

Classifying and Defining Heterogeneity within Antisocial Behaviour

Saima Eman, University of Sheffield, UK
Roderick I. Nicolson, University of Sheffield, UK
Mark Blades, University of Sheffield, UK

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Abstract

Confusion over the appropriate classification of antisocial behaviour (ASB) has impeded both theoretical and applied approaches to its understanding and prevention. The current review starts by making the distinction between describing ASB (as required for legal purposes) and understanding ASB (as required for theoretical purposes). We start by developing a descriptive system for the behaviours of ASB in terms of five dimensions: Type (physically aggressive, verbally aggressive and non-aggressive); Intent; Impact (Mild to Severe); Affect (Hot vs Cold) and Mode (Personal interactive, Personal non-interactive, and Impersonal). This descriptive system then underpins our theoretical analysis, which highlights the importance of the Type, Affect and Mode dimensions in the understanding of the aetiology of ASB. This classification system is not sufficient to account for all the interactions between different dimensions during the development of the 'anti-social personality' but we hope that it will provide a fruitful framework for further research.

Keywords: antisocial behaviour (ASB), subtypes, classification, causes, intent, impact, affect, mode, developmental trajectories, correlates, consequences

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Introduction

Antisocial behaviour (ASB) is a term much used but little understood. Antisocial behaviours, from late night noise to internet trolls to graffiti to tax evasion are a potent cause of aggravation and disapprobation in society, to the extent that every society attempts to 'police' behaviour within acceptable limits and to punish behaviours outwith those limits. A literal interpretation indicates that ASB is behaviour (that is, observable actions) that in some way transgresses the 'rules' of society. Since the rules of society are mostly implicit, and vary with society, societal group and over time, it may be seen that precision will be elusive. Societies have attempted to classify ASB by drawing up a legal framework. For example, the UK 'Crime and Disorder Act' (1998) defines anti-social behaviour as acting in a manner that has "caused or was likely to cause harassment, alarm or distress to one or more persons not of the same household" as the perpetrator (Muncie, 1999). Individuals convicted of ASB were then subject to an antisocial behaviour order (ASBO), which was a civil order designed to criminalize minor incidents that would not previously have warranted prosecution. In addition to the statutory importance of ASB, there is also psychological significance, in that 'Antisocial Personality Disorder' is defined both in DSM-IV and DSM-V in terms of persistent antisocial behaviour.

Unfortunately, the forms and potential underlying causes of ASB are legion. Hence, in this article we attempt to introduce a more systematic classification, by means of common sense, search of the literature, and theoretical analysis. We take the view that it is important that psychological and statutory approaches to ASB show synergy, with the legal dimension providing the impetus for clear classification, and the psychological dimension providing the opportunity for greater insight and rigour with a view to optimizing the outcomes for differential treatment or intervention depending on the precise classification. We start by giving examples of ASB culled from the literature – both academic and non-academic.

ASB refers to physical, emotional, verbal, or non-verbal actions or attitudes that violate the age appropriate norms of the society, the rights of others. Examples cited include disobedience, domestic violence, theft, cheating, heavy smoking, fraud, murder, internet trolling, homicide, sexual offenses, litter, lying, and even thumb sucking (Burt, 2012; El Hatw, El Taher, El Hamidi, & Alturkait, 2015; Walters, 2015).

This review attempts to address and tackle two problems with respect to ASB. The first problem is the sheer variety of definitions of ASB in the literature with respect to context, intensity, type of interaction, personality traits, and personality disorders, age, age of onset, gender – and indeed the use of the same term with different meanings by different researchers (Patrick, 2010; Stephens, 2014). This problem is compounded by the differing motivations of ASB researchers, varying from the applied issue of classifying a specific example of ASB for legal purposes to the theoretical issue of attempting to characterise the personality types likely to lead to the 'ASB personality'. This review attempts to address these problems by focusing initially on the observable dimensions of ASB, then using the classification derived to address the underlying theoretical issues.

Method

Articles containing the term such as “antisocial behaviour”, “classifying antisocial behaviours”, “subtypes of antisocial behaviours”, “physically aggressive” and “non-aggressive behaviours”, “disruptive disorders”, “conduct disorder”, and “domestic violence” were searched online on Google scholar, Science Direct, and Sage Publications.

The developmental trajectories with respect to demographic variables and aetiological factors in relation to antisocial behaviours were examined by entering the terms “developmental trajectories”, “gender”, “IQ”, “age”, “age of onset”, “environmental”, “epigenetic”, “genetic”, and “neurological” along with “antisocial behaviour”.

