villemarette-Pittman et al., 2003) and an inability to process unique social cues (Fite et al., 2008) may lead to hostile attributional biases in individuals high in IA.

4. Non-overlap between premeditated and proactive subtypes

Despite some overlap, non-overlap emerged in the area of substance abuse and is reviewed below.

4.1. Areas of mixed evidence within aggressive subtype—premeditated and proactive

4.1.1. Social/interpersonal

Social/interpersonal outcomes are another area in which mixed effects occurred for premeditated (PM) and proactive (PRO) aggression. In children and adolescents, PRO has been associated with having high self-perceived social competence (Polman et al., 2007), being viewed less negatively by peers, at least at younger ages (Kempes et al., 2005; Polman et al., 2007; Vitiello & Stoff, 1997), and possessing leadership skills and humor (Dodge & Coie, 1987; Kempes et al., 2005; Xu et al., 2009). Researchers found no relations between PRO and prosocial behavior (Card & Little, 2006), social skills (McAuliffe et al., 2006) or peer rejection (Xu et al., 2009). PRO is negatively related to social problems (Fite et al., 2009). However, some studies do find PRO with poor social outcomes. PRO at age seven was characterized by poor peer relationships (Raine et al., 2006), was associated with antisocial behavior and peer rejection (Vitiello & Stoff, 1997) in adolescence (Fite & Colder, 2007). Moreover, PRO children are less likely to endorse relationship-enhancing goals during social interactions, choosing instead instrumental and self-serving goals (Crick & Dodge, 1996). However, the bulk of the findings suggest no or positive relations between PRO and social functioning. On the other hand, PM aggression is consistently associated with negative social outcomes, specifically with social consequences and anti-social behavior in adults and adolescents (Gauthier, Furr, Mathias, Marsh-Richard, & Dougherty, 2009; Kockler et al., 2006; Stanford et al., 2003).

4.1.2. Emotions/affect

There have been mixed findings for PM and PRO in terms of their relationships with emotional states and traits. In children and adolescents, PRO aggression has been significantly associated with blunted affect (Raine et al., 2006), depressive symptoms (McAuliffe et al., 2006; Scarpa et al., 2008), reduced emotional reactivity (Marsee & Frick, 2007), and low autonomic arousal and lack of emotional awareness (Conner, Swogger, & Houston, 2009). This dulled affect may prove to be protective in certain instances, as PRO was found to be significantly associated with adults' ability to control anger (Ramírez & Andreu, 2006) and children having fewer internalizing problems (Marsee & Frick, 2007). More often, however, this reduced emotional reactivity may be indicative of a lack of concern over the distress of others. One study demonstrated that PRO aggression was uniquely associated with callous-unemotional traits and positively biased outcome expectations for aggression in children and adolescents (Marsee & Frick, 2007). In observing couples interactions, partner violent men coded as being PRO displayed more dominance than REA violent men (Chase et al., 2001). However, at

least one study found no significant association between PRO and emotional dysregulation (Card & Little, 2006) and no relationship with anger expression (McAuliffe et al., 2006). However, at least one study found that children with internalizing disorders had higher ratings of PRO (Scarpa et al., 2008).

PM has been linked to a similar control of emotional states in some studies, including better control of anger (Ramírez & Andreu, 2006) and with cold, unemotional features of psychopathy in adults (Kockler et al., 2006; McDermott et al., 2008; Swogger et al., 2010). Conversely, other studies have linked PM with anger and verbal aggression in adults and adolescents (Mathias et al., 2007; Stanford et al., 2003). While impulsive and reactive aggression are consistently correlated with depression, there appears to be no consistent pattern with PRO and PM as it relates to emotionality.

