Adolescent Bullying and Intrasexual Competition: Body Concerns and Self-Promotion Tactics amongst Bullies, Victims and Bully-Victims

By

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Declaration

I, Kirsty Samantha Lee, conducted the work that is presented in this thesis.

Substantive contributions to chapters 8, 9 and 10 are as follows:

Chapter 8 (Study 1): Adolescent bullying involvement amongst boys and girls: is it body weight or body image that matters? (Under review: Body Image)

Contributions

- *Dieter Wolke: Study design, revisions of manuscript*
- *Jeremy Dale: Study design, revisions of manuscript*
- *Alexa Guy: Study design, revisions of manuscript, collection of data*

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Abstract

Bullying is ubiquitous and a major cause of psychological distress and disease. While most bullying research investigating the predisposing, precipitating and perpetuating factors has focused on victims, important gaps remain regarding the theoretical drivers of bullying perpetration. Using sexual selection and intrasexual competition as a theoretical framework, researchers have argued that bullying is an evolved behaviour that enables bullies to obtain or maintain a strong position in the social hierarchy and have greater access to resources, including sexual and romantic experiences. Intrasexual competition comprises two key features: competitor derogation and self-promotion. Bullying could be considered as a type of repeated competitor derogation, but the extent to which bullies engage in self-promotion tactics is unknown. As body shape and size are of central importance to males and females in the context of intrasexual competition, the aims of this thesis were: to determine whether body weight or body image independently or jointly predict bullying role; and to examine the extent to which bullies, victims and bully-victims are preoccupied with self-promotion through body alteration, and whether this is related to psychological functioning.

A large school-based study (The Bullying, Appearance, Social Information Processing and Emotions Study; The BASE study) of adolescents in the UK was conducted. Study 1 investigated whether body weight or body image (i.e., actual or perceived underweight or overweight) was independently associated with bullying role (bully, victim or bully-victim), and whether body weight and body image interacted to

predict bullying role amongst adolescent boys and girls. Study 2 examined whether bullies, victims and bully-victims were at increased risk of weight loss preoccupation compared to adolescents uninvolved in bullying, whether psychological functioning mediated the relationship between bullying role and weight loss preoccupation, and whether sex was a key moderator. Study 3 examined whether bullies, victims and bully-victims had a higher desire for cosmetic surgery compared to adolescents uninvolved in bullying, whether the relationship between bullying role and desire for cosmetic surgery was direct or mediated by psychological functioning, and whether any effects were sex-specific.

The findings offer several new contributions to knowledge. Firstly, it was revealed that body image, rather than actual body weight, is associated with being a victim and bully-victim. Bullies were of average weight and were more likely to be at an advanced pubertal status (girls only). Secondly, being a male or female bully was directly associated with increased desire for cosmetic surgery and weight loss preoccupation (boys only). The relationship between being victimised (as a victim or bully-victim) and cosmetic surgery desire and weight loss preoccupation was mostly mediated by reduced psychological functioning. Overall, victims had the highest desire for cosmetic surgery, whilst bully-victims had the highest weight loss preoccupation; there were no significant differences between male and female victims or bully-victims.

In conclusion, the findings that male and female adolescent bullies are engaging in or cognizing about self-promotion strategies to improve physical appearance, which

was unrelated to psychological functioning, are consistent with the theory of bullying as a form of intrasexual competition. Bullies are thus multi-strategic in their attempt to obtain or maintain social dominance. Bullied adolescents are similarly concerned about their appearance, but this is mostly because of reduced self-esteem, body-esteem and emotional problems as a result of being bullied. Thus, adolescents involved in bullying are at increased likelihood of attempting to alter their physical appearance, albeit via different pathways and with likely different outcomes. The research advances theoretical understanding about bullies and has practical implications for understanding the body concerns and self-promotion tactics of bullies, victims and bully-victims.