As antisocial behaviour is a symptom of personality and developmental disorders (American Psychiatric Association, 2000; 2013; Lo, Waring, Pagoto, & Lemon, 2015), antisocial behaviour was also searched as part of personality disorders and developmental disorders. For example, the terms “oppositional defiance disorder”, “conduct disorders”, “obsessive compulsive disorder” and “attention deficit Hyperactivity disorder” were searched along with the term “antisocial behaviour”.

The consequences of antisocial behaviours were searched using the terms “physical injury”, “broken homes”, “mental trauma”, “property offenses”, “self-harm”, “suicide”, “violence”, “vandalism”, “drug abuse”, “theft”, “fire setting” and “animal cruelty”.

The Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) and a number of researchers classify conduct disorders into physically aggressive and non-aggressive behaviours (e.g. American-Psychiatric-Association, 2000; Maughan, Pickles, Rowe, Costello, & Angold, 2000; Rowe, Maughan, Worthman, Costello, & Angold, 2004). The term “physically aggressive” gives the impression of a physical interaction involving a living or a non-living thing and the term “non-aggressive” implies mild form of ASB, which might not be termed as aggression. Physically aggressive or aggressive behaviour means actual or threatened physical/verbal aggression towards living beings while non-aggressive behaviour means actual or threatened aggression towards other people’s property (American-Psychiatric-Association, 2000). Threatening to hurt someone through verbal abuse, attempting to steal something one is wearing, or hitting someone is categorised as physically aggressive behaviours.

In contrast, examples such as setting someone’s property on fire, breaking into someone’s car or house to steal something, spray painting others’ property, selling stolen goods, shop lifting and public rowdiness are categorised as non-aggressive behaviours (Burt, 2012; Eman, Nicolson, & Blades, 2014). Such non-aggressive behaviours are most often known as delinquency (Charles, Acheson, Mathias, Michael, & Dougherty, 2012; Smith, 2011) or mild ASB (Torok, Darke, Kaye, & Ross, 2011). Physical aggression can refer to sexual abuse, destruction of property, physical attack, or verbal abuse during a confrontation (Ansel, Barry, Gillen, & Herrington, 2014). Direct physical aggression can refer to impulsive, affective, hostile or reactive aggression, which is driven by anger and frustration on the spur of the moment (Kaartinen, Puura, Helminen, Salmelin, Pelkonen, et. al., 2014). Physical

aggression might be a subtype of reactive aggression named as “reactive physical aggression” (Banny, Tseng, Murray-Close, Pitula, & Crick, 2014; White, Gordon, & Guerra, 2015).

It is also important to note developments in related literatures. There is, both in law and in psychological theory, a fundamental distinction between a ‘heat of the moment’ reaction, which may be seen as a failure of self control, and a premeditated series of actions, that suggest a clear, cognitive plan, quite the opposite of the heat of the moment. This distinction is described in the literature on executive function as the distinction between ‘hot’ and ‘cold’ cognition (Zelazo & Carlson, 2012), and the actions are underpinned by different neural systems, with the hot cognitive control taking longer to develop (Prencipe et al., 2011). The hot category is more instinctive, ingrained, dictated by the innate animal brain while the cold category is a production of a higher level of cognitive processing (Read & Loewenstein, 1999).

We therefore adopt the hot and cold distinction to represent the affective and cognitive dimensions of ASB. For example, reactive, physical, impulsive and relational aggression characterises the hot (affective) category, whereas instrumental, proactive, and premeditated aggression characterises the cold (cognitive) category (e.g. Babcock, 2014; Book, Volk, & Hosker, 2012; Crapanzano, Frick, & Terranova, 2010; Ojanen & Kiefer, 2013; Ramirez & Andreu, 2006; Vitaro, Brendgen, & Barker, 2006; Xu, Raine, Yu, & Krieg, 2014); Yu et. al., 2015; see Table 1). Callous and unemotional (CU) traits are very good example of ASB consisting of both affective and cognitive dimensions. The “unemotional” aspect of CU traits is the affective component when emotional reactivity is very low or absent (Byrd, Kahn, & Pardini, 2013). The affective-cognitive components are “callousness” and “uncaring” when there is disregard for others’ feeling, lack of conscientiousness, fearlessness and remorselessness (Patrick, 2010; Patrick, Fowles, & Krueger, 2009).