4.1.3. Extraversion

Extraversion is another area with mixed results as it correlates to PM and PRO. Although PRO has not been linked to extraversion directly, significant interactions were found between psychoticism and extraversion in the prediction of PRO, such that extraversion may play a protective role when high levels of psychoticism are present in children (Schippell et al., 2003). On the other hand, PM has mixed relationships with extraversion, including both positive associations (Gauthier et al., 2009; Stanford et al., 2003) and inverse associations (Mathias et al., 2007) in adults and adolescents.

4.1.4. Verbal processing

In terms of verbal processing, PRO has been uniquely related to higher verbal abilities (Arsenio et al., 2009), but also to lower verbal IQ (Connor et al., 2003), while PM aggression has been linked to lower WASI verbal scores among adolescents with conduct disorder compared to controls (Dougherty et al., 2007).

4.2. Areas of mixed evidence within aggressive subtype—impulsive and reactive

4.2.1. Delinquency

Evidence appears mixed when comparing relationships to delinquency among REA and IA. To our knowledge, only one study demonstrated a direct relationship between REA aggression and delinquency, where REA was associated with increases in peer delinquency (Fite & Colder, 2007). A larger literature, however, found either non-significant or indirect relationships between REA aggression and delinquency. For example, Fite et al. (2008) found no association between REA aggression and overall levels of delinquency from 5th to 9th grade. Similarly, a review by Kempes et al. (2005) suggests that REA is not related to delinquency in children and adolescents. Other studies suggest indirect relationships between REA and delinquency. REA was associated with high levels of peer rejection, which in turn, were associated with peer delinquency (Fite & Colder, 2007). Similarly, juvenile delinquents demonstrated higher levels of REA aggression than higher educated peers but not lower educated peers (Nas, de Castro, & Koops, 2005). Here, it seems that mediating or moderating factors, such as peer rejection or level of education must be present for the association between REA aggression and delinquency to emerge. On the other hand, IA aggression was directly associated with delinquency where higher levels of IA were related to a younger age at first arrest and engaging in criminal activities (as cited in Villemarette-Pittman et al., 2003).

4.2.2. Substance abuse

Substance abuse is another area of mixed evidence for comparison of IA and REA. For IA, substance abuse or risk for substance abuse was found to co-occur with IA among two clinical populations. Men who reported sexual aggression were more likely both to report IA and have a substance abuse diagnosis (Teten, Schumacher, Bailey, & Kent, 2009). Another study found that patients with a dual diagnosis of

conduct disorder and bipolar disorder both presented higher levels of IA at baseline (compared to individuals with conduct disorder alone), and that those with dual diagnosis were at the highest risk for substance abuse (Masi et al., 2008). Additional studies speak to the neurochemical pathways linking IA aggression and substance abuse, suggesting that substance abuse associated with IA can be understood within the context of dopamine dysregulation resulting from serotonergic deficiency (Seo et al., 2008) and that densities of serotonin uptake sites may be reduced among cocaine abusers and related to impulsive-aggressive behavioral dimensions (Patkar et al., 2003). For REA aggression, no direct relations appear between REA and substance abuse (Miller & Lynam, 2006). However, one study did find REA to be directly associated with peer rejection and delinquency, which subsequently predicts substance use (Fite & Colder, 2007).

4.2.3. Psychophysiological

Both REA and IA have been linked to physiological and psychophysiological outcomes in general, but specific outcomes do not always overlap. REA has been associated with increased heart rate (Kempes et al., 2005) and somatic complaints (Mathias et al., 2007) in children and adolescents. IA aggression has been associated with various psychophysiological outcomes across several studies. These outcomes include, lower stress immunity (Helfritz & Stanford, 2006), lower levels of cerebrospinal fluid 5-hydroxyindolacetic acid, impaired prefrontal function, lower p3 ERP amplitude (Stanford et al., 2003) diminished p3 ERP amplitudes (Kockler et al., 2006), significant prefrontal hypometabolism in medial orbital frontal cortex bilaterally (Soloff et al., 2003), lower frontal delta and theta activity on EEG, different region pattern of beta activation (Houston & Stanford, 2005), higher shock tolerance, and attenuated hormonal response to an acute dose of paroxetine (Berman, McCloskey, Fanning, Schumacher, & Coccaro, 2009).