Structure of Thesis

Chapter 1 provides a general overview of school bullying, including a definition and discussion of what bullying is, how it is assessed, what factors are related to bullying involvement and what is known about the causes of bullying. Chapter 2 presents an overview of the theory of natural and sexual selection and provides an in-depth discussion of intrasexual competition, which is used as the primary framework to guide the research. The extant literature on intrasexual competition and bullying is reviewed and current gaps in the literature are highlighted. Chapters 3, 4 and 5 review literature on several key areas: body weight and body image (chapter 3), weight control strategies (chapter 4) and cosmetic procedures (chapter 5). Background discussion is given, alongside discussion of how these key topic areas relate to bullying. Chapter 6 formulates the questions that guided the research and chapter 7 outlines the methodology used to assess the research questions. Chapters 8, 9 and 10 present the three studies of the thesis and chapter 11 summarises the key results across the three studies and offers an integrated discussion of the key findings and their relationship to the theory of intrasexual competition. The strengths and limitations of the research are acknowledged, as well as the implications of the research and directions for future investigations.

1 An overview of school bullying

School bullying is a global phenomenon; around one in three young people will be involved in bullying at some point during their school career. This chapter gives an overview of school bullying, defines what bullying is and how it can be distinguished from other types of aggressive behaviours. The chapter describes different types of bullying and variations amongst different groups, such as males and females and those who come from different ethnic backgrounds. Finally, the chapter outlines the most commonly reported outcomes of bullying involvement and highlights important gaps in the extant literature.

1.1 What is bullying?

In the scientific literature, bullying is considered to be a specific type of aggressive behaviour (Rivers & Smith, 1994; Smith, Cowie, Olafsson, Liefooghe, Almeida, Araki et al., 2002), which can be differentiated from general aggression by three defining characteristics: intentionality, repetition and a power imbalance (Olweus, 1994, 1999). Bullying is intentional in that bullying perpetrators aim to cause physical or psychological harm and distress to the victim (Farrington, 1993). On the other hand, accidental harm is not considered to be bullying or aggression (Anderson & Bushman, 2002). Bullying is repeated over time (Olweus, 1999), whilst solitary or random acts of aggression are not typically considered to be bullying (Griffin & Gross, 2004; Olweus, 1999). Finally, bullying involves an imbalance of power, either

real or perceived, which leaves victims feeling unable to defend themselves. In contrast, conflict between two equally powerful individuals is not considered to be bullying (Farrington, 1993; Smith et al., 2002). Power imbalances can arise in any situation where one person is more powerful or stronger than another, in physical size, social standing, intelligence or any other domain (Swearer & Espelage, 2012).

Some have argued that "It is also bullying when a young person is teased repeatedly in a nasty way" (Whitney & Smith, 1993, p. 7). Teasing is more difficult to define because it can involve both humour and aggression (Keltner, Capps, Kring, Young, & Heerey, 2001). In its aggressive form, teasing can be considered as a type of bullying (Farrington, 1993) because there is intent to cause harm (Smith et al., 2002). Much research has indicated that teasing can adversely affect psychological wellbeing, (Eisenberg, Neumark-Sztainer, Haines, & Wall, 2006; Eisenberg, Neumark-Sztainer, & Story, 2003), body image (Cash, 1995), eating behaviours (Menzel, Schaefer, Burke, Mayhew, Brannick, & Thompson, 2010) and plays a significant role in the uptake of cosmetic surgery (Jackson, Dowling, Honigman, Francis, & Kalus, 2012; Neumark-Sztainer, Falkner, Story, Perry, & Hannan, 2002; Park, Calogero, Harwin, & DiRaddo, 2009). The most recent and universally accepted definition of bullying offered by the Centre for Disease Control and Prevention includes teasing as a type of verbal bullying (Gladden, Vivolo-Kantor, Hamburger, & Lumpkin, 2014).

1.2 How can bullying be assessed?

Bullying involvement is commonly measured using self-reports, whereby each child completes either a paper or electronic questionnaire, often anonymously (e.g., Farrow & Fox, 2011; Olweus, 1978, 1994; Rivers & Smith, 1994; Whitney & Smith, 1993). Occasionally, self-report questionnaires are repeated over time, meaning longitudinal predictors and consequences can be investigated (e.g., Copeland, Bulik, Zucker, Wolke, Lereya, & Costello, 2015; Copeland, Wolke, Angold, & Costello, 2013; Copeland, Wolke, Lereya, Shanahan, Worthman, & Costello, 2014; Kukaswadia, Craig, Janssen, & Pickett, 2011; Wolke, Copeland, Angold, & Costello, 2013). The key advantage of using self-reports is that large samples can be screened. However, the limitations of relying solely on self-reports include social desirability bias (few bullies like to admit they are bullies) and the necessity for adequate reading comprehension (Wolke, Woods, Bloomfield, & Karstadt, 2001).