The definition of ASB within the hot and cold distinction varies. The subtypes of ASB such as early onset ASB, non-aggressive ASB, cyberbullying, proactive aggression, self-harm, CU traits (e.g. Crapanzano et al., 2010; Rowe, Maughan, Worthman, Costello, & Angold, 2004; Stringaris & Goodman, 2009; Dodge, 2009; see Table 1) have been defined as developmental trajectories with respect to age of onset, context, gender, IQ, personality disorders, developmental disorders, type of interaction (overt/covert), intensity, age, comorbidity, aetiology in terms of genetic, environmental or epigenetic factors, and consequences of ASB. For example, ASB can be classified into early onset, life course persistent, and adolescent/late onset ASB depending on the age at which ASB appears and sustains (e.g. Moffitt, 1993; Tzoumakis, Lussier, Blanc, & Davies, 2013). ASB can be further subdivided into childhood limited, adolescent limited, adolescent delayed onset or adulthood onset (Fontaine, Carbonneau, Vitaro, Barker, & Tremblay, 2009).

There are also independent literatures for ASB in specific contexts, such as driving and conduct disorder. ASB in the form of driving offences is termed aggressive driving behaviour (Danaf, Abou-Zeid, & Kaysi, 2015). In terms of type of interaction and gender, covert ASB manifested at workplace may be termed as mean girl behaviour (Stephens, 2014). With respect to different personality disorders ASB are also manifested in the form of antisocial personality disorder, obsessive-compulsive disorder, schizophrenia, paranoid personality disorder, bipolar disorder, post-

traumatic stress disorder, pathological gambling, and developmental disorder such as autism (Barrowcliffe, & Gannon, 2015; Carroll, 2009; Hodgins, 2004), attention deficit hyperactivity disorder, oppositional defiance disorders and conduct disorders (Kapalka, 2015; Tyrer, 2015). ASB has been referred broadly to conduct disorders in children, psychopathy in adults, or different types of bullying in terms of type of interaction (e.g. Sticca, Ruggieri, Alsaker, & Perren, 2013; Wiklund, Ruchkin, Kuposovc, & Klintebergd, 2014; Woodworth & Waschbusch, 2008). Conduct disorders can vary from rule breaking behaviours to violence (e.g. Scheepers, Buitelaar, & Matthys, 2011) in terms of intensity. For example, hitting may be termed as aggression and stabbing can be termed as violence (Burt, 2012). Therefore, conduct disorders have been further divided into physically aggressive and non-aggressive as subtypes based on type of interaction against living things or property offences (American-Psychiatric-Association, 2000, 2013).

Developmental trajectories of ASB in terms of age, type and mode of interaction

Conduct disorders might progress towards adulthood transforming into psychopathy (a personality type). Therefore, conduct disorders reflect ASB during childhood while psychopathy reflects ASB during adolescence or adulthood. Age can change the terminology used to define ASB. Psychopathy can involve ASB that could be reactive or proactive and pre-planned (e.g. Centifanti, Kimonis, Frick, & Aucoin, 2013) based on hot or cold distinctive nature. Reactive and proactive are examples of two opposite types of ASB. Proactive/pre-planned or indirect aggression can involve verbal abuse or bullying. Bullying can be further divided into traditional, direct cyber bullying and indirect cyber bullying (e.g. Langos, 2012; Ortega, Elipe, Mora-Merchan, Calmaestra, & Vega, 2009). Direct and indirect bullying depends on whether bullying involves physical aggression or verbal aggression. Researchers have also classified ASB into proactive/premeditated versus reactive aggression; aggressive versus non-aggressive; violent versus non-violent; confrontational versus non-confrontational; direct versus indirect aggression; aggression versus delinquency in the literature (e.g. Babcock, 2014; B. Maughan et al., 2000; Vitaro et al., 2006). The meaning of these ASB subcategories varies and they may have further subcategories with variable meanings. For instance, in the aggressive versus non-aggressive classification, aggressive behaviour refers to both actual or threatened physical and verbal aggression or just physical aggression, while non-aggressive behaviour implies delinquency, verbal aggression, relational aggression, actual or threatened aggression against others' possessions or normal/pro-social behaviour (e.g. B. Maughan et al., 2000; Mayberry & Espelage, 2007; Milojević & Dimitrijevic, 2014; Underwood, Galen, & Paquette, 2001).