5. Areas examined only for impulsive/premeditated or reactive/proactive classification systems

5.1. Delinquency

In reviewing the literature, to our knowledge there were no studies that established relationships between PM and delinquency, presumably due to the fact that delinquency is examined in youth samples only, while PM is largely examined in adult samples. PRO, however, has been positively associated with delinquency in juveniles in several studies and reviews (Brendgen et al., 2001; Fite et al., 2008; Kempes et al., 2005; Nas et al., 2005; Polman et al., 2007; Pulkkinen, 1996; Raine et al., 2006; Scarpa et al., 2008; Vitaro, Barker, et al., 2006). In an overview of methodological innovations in the study of aggression, Vitaro, Brendgen, and Barker (2006) highlighted that proactively aggressive children have been found to be more at risk for both concurrent and later delinquent behaviors and conduct disorders in several previous studies (Connor et al., 2003; Pulkkinen, 1996; Vitaro, Barker, et al., 2006; Vitaro et al., 2002; Vitaro, Gendreau, Tremblay, & Oligny, 1998). Moreover, one study of incarcerated juvenile delinquents found that delinquents had higher levels of PRO than non-delinquent peers (Nas et al., 2005).

In the area of PRO and delinquency, longitudinal studies reveal interesting relationships. For example, PRO aggression at younger ages was a significant predictor of future delinquency, with PRO aggression at sixth and eighth grade predictive of delinquency in seventh- and ninth-grade (Fite et al., 2008). Similarly, PRO at age 16 was uniquely characterized by delinquency at age seven (Raine et al., 2006). PRO adolescent boys had more arrests as young adults, and PRO aggression was associated with conduct problems during adolescence for both genders (Pulkkinen, 1996). Finally, one longitudinal study found that the significant relationship between PRO at age 13 and delinquency-related violence at ages 16 and 17 depended on the degree of parental involvement in this developmental period: early adolescent PRO was predictive of later delinquency-related violence among boys with low

to moderate parental monitoring but not among those with high parental monitoring (Brendgen et al., 2001). While at least one study found no significant relation between PRO aggression and delinquency (Fite & Colder, 2007), the preponderance of evidence supports a positive relation between PRO and antisocial activity.

5.2. Hyperactivity/attentional problems

PM and PRO aggression also differ in terms of hyperactivity and attentional problems. PM aggression has been linked to greater levels of ADHD among adolescents with conduct disorder, when compared to controls (Dougherty et al., 2007). There has been mixed evidence, however, regarding the nature of the relationship between PRO aggression and hyperactivity. Some studies link PRO with more hyperactivity (Raine et al., 2006; Scarpa et al., 2008; Schippell et al., 2003) or disruptive behavioral disorders, including ADHD (Connor et al., 2004), while other studies find no relationship (Card & Little, 2006; McAuliffe et al., 2006; Polman et al., 2007). In terms of conduct disorder, PRO was found to be related to disruptive classroom behavior and conduct problems in two studies (Seah & Ang, 2008b; Xu et al., 2009). No relationships emerged between PM aggression and these factors; as with delinquency, hyperactivity and attentional problems are primarily examined in youth samples, while PM is largely examined in adult samples.

5.3. Substance abuse

PRO and substance abuse are positively related (Miller & Lynam, 2006); however, little research examines on the relations between substance abuse and PM aggression, creating another area where these two categorizations of aggression differ. A family history of substance abuse has been linked to PRO (Conner, Houston, Sworts, & Meldrum, 2007; Conner et al., 2009) and proactively aggressive children have been found to be more risk for later substance abuse (Connor et al., 2003; Vitaro, Barker, et al., 2006; Vitaro, Brendgen, et al., 2006). The relations between PRO and substance abuse may be complex; one study found that PRO is only weakly associated with initiation of alcohol use and indirectly associated with risk for initiation of marijuana and tobacco use through peer delinquency (Fite et al., 2008).