To overcome the limitations of self-report measures, researchers began to use other informants (e.g., Garandeau, Lee, & Salmivalli, 2014a; Perry, Kusel, & Perry, 1988; Salmivalli, Lagerspetz, Björkqvist, Österman, & Kaukiainen, 1996; Stapinski, Bowes, Wolke, Pearson, Mahedy, Button et al., 2014; Vaillancourt & Hymel, 2006). Peers, parents and teachers can all serve as informants and there are advantages and drawbacks to each. For instance, teacher and parent reports are particularly useful for younger children with low reading ability (Fox & Boulton, 2005; Ladd & Profilet, 1996); the drawback being that parents and teachers are not always aware of bullying involvement (Shemesh, Annunziato, Ambrose, Ravid, Mullarkey, Rubes

et al., 2013). Teacher reports of adolescent bullying involvement appear to be especially unreliable, as Leff, Patterson, Kupersmidt, & Power (1999) found that teachers were only able to identify 22% of bullies and 16% of victims and identified less than half of those identified by peers. Peer informants, i.e., pupils within the same school or class, offer greater external validity, but gathering this type of data can be particularly time consuming (Perry et al., 1988). The second drawback of using peer nominations is that British schools tend to use either vertical or horizontal tutoring systems. In a vertical system, each pupil is grouped with peers from all other year groups and each year pupils in year 11 leave the tutor group, whilst new year 7 pupils join the tutor group; in horizontal systems, pupils are grouped with peers in the same year group and progress through school in the same tutor group with the same peers. This means that pupils are more or less familiar with the peers in their tutor group depending on the tutoring system within their school. Overall, correlations between self, peer, teacher and parent reports are generally low, ranging between r=0.17 to r=0.32 for victimisation and r=0.10 to r=0.18 for bullying (Branson & Cornell, 2009). Despite this low reliability, it seems that the outcomes reported for victims are usually equivalent, whichever informants are used (Klomek, Sourander, & Elonheimo, 2015; Winsper, Lereya, Zanarini, & Wolke, 2012; Wolke & Lereya, 2015). Ideally studies should use a combination of informants (Bouman, van der Meulen, Goossens, Olthof, Vermande, & Aleva, 2012; Juvonen, Graham, & Schuster, 2003).

Self and peer reports of bullying involvement can be assessed individually or in a group setting. This is usually done at school, during school hours (e.g., Arnocky & Vaillancourt, 2012; Craig, Harel-Fisch, Fogel-Grinvald, Dostaler, Hetland, Simons-Morton et al., 2009; Garandeau et al., 2014a; Solberg & Olweus, 2003; Wang, Iannotti, & Nansel, 2009; Wolke, Woods, Stanford, & Schulz, 2001). The benefits of collecting data from a school-setting include access to large samples that can be assessed simultaneously (i.e., in groups) and the ability to control data collection (i.e., standardised procedures can be implemented and enforced by researchers).

1.3 What is being assessed?

Bullying is an umbrella term that encompasses different types of behaviours. There are three main types of bullying: *direct*, *indirect* and *cyber* (Card, Stucky, Sawalani, & Little, 2008; Slonje & Smith, 2008; Waasdorp & Bradshaw, 2015). *Direct* bullying refers to behaviours that are directly targeted at the victim, face-to-face. This can include acts like hitting, kicking, pushing, verbal insults, swearing, name calling and damaging or stealing belongings. Some researchers have differentiated between physical and verbal aggression (Björkqvist, 1994; Waasdorp & Bradshaw, 2015; Wang et al., 2009), but many accept that the terms are blurred and fall under the general umbrella of direct aggression (Card et al., 2008). *Indirect* bullying is any behaviour that is designed to damage the relationships and social status of the victim. Indirect bullying typically involves behaviours like gossiping, spreading rumours or lies, withholding friendship and excluding someone from play or social events (Björkqvist, 1994). Some researchers use different terminology to describe