Developmental trajectories of ASB in terms of comorbidities with ASB, aetiology and consequences of ASB

ASB are also defined with respect to comorbidity with personality disorders, for instance obsessive-compulsive disorder, posttraumatic stress disorder, or depressive disorders (Schepman, Fombonne, Collishaw, & Taylor, 2014). ASB can be comorbid with depression and depression can be genetic, environmental or epigenetic in the form of interpersonal interaction of children in school, parenting styles, parent-child interaction, peer group influence and so forth. Therefore, multiple aetiological factors along with age determine different subtypes of ASB. For example, ASB has been termed as primary or secondary subtypes. Primary is more likely to be early onset,

genetic or epigenetic and secondary subtype is likely to be acquired and based on environmental aetiology (Ojanen & Kiefer, 2013; Klahr, Klump, & Burt, 2014). With respect to consequences, reactive aggression (motivated by frustration, involving impulsivity) might be manifested as self-harm or suicide if oneself is the victim/target/consequence, or as verbal or physical interpersonal aggression if others are the victims (Colins, 2015). Thus, self harm, suicide, homicide, self-destructive behaviours are examples of terminologies used to determine the consequence of ASB (Conner, Duberstein, Conwell, & Caine, 2003). Therefore, developmental trajectories with respect to age of onset, context, gender, IQ, personality disorders, developmental disorders, type of interaction (overt/covert), intensity, age, comorbidity, aetiology in terms of genetic, environmental or epigenetic factors, and consequences of ASB are the defining aspects of ASB and a basis for a label to define a specific form of ASB.

Terminologies used for ASB

The variety of terminologies used to define antisocial behaviour makes the literature more ambiguous. For example, in some cases (Patrick, 2010; Stephens, 2014), the terminologies used to identify antisocial behaviours could hold different meanings. The term “meanness” is used for “relational aggression” (Stephens, 2014), a subtype of antisocial behaviour and for “callousness” (Patrick, 2010). The term “relational aggression” is defined as harmful behaviours through damage of relationships (e.g. Czar, Dahlen, Bullock, & Nicholson, 2011) and “callousness” has been defined as a state in which emotional reactivity is low or absent in response to distress of others (e.g. Gupta & Beach, 2003). In another example, the literature does not indicate the difference between “reactive aggression”, “emotional aggression”, and “hyper reactive aggression”(Dodge, 2009). We might surmise that “reactive aggression”, “emotional aggression”, and “hyper reactive aggression” are different terms for the same concepts, or indicate the degree of intensity of emotional aggression. In another example, non-aggressive behaviour may not always refer to delinquency or rule breaking behaviours (Maughan et al., 2000). Non-aggressive behaviour may refer to docile behaviours involving negotiation or delegating the matter to authority (Mayberry & Espelage, 2007). With respect to the term “aggression”, aggression does not only refer to mild physical aggression (Burt, 2012). Aggression can refer to violent offender categories, which can be subdivided into under-controlled/psychopath type and over-controlled/inhibited/controlled type. The under-controlled are more likely to be impulsive and display externalising behaviours, while the over-controlled are more likely to be shy, withdrawn and anxious (Chambers, 2010). Aggression is a more intense antisocial category involving cruelty, destruction, disobedience, as compared to non-aggressive behaviours or delinquency involving rule breaking behaviours such as lying, cheating, truancy, and stealing (e.g. Logan-Greene & Jones, 2015).

Attempted classification

The use of numerous terminologies and definitions of those terminologies such as physically aggressive versus non-aggressive, aggression versus delinquency, direct versus indirect, and their further sub-categories in various studies on personality disorders and ASB, makes ASB hard to review and evaluate.

From a legal perspective, the concept of a 'covert ASB' (Patterson & Yoerger, 1999) is a contradiction in terms, but the concept has considerable significance in understanding the underlying aetiology. Given the confusion in the literature noted

above, we consider that the first step in classification is to distinguish between 'description' and 'understanding'. We start with an attempt at developing a classification for the different types of ASB.

Classifying ASB in terms of behaviour

From a legal perspective, the key dimensions for classifying a proscribed behavior are in terms of behavior type (for example, trespass versus burglary), intent (for example, litter versus graffiti), impact (for example, wounding versus grievous bodily harm) and affect/premeditation (for example, in US distinction between murder in the first degree and third degree). We believe that these dimensions are of value both for describing the behaviour of ASB and the underlying causes of ASB. Given the importance of maintaining and developing the links with the legal and theoretical requirements of the science of ASB, we will start by using these four dimensions as an initial classification tree.

Behaviour type

The distinction between physically aggressive and non-aggressive ASB is an important one, with a third dimension of verbal aggression being necessary for clarity.

Behaviour intent

The key issue here is whether there is actually intent to behave anti-socially, or whether (as say in the case of litter, or late-night noise or putting out the rubbish on the wrong day) the outcome is an unintended consequence of the action.

Behaviour impact

The impact of ASB can vary from minor antisocial behaviours such as cheating (McTernan, Love, & Rettinger, 2014) to serious offences such as fire-setting (Johnson, 2015). Therefore, antisocial behaviours vary in terms of impact from mild to extreme forms (Buckels, 2012; Pardini & Byrd, 2012; Stephens, 2014).