5.4. Suicide

Suicide is another domain where relationships exist with PRO but not PM aggression. PRO aggression was significantly associated with both suicide attempts and suicidal ideation in adults (Conner et al., 2009). However, sex moderated the relationship with suicide attempts, such that there was a positive association between these factors among men but not women. To our knowledge, no research examined PM and suicide.

5.5. Neurochemical

Because impulsive aggression is of particular interest in inpatient settings, there has been considerable attention paid to psychotropic drugs effect on IA. Associations have been found between neurochemical responses and IA, however, to our knowledge, there is no corresponding research examining neurochemical outcomes in REA research. Dopamine hyperfunction was found to contribute to a serotonergic deficit among individuals with IA in adults (Seo et al., 2008), and treatment of IA with anti-epileptic drugs was linked to blockade of sodium channels and/or GABA related mechanisms (Stanford, Anderson, Lake, & Baldrige, 2009).

6. Discussion

While the proactive/reactive typology is often used interchangeably with the impulsive/premeditated typology (e.g., Antonius et al., 2013),

this review suggests that the two bimodal classifications are conceptually and empirically distinct. A broad view of the empirical overlap and non-overlap of the subtypes reveals there is more correspondence between REA and IA than there is between PRO and PM. This suggests that while reactive and impulsive aggression may be parallel, it appears that PRO and PM are not. While there is partial correspondence between PRO and PM, there are apparent differences between these two subtypes, at least as they correlate to outcomes. This non-correspondence suggests that unique etiologies may exist for proactive and premeditated aggression.

The correspondence between impulsive and reactive aggression suggest that these two subtypes may be tapping into the same underlying construct. Although few studies assess both reactive and impulsive aggression, this review suggests that findings based on reactive aggression in childhood may be generalized to impulsive aggression in adults. Variables that are found to be risk factors for reactive aggression are likely also to be risk factors for impulsive aggression as well. Treatments that are effective in reducing reactive aggression are also likely to reduce impulsive aggression. However, while IA and REA have greater correspondence than PM and PRO in terms of correlates, their correspondence remains only partial. New models of aggression that can account for the shared and unique characteristics of impulsive and proactive aggression are in order.

Pragmatically, there are differences between the two classification systems that render them not synonymous. Impulsive/premeditated aggression generally assesses state aggression in adults whereas proactive/reactive aggression assesses trait aggression in children. While this is not explicitly stated by the authors, RPQ prefaces its questions by normalizing anger and then asking participants to rate the frequency of certain responses to anger, rendering an overall trait-like behavioral measure of general aggressive tendencies. The IPAS, on the other hand, asks participants to consider a specific time frame and then agree with a statement about the nature of an angry act, yielding a state-like measure of aggressive motivation. In the former, the tendency to act in a certain way is assessed, while in the latter, the nature of an angry act is assessed (Teten Tharp et al., 2011). While one could posit that reactively aggressive children become impulsively aggressive adults, no longitudinal studies have addressed the developmental trajectories of REA as it maps onto IA. This review highlights the need for future research that addresses developmental trajectories of the two concepts.

6.1. Limitations

Gaps in the literature may account for some of the discrepancies between PRO and PM. For example, no studies to date have examined change in proactive aggression in response to psychotropic drugs, whereas this was an early application of premeditated/impulsive aggression classification (Barratt et al., 1991). Another limitation is that, while there are a variety of measures of proactive/reactive aggression commonly used, the bulk of the research reviewed here on impulsive/premeditated aggression relied exclusively on the IPAS scale. The current review includes a broad survey of multiple correlations with the two bimodal classifications. While currently the body of research base lacks the depth to conduct statistical comparison across classification, researchers may consider conducting a formal meta-analysis of specific outcome measures surveyed here.