indirect bullying, like relational (Crick & Grotpeter, 1995) or social bullying (Cairns, Cairns, Neckerman, Ferguson, & Gariepy, 1989). However, differences in terminology can generally be ignored (Vaillancourt, 2005) as although indirect, relational and social aggression have some distinct features, there is considerable overlap between them (Coyne, Archer, & Eslea, 2006) and they essentially refer to the same phenomenon (Björkqvist, 2001). Often, studies combine assessments of indirect and direct bullying and describe it as traditional bullying, which is then contrasted to c*yber*bullying (Waasdorp & Bradshaw, 2015). Cyberbullying is a more recent phenomenon, whereby the victim is targeted using electronical methods: cyberbullying behaviours can include sending someone an aggressive message via social media, chatrooms, messenger services or email or posting an embarrassing picture online without consent (Smith, Mahdavi, Carvalho, Fisher, Russell, & Tippett, 2008). Cyberbullying can be viewed as a type of indirect bullying (Jackson, Cassidy, & Brown, 2013). Some have suggested that different types of bullying are distinct (Wang et al., 2009), whilst others have found considerable overlap between direct, indirect and cyber bullying and victimisation (Casper & Card, 2016; Olweus, 1994; Waasdorp & Bradshaw, 2015; Wang, Iannotti, Luk, & Nansel, 2010; Wolke, Woods, Bloomfield, & Karstadt, 2000).

1.4 What are the potential roles involved in bullying?

Early researchers tended to dichotomise children and adolescents involved in bullying into bullies or victims (e.g., Boulton & Smith, 1994; Olweus, 1978). Bullies are the perpetrators of continuous and malicious acts towards the victim (Jones,

2002) and victims are those who are targeted by the bully and do not engage in any bullying behaviours. Over time researchers began to acknowledge a sub group of bullies who were also victimised (Haynie, Nansel, Eitel, Crump, Saylor, Yu et al., 2001). It is now acknowledged that these so-called bully-victims, also called aggressive or provocative victims (Pellegrini, Bartini, & Brooks, 1999), are a distinct group in terms of precursors to and outcomes of bullying involvement (Batsche & Knoff, 1994; Juvonen et al., 2003; Lereya, Samara, & Wolke, 2013). Most research into bullying also includes a fourth role i.e., the "not involved" or "neutral" group of children and adolescents, who act as controls. Some researchers have gone on to identify other bullying roles, like defenders (of the victim) and bystanders, who act as an audience (Salmivalli, 1999; Salmivalli et al., 1996).

1.5 How prevalent is bullying?

Bullying is a universal problem that can be observed across countries and cultures (Analitis, Velderman, Ravens-Sieberer, Detmar, Erhart, Herdman et al., 2009; Craig et al., 2009; Due, Holstein, Lynch, Diderichsen, Gabhain, Scheidt et al., 2005). In a large-scale international study of 28 countries, peer victimisation was present in every county, albeit with large variation: the prevalence of victimisation was lowest for Swedish girls (5.1%) and boys (6.3%), whereas victimisation was highest for Lithuanian girls (38.2%) and boys (41.4%); in the UK, victimisation was higher in girls (11.3%) and boys (12%) from Wales than girls (7.2%) and boys (9.1%) from England (Due et al., 2005). In a study of 11 European countries, peer victimisation was lowest in French boys (10.9%) and Hungarian girls (10.3%) and highest in boys

(28.9%) and girls (33.9%) from the UK (Analitis et al., 2009). Another study of seven European countries similarly found large variation in prevalence rates of bullying involvement, with England having one of the lowest rates of self-reported bullies (2.2% vs. 16.9% in Spain), victims (11.5% vs. 25.6% in Italy) and bully-victims (0.8% vs. 19.6% in Spain) (Eslea, Menesini, Morita, O'Moore, Mora-Merchán, Pereira et al., 2004).