Behaviour affect

The distinction between 'spur of the moment' and 'premeditated' corresponds directly with the hot and cold categories developed by theorists. We label them as Affect here to highlight the presence or absence of emotional dimension.

Behaviour mode

While less important for legal purposes, it is crucial to consider the mode of ASB – whether it is personal and interactive (face-to-face), personal non-interactive (as, say, spreading rumours) or impersonal (as, say, in generic graffiti). It is likely that different personality types will be involved in different behaviour modes.

Table 1:

A categorisation of the subtypes of ASB in terms of the description of the behaviour

Behaviour	Type	Intent	Impact	Affect	Mode
Using weapon, hitting, pushing, throwing stones, and sexual crimes towards people and animal cruelty	Physically aggressive	Yes	Moderate to Extreme	Yes	Personal-interactive
Defiance, arguing, shouting, verbal abuse	Verbally aggressive	Varies	Varies	Yes	Personal-interactive
Football hooligan	Verbally and/or physically aggressive	Yes	Varies	Yes	Personal-interactive
Threatening/emotional abuse	Verbally/Non-aggressive	Varies	Varies	Varies	Varies
Bullying, calling names	Verbally aggressive	Yes	Varies	Yes	Personal-interactive/ Personal non-interactive
Internet troll	Verbally aggressive	Yes	Varies	Yes	Personal non-interactive
Silence- mean girl behaviour or micro aggression	Non-aggressive	Yes	Varies	No	Personal-interactive/ Personal non-interactive
Drug use, drinking, smoking	Non-aggressive	Varies	Varies	Yes	Personal-interactive
Breaking traffic rules, underage driving	Non-aggressive	Yes	Varies	Yes	Impersonal

Late night noise	Non-aggressive	No	Mild to medium	No	Impersonal
Litter	Non-aggressive	Yes	Mild	No	Impersonal
Damage to property	Non-aggressive	Yes	Varies	Varies	Impersonal
Lying, cheating, forgery, theft	Non-aggressive	Yes	Varies	Yes	Personal non-interactive
Truancy	Non-aggressive	Varies	Varies	Yes	Personal non-interactive
Public rowdiness, driving aggression	Non-aggressive	Yes	Varies	Yes	Varies
Late/improper (late card payment, tax or failing to fulfill financial obligation)	Non-aggressive	Varies	Varies	No	Varies

Table 1 provides an attempt to use this classification system for a series of different forms of ASB

Classifying ASB in terms of cause

The above analyses permit the classification of the behaviours of ASB, which is important for legal purposes. From a psychological perspective, however, understanding the causes of ASB is a crucial step in addressing the aetiology and prevention. We consider that the hot/cold dimension (Kaufman, 2007) outlined above provides an important link (Babcock, 2014; Pardini & Byrd, 2012), and this provides the first part of our classification tree. Next, the hot and cold categories are subdivided into mode – personal vs impersonal, interactive vs non-interactive. This distinction clarifies the confusion about overt and covert subtypes (Eisenberg, 2010; Kaufman, 2007; Mayberry & Espelage, 2007). Then the hot and cold categories are linked to aetiology (Ojanen & Kiefer, 2013; Klahr et al., 2014), and developmental trajectories (Maughan, 2005; Ojanen & Kiefer, 2013; Tremblay, 2013; Vitaro et al., 2006). The correlates (Esin, Dursun, Acemoğlu, & Baykara, 2015; Sengupta, Fortier, Thakur, Bhat, Grizenko, & Joober, 2015; e.g. Tyrer, 2015) and consequences of hot and cold categories (American-Psychiatric-Association, 2000; B. Maughan et al., 2000; Rowe et al., 2004) are also considered.

Table 2

A categorisation of the subtypes of ASB in terms of the theoretical understanding

Main types		References	
	Hot blooded ASB	Cold blooded ASB (e.g. Kaufman, 2007).	
Subtypes of antisocial behaviours	Personal interactive: Reactive, Reactive physical, Impulsive (lack of control; spontaneous)	Personal non-interactive/Impersonal: Proactive/instrumental, bullying, Premeditated (planned) Personal interactive: Proactive physical	(e.g. Babcock, 2014; Book et al., 2012; Crapanzano et al., 2010; Ojanen & Kiefer, 2013; Ramirez & Andreu, 2006; Vitaro et al., 2006; Xu et al., 2014); Yu et al., 2015.
	Personal non-interactive: Relational	Impersonal: Instrumental	(Fassnacht, 2010).
	Personal interactive: Confrontational	Personal non-interactive: Non-confrontational	(Xie, Swift, Cairns, & Cairns, 2002).
	Personal interactive: Physically aggressive/Aggressive (Actual/threatened physical/verbal aggression) towards people and animals	Personal non-interactive/Impersonal: Non-aggressive, (Actual/threatened physical aggression towards others' possessions such as Vandalism and theft)	(e.g. American-Psychiatric-Association, 2000; B. Maughan et al., 2000; Rowe et al., 2004).
	Personal	Personal non-	(e.g. Pardini & Byrd, 2012).