As the goal of the current review was to examine whether differences in subtype classifications are semantic or whether the research supporting each suggests the terms are actually capturing different constructs, our conclusions are somewhat limited by the confound of overall differences in age groups used to study IA/PM and REA/PRO classifications. The age of participants typically assessed with each subtype scale creates gaps in the literature overlap, making some comparisons impossible. For example, delinquency and conduct disorder are not measured in adults, so although proactive aggression is consistently linked to these negative outcomes, we can make no statement about PM. However,

with overall differences in age of participants assessed with each subtype, a developmental trajectory is suggested with regard to social problems for PRO children and PM adults. PRO children are often liked by their peers, but several processes/tendencies present in PRO children seem to set them up for social problems. However, PM in adults is consistently linked to negative social outcomes. This may suggest some developmental change in proactive and premeditated aggression or may simply reflect differences in the items. Premeditated aggression may not capture some of the dissocial leadership qualities associated with proactive aggression.

Other limitations are with the classifications themselves. While premeditated/impulsive or proactive/reactive aggression are often discussed as if they are distinct or even mutually exclusive, research reveals that there is significant overlap between the two types. For example, individuals with more general antisocial features tend to display a combination of instrumental and reactive aggression (Crowe & Blair, 2008). In community samples at least, it may be difficult to find a sample of purely proactive violent offenders, as most perpetrators who use proactive violence, use reactive violence as well (Chase et al., 2001; Kini, Banks, & Babcock, 2014). When applied to specific acts of violence, it is often difficult to label the act as either hot or cold, as much aggression appears to be “warm” (Bushman & Anderson, 2001, p. 275). Finally, although categories are easy to conceptualize, dimensional approaches may be better representations of reality.

6.2. Recommendations for researchers

Researchers attempting to classify the function of aggression should carefully choose which measure they use. If their model is concerned with aggressive *states*, as are many criminal justice questions, then measures assessing impulsive/premeditated aggression, such as the IPAS (Stanford et al., 2003) would be preferable. If the proposed model is concerned with aggressive *traits*, as are many developmental psychopathology models, then they should adopt a measure that assesses proactive/reactive aggression, such as the PRQ (Raine et al., 2006). Consideration for age-appropriateness of the items leads to recommendations that proactive/reactive measures are administered to children and impulsive/premeditated aggression scales are administered to adults. Care should be taken to modify and validate self-report measures of proactive vs. reactive aggression, such as the PRQ, to ensure that they are suitable for administration to adults. Similarly, premeditated/impulsive self-report measures such as the IPAS may not be valid to administer to children. Even better, future studies could include both scales in longitudinal design to see continuity and change over time, as well as correspondence with risk factors. While the nature of the associations between the two typologies is being clarified in subsequent research, researchers must take caution in generalizing results beyond a specific subtype (Teten Tharp et al., 2011). The impulsive/premeditated and reactive/proactive aggression subtypes, while they came from similar lines of thinking and have been used interchangeably, have diverged in application over time so that they are not interchangeable or equivalent. Because of subtle differences in definition, measurement, theory, and target age group, the subtypes complement, rather than correspond to, each other.

6.3. Clinical and forensic implications

Violence risk predictors often neglect to examine the differential predictive validity of the two subtypes of violence (Antonius et al., 2013). Some scholars suggest that doing so would lead to better risk assessment and intervention outcomes (Antonius et al., 2013; Cawood & Corcoran, 2009). Tailoring treatment to distinct subtypes of violent behavior may yield more efficacious violence prevention and intervention programs (Antonius et al., 2010; Volavka & Citrome, 2008). We encourage researchers, clinicians and forensic evaluators to attend to the developmental discontinuities, assessment assumptions (e.g. trait vs.

state measures), and labeling of the proactive/reactive or impulsive/premeditated aggression in their future work.

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