Variation in prevalence rates between and within countries can be explained by a number of factors, including method of data collection and how bullying is operationalised, i.e., which, if any, definitions are provided to participants (Modecki, Minchin, Harbaugh, Guerra, & Runions, 2014), how definitions are translated (Eslea et al., 2004) and which cut-offs are used for inclusion (Austin & Joseph, 1996; Wolke, Woods, Stanford, et al., 2001). Prevalence rates also vary depending on whether self- or peer reports are used. For instance, a US study found that prevalence rates of bullying perpetration using peer nominations were double that generated by self-reports (11% vs. 5%, respectively) (Branson & Cornell, 2009). These findings indicate that to achieve accurate estimates, especially of bullies and bully-victims, a combination of both self-report and peer nomination may be required. In contrast, the prevalence of victims using self-reports and peer nomination is generally equivalent (Boulton & Smith, 1994), although the same victims are not always identified, likely because victims can be nominated based on victim reputation (Boulton, 2013).

Turning specifically to the UK, self-report data from large-scale cohort studies suggest that approximately one in four children are victimised at some point during their school years (Tippett, Wolke, & Platt, 2013; Wolke, Lereya, Fisher, Lewis, & Zammit, 2014) and 12-18% experience chronic victimisation that lasts more than six months (Wolke et al., 2014). Self-report prevalence rates of bullies (1-3%) and bully-victims (1-8%) are lower than that of victims (Tippett et al., 2013; Wolke et al., 2014). Amongst 8-11 year olds, peer reports of bullying can range from 12.7% to 25% (Boulton & Smith, 1994; Sutton, Smith, & Swettenham, 1999). Few studies have used peer reports to assess bullying involvement explicitly amongst adolescents in the UK.

1.6 Can bullying be explained by individual characteristics?

A number of individual characteristics have been investigated in regards to bullying involvement, including sex, age, ethnicity and socioeconomic status (SES). Early research into bullying indicated that boys were much more involved than girls (Boulton & Underwood, 1992; O'Moore & Hillery, 1989; Olweus, 1994; Whitney & Smith, 1993), but this was probably due to a focus on direct types of bullying, which are more common in boys (Card et al., 2008; Olweus, 1994; Vaillancourt, 2005; Wolke, Woods, Stanford, et al., 2001). Evidence from studies across the globe indeed suggests that boys are more likely to be bullies and bully-victims (Cook, Williams, Guerra, Kim, & Sadek, 2010; Due et al., 2005; Espelage & Holt, 2001; Nansel, Overpeck, Pilla, Ruan, Simons-Morton, & Scheidt, 2001; Salmivalli et al., 1996; Tippett et al., 2013). However, that is not to say that girls do not bully. Girls

tend to be more indirectly aggressive (Card et al., 2008; Crick & Grotpeter, 1995; Lereya, Eryigit-Madzwamuse, Patra, Smith, & Wolke, 2014; Nansel et al., 2001), which is often invisible and thus difficult to detect (Garandeau & Cillessen, 2006). Sex differences in the types of bullying that is utilised (i.e., direct or indirect) are generally evident in younger samples of children, but become less clear in adolescent samples (Analitis et al., 2009; Coyne et al., 2006; Garandeau & Cillessen, 2006). Overall, meta-analysis suggests that the magnitude of sex differences in direct and indirect aggression is small (Casper & Card, 2016). There is conflicting evidence as to whether girls or boys are more likely to be victimised. The majority of studies find that boys are more likely to be victims (Cook et al., 2010; Copeland et al., 2013; Espelage & Holt, 2001; Lunde & Frisén, 2011; Mamun, O'Callaghan, Williams, & Najman, 2013; Tippett et al., 2013), whilst others report no sex differences (Reulbach, Ladewig, Nixon, O'Moore, Williams, & O'Dowd, 2013; Salmivalli et al., 1996), particularly regarding indirect victimisation (Card et al., 2008; Casper & Card, 2016), or find that girls are more likely to be victimised (Craig et al., 2009; Wolke, Woods, & Samara, 2009). Again, meta-analysis suggests that the magnitude of sex differences in victimisation is small (Casper & Card, 2016).