	<u>interactive:</u> Physical (literally physical- in contact)	<u>interactive:</u> Non- physical (no physical contact or touch involved; teasing and threatening)	
	<u>Personal interactive:</u> Physical/Verbal <u>Personal non- interactive:</u> Verbal (including threats) e.g. domestic violence	<u>Personal non- interactive</u> <u>/Impersonal:</u> Social/Relational/Indi rect e.g. domestic violence	(e.g. Marsee & Frick, 2007; McEvoy, Estrem, Rodriguez, & Olson, 2003; Pursoo, 2013; Underwood et al., 2001; Vitaro et al., 2006; Waasdorp, Baker, Paskewich, & Leff, 2013).
	<u>Personal interactive/</u> <u>Personal non- interactive:</u> Physical/verbal/r elational	<u>Docile/Uninvolved/ Harmless:</u> Non- aggressive (problem solving, withdrawal or socially appropriate)	(Eisenberg, 2010; Kaufman, 2007; Mayberry & Espelage, 2007).
	<u>Personal interactive:</u> Direct Bullying/aggress ion)	<u>Personal non- interactive:</u> Indirect (bullying/aggression)	(e.g. Kaukiainen et al., 1999; Muñoz, Qualter, & Padgett, 2011; van Heerebeek, 2010).
	<u>Personal interactive:</u> Secondary psychopathy	<u>Personal non- interactive:</u> Primary psychopathy	(Chambers, 2010; Del Gaizo & Falkenbach, 2008; Kimonis, Frick, Cauffman, Goldweber, & Skeem, 2012).
	<u>Personal interactive:</u> Under- controlled: primary and secondary psychopath	<u>Personal Non- interactive/Imperso nal:</u> Controlled and inhibited	(Chambers, 2010).
	<u>Personal interactive:</u> Inhibited/Over- controlled	<u>Personal non- interactive:</u> Controlled	(Chambers, 2010).
	<u>Personal interactive:</u> Aggression, and Delinquency (sexual crime, physical contact)	<u>Personal non- interactive/Imperso nal:</u> Delinquency/Mild ASB	(e.g. Marsee, Silverthorn, & Frick, 2005; Rowe, Rijdsdijk, Maughan, Eley, & Hosang, 2008).
	<u>Personal interactive/Imp ersonal:</u> Early	<u>Personal non- interactive/Imperso nal:</u> Late onset/adult	(e.g. Maughan, 2005; Ojanen & Kiefer, 2013; Tremblay, 2013; Vitaro et al., 2006).

	onset/life-course persistent	onset	
	<u>Personal interactive/Impersonal</u> : Genetic and environmental	<u>Personal non-interactive/ Personal Interactive /Impersonal</u> : Environmental	(e.g. Klahr, Klump, & Burt, 2014; Recoquillay et al., 2013).
	<u>Personal interactive/ Personal non-interactive/Impersonal</u> : ASB (antisocial behaviour) without CU (callous and unemotional) traits	<u>Personal non-interactive/ Personal Interactive /Impersonal</u> : ASB with CU traits	(e.g. Crapanzano et al., 2010; Stringaris & Goodman, 2009).
	<u>Personal interactive/ Personal non-interactive /Impersonal</u> : Anxious	<u>Personal interactive/Personal non-interactive/Impersonal</u> : Sadistic	(e.g. Buckels, 2012; Dorfman, Meyer-Lindenberg, & Buckholtz, 2014; Proulx & Beauregard, 2014; Swogger, Walsh, Christie, Priddy, & Conner, 2014).
	<u>Personal non-interactive/Personal interactive/Impersonal</u> : OCD, ODD, CD, ADHD, disruptive disorders involving physically aggressive and self destructive behaviours; ASPD, ODD, CD neurodevelopmental in origin	<u>Personal non-interactive/ Personal interactive /Impersonal</u> : OCD, ODD, CD, ADHD, disruptive disorders, involving rule breaking behaviours	e.g. Esin, Dursun, Acemoğlu, & Baykara, 2015; Kapalka, 2015; Sengupta, Fortier, Thakur, Bhat, Grizenko, & Joobar, 2015; e.g. Tyrer, 2015.