Large scale studies suggest that peer victimisation starts early and is most prevalent in younger samples of children aged around 8-10 years (Analitis et al., 2009; Tippett et al., 2013). Amongst adults, bullying appears to be most memorable between the ages of 11-13, suggesting that victimisation during adolescence may be particularly severe (Eslea & Rees, 2001). As children reach mid-adolescence (around age 14-15)

rates of victimisation tend to decline (Craig et al., 2009; Pellegrini & Long, 2002; Solberg & Olweus, 2003), whilst rates of bullying perpetration tend to peak (Analitis et al., 2009; Nansel et al., 2001; Pellegrini & Long, 2002). Some suggest that bullying perpetration declines in late adolescents (Pellegrini & Long, 2002), but others have argued that as bullies get older they begin, or get better at, using more indirect and invisible types of bullying (Garandeau & Cillessen, 2006; Smith, 1999).

The majority of bullying research has used chronological age as a covariate, but in some cases it is important to consider biological age, i.e., pubertal stage. Pubertal stage is an indication of physical and sexual maturation and has a major impact on appearance in terms of body size (i.e., weight and height) and on the development of secondary sexual characteristics (e.g., facial hair and muscle growth in boys; deposits of fat in the hips, buttocks and breasts in girls). Pubertal stage is associated with increased body mass index, particularly in girls (Kaplowitz, Slora, Wasserman, Pedlow, & Herman-Giddens, 2001), as well as social difficulties (Waylen & Wolke, 2004) and delinquent behaviours (Dick, Rose, Pulkkinen, & Kaprio, 2001; Downing & Bellis, 2009). As such, investigations of the associations between bullying involvement and body size or image or weight control (as will be covered in later chapters) needs to include pubertal stage as a covariate. Another reason why pubertal stage is important is because bullying may be a tactic to increase sexual opportunities (Arnocky, Sunderani, Miller, & Vaillancourt, 2012; Lereya et al., 2014; Vaillancourt, 2005; Vaillancourt, 2013; Vaillancourt & Sharma, 2011; Volk, Dane,

Marini, & Vaillancourt, 2015) and sexual interest develops around the time of puberty.

Although bullying can be found across the globe (Analitis et al., 2009; Craig et al., 2009; Due et al., 2005), there has been debate as to whether different ethnic groups are more or less likely to be involved in bullying. Findings tend to vary depending on the sample size and location of the study. For instance, studies from large, population based samples in the US tend to report that African Americans are at lower risk of victimisation and other minority groups are more likely to be bullies (Nansel et al., 2001). Studies based on European samples tend to be relatively small, classroom or convenience samples and have thus produced more inconsistent findings: some report immigrant children are more likely to bully compared to native children, especially boys (Fandrem, Ertesvåg, Strohmeier, & Roland, 2010); others report that native children are more likely to bully (Strohmeier, Spiel, & Gradinger, 2008) and immigrant children are more likely to be victimised (Strohmeier, Karna, & Salmivalli, 2011). Studies based in the UK suggest that although white adolescents appear to be at increased risk of victimisation (Tippett et al., 2013), there are few ethnic differences in bullying perpetration (Eslea & Mukhtar, 2000; Tippett et al., 2013).

Findings on the relationship between bullying involvement and SES have been mixed. Some have found that bullies, victims and bully-victims are more likely to come from lower SES groups (e.g., Jansen, Verlinden, Dommisse-van Berkel, Mieloo, van der Ende, Veenstra et al., 2012; Wolke, Woods, Stanford, et al., 2001), whereas

others have found no association (e.g., Veenstra, Lindenberg, Oldehinkel, De Winter, Verhulst, & Ormel, 2005). A recent systematic review found small but significant effects of an association between victimisation (victims and bully-victims) and a lower SES background (Tippett & Wolke, 2014). However, the authors suggest that rather than a direct relationship between low SES and an increased risk of victimisation, the effect may be mediated by the home environment, such as parenting behaviour (Lereya, Samara, et al., 2013) and sibling relationships (Tippett & Wolke, 2015).

Although bullying involvement does not appear to be strongly related to socioeconomic status, it seems to be related to status hierarchies. Bullying is more prevalent when the degree of social ranking is greater (Garandeau, Lee, & Salmivalli, 2014b; Wolke et al., 2009). Status hierarchies are ubiquitous and instinctive amongst humans and many animal species, leading some to suggest they may reduce within-group aggression (Pellegrini & Long, 2002). However, others argue that inequalities in social ranking may support and reinforce bullying perpetration (Garandeau et al., 2014b) and that bullying perpetration is a strategic attempt to obtain social dominance (Olthof, Goossens, Vermande, Aleva, & van der Meulen, 2011; Volk, Camilleri, Dane, & Marini, 2012)

1.7 Why research bullying?

Prior to empirical research, bullying was generally considered to be a rite of passage into adulthood. Over the last thirty years scientific evidence has steadily

accumulated (Berger, 2007; Zych, Ortega-Ruiz, & Del Rey, 2015) to show how the effects of being victimised by peers can be severe and long lasting. Evidence from systematic reviews and longitudinal studies show that victimisation by peers during childhood or adolescence predicts long-term adverse consequences on health (e.g., Gini & Pozzoli, 2009; Stapinski et al., 2014; Takizawa, Maughan, & Arseneault, 2014; Wolke et al., 2013; Wolke & Lereya, 2014; Wolke et al., 2014), wealth (e.g., Brown & Taylor, 2008; Copeland et al., 2014; Takizawa et al., 2014; Wolke et al., 2013) and relationships (e.g., Lehti, Klomek, Tamminen, Moilanen, Kumpulainen, Piha et al., 2012; Lehti, Sourander, Klomek, Niemelä, Sillanmäki, Piha et al., 2011; Sigurdson, Wallander, & Sund, 2014; Takizawa et al., 2014; Wolke et al., 2013) in adolescence and adulthood, as summarised in Figure 1 (adapted from Wolke & Lereya, 2015).

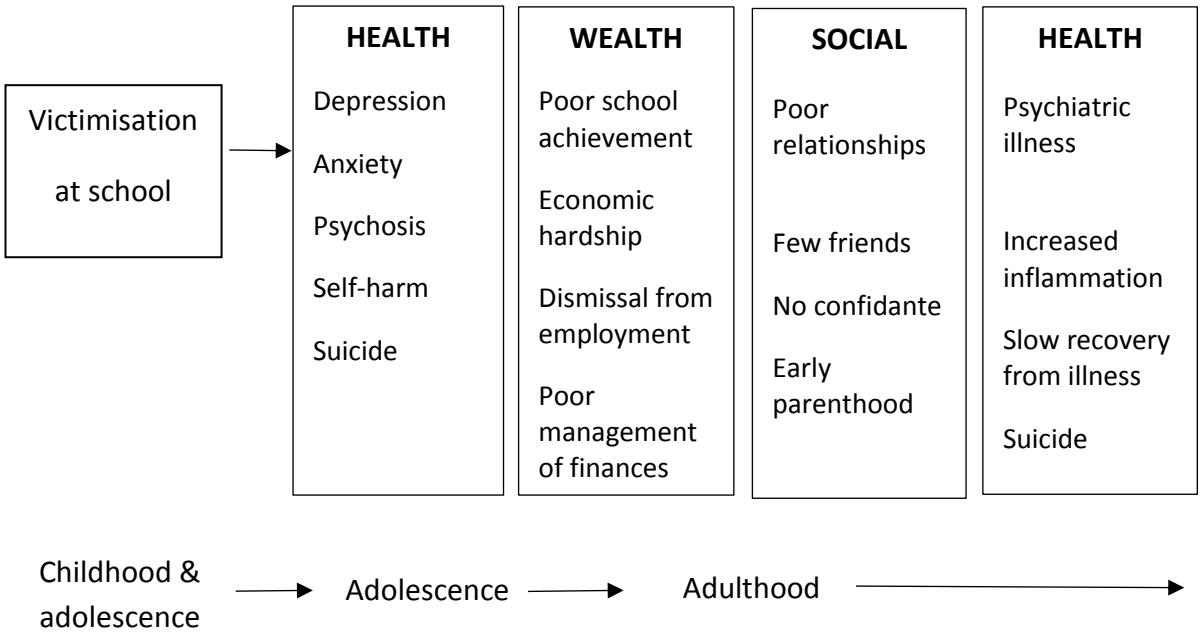

Figure 1 Overview of the long-term consequences of victimisation at school during childhood and adolescence on health, wealth and social functioning outcomes in adolescence and adulthood (adapted from Wolke & Lereya, 2015)