The results of this classification system may be seen in Table 2. The correlates and the consequences cannot be grouped into hot and cold categories due to the overlapping characteristics of the correlates (Esin, Dursun, Acemoğlu, & Baykara,

2015; Sengupta, et. al., 2015; Tyrer, 2015) and the consequences (Yektatalab, Alipour, Edraki, & Tavakoli, 2015; Conner, Swogger, & Houston, 2009; also see table 1). For example, obsessive-compulsive disorder and attention-deficit hyperactivity disorder as correlates can represent both hot and cold categories (Esin et. al., 2015; Sengupta et. al., 2015; Tyrer, 2015). Consequences such as school dropout, self-harm (Yektatalab et. al., 2015; Conner, Swogger, & Houston, 2009; also see table 1), physical injury (Ferrah et. al., 2015; Skervin, Palmer, & Pascal, 2015), mental trauma (Mahishale & Mahishale, 2015), broken homes (Laeheem & Boonprakarn, 2014), disability and death (Breiding & Armour, 2015; Thomson et. al., 2015) are examples of outcomes of both hot and cold categories.

Summary and conclusions

In our introduction, we highlighted the need for synergy between the legal and psychological approaches to ASB, stressing the need for observable classifications for legal purposes while supporting further analysis for psychological purposes so as to facilitate treatment or intervention. We first highlighted the need to distinguish between ASB as a set of behaviours (as needed for any legal interpretation) and ASB as a syndrome requiring further analysis (as required for a theoretical approach).

Following a review of the academic literature, we made a fundamental theoretical distinction between hot ASB and cold ASB, based on the analysis of executive function in cognition and also reflects the important legal distinction between premeditated and heat of the moment reactions. The hot category is more likely to be early onset, caused due to genetic reasons, involve direct and physically aggressive behaviours and involve people as victims instead of objects. The cold category is more likely to be late onset, develop due to environmental reasons and involve indirect antisocial behaviours that can involve objects as victims or sophisticated methods of aggression (Burt et. al., 2015). These two categories are not mutually exclusive; their characteristics may overlap depending on the combination of factors such as gender, IQ, age, age of onset, developmental trajectory, comorbidity with other problems, psychopathology, intensity, and epigenetic factors. We then developed a classification system for the behavioural dimension of ASB in terms of five dimensions: Type, Intent, Impact, Affect and Mode. This classification applies well to the theoretical analyses, providing valuable insights in terms of aetiology, developmental trajectories, correlates and consequences of ASB.

The hot and cold types were further sub-classified into Mode subtypes based on the type of interaction of antisocial behaviours. Three categories were provided for Mode: interactive personal, non-interactive personal and impersonal. The hot interactive (personal and impersonal) subtypes would refer to 'heat of the moment' displayed ASB whereas cold interactive subtypes could refer to comparatively hidden ASB.

The hot interactive personal subtype can refer to reactive aggression, direct aggression, physical aggression, and confrontation, and includes intimate partner violence (Breiding & Armour, 2015), and impulsive acts such as hitting someone, throwing stones at someone, or trying to snatch something someone is wearing (Burt, 2012). The hot non-interactive personal subtype may refer to inhibited, suppressed, and relational aggression (Hester et. al., 2015; Thomson et. al., 2015). For example, running away from home, (Havik, Bru, & Ertesvåg, 2015), obvious social exclusion,

verbally aggressive ASB, use of social media to harm reputation and relationships, and nonverbal gestures might be characterized as hot non-interactive personal subtypes (Dailey, Frey, & Walker, 2015). The hot-impersonal subtype may include 'spur of the moment' theft, shoplifting, breaking into a car/van to steal a visible item (Burt, 2012).

In contrast to the hot and impulsive ASB, the cold type is pre-planned behaviour designed to achieve a certain goal and may be manipulative and hard to detect. The cold interactive subtype might refer to manipulative non-aggressive behaviours such as unobvious relational aggression, imperceptible micro-aggressions, non-verbal insulting body language. For example, subtle forms of emotional abuse, lying and relationship cheating could be examples of cold interactive subtype (McTernan et. al., 2014; Stephens, 2014). The cold non-interactive subtype might refer to indirect aggression, proactive/premeditated aggression, non-confrontational aggression, controlled/primary psychopath type, delinquency and subtle forms of aggression. For example, cold non-interactive ASB could involve using other people to physically attack people, damaging someone's reputation through written complaint, spreading rumours, indirect verbally aggressive ASB, and planned sophisticated murders (Chambers, 2010; Pursoo, 2013; Yu et. al., 2015). The cold non-interactive subtype may also involve non-apparent, imperceptible non-aggressive behaviours such as creating misunderstandings between people, misguiding or manipulating others to advance one's own career, and so on (Czar, Dahlen, Bullock, & Nicholson, 2011; Schmeelk, Sylvers, & Lilienfeld, 2008). The cold impersonal could involve planned theft, selling illegal drugs, introducing computer viruses into the internet web, and facilitation of planned behaviours to rob others of their property or to damage their possessions (Blakely, 2012; Burt, 2012; Morgan, Batastini, Murray, Serna, & Porras, 2015).

The hot and cold categories of antisocial behaviours follow different developmental trajectories depending on the correlates such as personality or developmental disorders, aetiology, gender, and age. Certain antisocial behaviours can belong to both hot and cold categories (Lo, Waring, Pagoto, & Lemon, 2015) depending on the correlates or context of antisocial behaviour. For example, antisocial behaviour with callous and unemotional (CU) traits (Crapanzano et al., 2010; Stringaris & Goodman, 2009; Dodge, 2009) can belong to both hot and cold categories and can be interactive or non-interactive depending on the correlates of CU traits (Berg, Hecht, Latzman, & Lilienfeld, 2015; Roşan, Frick, Gottlieb, & Faşıcaru, 2015; Waschbusch, Walsh, Andrade, King, & Carrey, 2007). CU traits accompanied with depression and anxiety can be manifested in the form of physical aggression as compared to CU traits with low levels of anxiety and depression (Roşan et. al., 2015). In another example, in the context of antisocial behaviour, sadistic behaviour is likely to be interactive such as enjoyment of animal and human targeted aggression (Buckels, 2012; Vachon & Lynam, 2015) but it may occur in non-interactive forms such as mean girl behaviour (Stephens, 2014).

In terms of age of onset and aetiology, early onset ASB is more likely to be genetic and likely to persist throughout life (see table 1). Maleness (Piotrowska, Stride, Croft, & Rowe, 2015) and a lower IQ are related to antisocial behaviours (Macvarish, Lee, & Lowe, 2015). However, IQ may not be low in psychopathy possibly due to positive affective features of psychopathy (de Tribolet-Hardy, Vohs, Mokros, & Habermeyer,

2014). IQ may be average in relation to antisocial behaviours in the context of development disorders such as high functioning autism (Chandler, Howlin, Simonoff, O'Sullivan, Tseng et. al., 2015; Green, Dissanayake, & Loesch, 2015). Hence the development of antisocial behaviour involves multiple determinants.

We also classified antisocial behaviours in terms of their consequences. These include people victims, object victims, self-harm, suicide, job, school and marriage failure. Following the current classification, future researchers may be able to understand the current discoveries and build upon the existing research (Table 1 and Table 2) because several issues still need to be addressed. For example there is limited research on female antisocial behaviour. As another example, the developmental trajectories of mild antisocial behaviour in terms of unintended irresponsibility and mood problems have not been explored.

The hot and cold categories are linked to the developmental trajectories of antisocial behaviour, which are the aetiological factors including genetic, environmental, epigenetic factors (Recoquillay et al., 2013), other correlates are gender, age of onset, IQ, (Moffitt, 1993; Piotrowska et. al., 2015; Macvarish et. al., 2015) and personality disorders/developmental disorders/disruptive disorders (Sengupta et. al., 2015) as well as intensity of the antisocial behaviour on a continuum from mild to extreme (Buckels, 2012; Pardini & Byrd, 2012; Stephens, 2014). Examples of personality/developmental/disruptive disorders are Antisocial personality disorder, Attention deficit hyperactivity disorder, Oppositional defiance disorder, and Psychopathy (e.g. Tyrer, 2015; see Table 2). Antisocial behaviour might also occur with depression, substance abuse and other mental disorders (see Table 2; Bergen, Martin, Richardson, Allison, & Roeger, 2004; Ritakallio et. al., 2008). In terms of intensity, the mild category can include mood disorders/problems or maladjusted behaviour (Blatt, 2006; Khanna, Shaw, Dolan, & Lennox, 2014; Price, Turnbull, Gregory, & Stevens, 1989) whereas the extreme forms can include physical violence such as hitting others or rule breaking behaviours such as theft, and vandalism (Burt, 2012).

In conclusion, the 5-dimension descriptive system of Type, Intent, Impact, Affect and Mode provides a descriptive system capable of direct application in the legal system, and it also underpins our theoretical analysis, which highlights the importance of the Type, Affect and Mode dimensions in the understanding of the aetiology of ASB. While capable of considerable further refinement, this classification holds out the promise of developing a fruitful agenda for developing of psychological assessments and treatments that are optimally aligned with the personal characteristics of the perpetrators of ASB.

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Contact email: saima.eman@sheffield.ac.uk

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