The effects of peer victimisation are thus profound. One study found that victimised children and adolescents continued to be at risk of poor health, social and economic outcomes nearly 40 years after the bullying took place (Takizawa et al., 2014). This is not surprising, considering that peer victimisation can affect health on a biological level (Vaillancourt, Hymel, & McDougall, 2013). Peer victimisation has been associated with dysregulation of cortisol secretion (i.e., the stress hormone) (Vaillancourt, Duku, Decatanzaro, Macmillan, Muir, & Schmidt, 2008) and systemic inflammation (Copeland et al., 2014). Thus, being bullied causes lifelong adversity and has been described as a major public health issue (Feder, 2007).

But what about the consequences for bullies? Evidence on the outcomes of bulling perpetration has been confounded because bullies and bully-victims have often been grouped together. This is problematic because bullies and bully-victims are quite distinct: bully-victims tend to be highly aggressive and emotionally reactive, leading them to be disliked and rejected by the peer group (Juvonen et al., 2003; Mahady, Melissa, Craig, & Pepler, 2000; Salmivalli & Nieminen, 2002), whereas bullies appear to be less aggressive than bully-victims, use more proactive aggression (Salmivalli & Nieminen, 2002), have just as many friends as those not involved in bullying and are generally popular amongst peers (Eslea et al., 2004; Espelage & Holt, 2001; Garandeau et al., 2014a; Juvonen et al., 2003). When researchers have distinguished between bullies, victims and bully-victims, bully-victims are often at the highest risk of poor outcomes (Haynie et al., 2001; Juvonen et al., 2003; Wolke et al., 2013). In contrast, once pre-existing factors are taken into account, bullies experience few negative consequences as a result of harming others (Copeland et al., 2014; Juvonen et al., 2003; Sourander, Jensen, Rönning, Niemelä, Helenius, Sillanmäki et al., 2007; Wolke et al., 2013).

Considering the profound consequences that bullying has on the health and wellbeing of those who are victimised, researchers have attempted to understand the drivers of bullying involvement. In addition to the individual factors highlighted in section 1.6, numerous studies have investigated potential predictors of victimisation, including appearance (Feragen & Borge, 2010; Frisén, Lunde, & Hwang, 2009; Griffiths, Wolke, Page, & Horwood, 2006), cognitive ability

(Kaukiainen, Salmivalli, Lagerspetz, Tamminen, Vauras, Mäki et al., 2002; Shakoor, Jaffee, Bowes, Ouellet-Morin, Andreou, Happé et al., 2012; Wolke et al., 2009) and parenting or family factors (Barker, Boivin, Brendgen, Fontaine, Arseneault, Vitaro et al., 2008).

Although studies of victims are important, if the ultimate aim of bullying research is to lower the prevalence of bullying, a stronger focus on bullies would be warranted. Cook and colleagues (2010) conducted a meta-analysis on the most commonly reported predictors of bullying perpetration in childhood and adolescence. The strongest predictors of being a bully in adolescence were other-related cognitions (e.g., negative thoughts, feelings or attitudes about others), peer influences (e.g., reinforcement of inappropriate behaviours) and community factors (e.g., rates of violence, crime). Internalising symptoms (e.g., emotional problems) were also predictive of being a bully in adolescence, albeit the effect size was small. Overall the results suggest that bullying involvement is the result of a combination of individual and environmental factors. However, there are several limitations to the review. Firstly, the authors did not report which studies were included and whether they were cross-sectional or longitudinal in design, meaning the factors identified may be correlates rather than predictors, thus precluding assumptions of causality. Secondly, it was not clear how the authors identified which factors to include: the authors focussed on individual and contextual factors, but there is emerging evidence of a substantial genetic influence on bullying and victimisation (Ball, Arseneault, Taylor, Maughan, Caspi, & Moffitt, 2008). Thirdly, although the authors

adjusted for study size, they did not assess or adjust for publication bias, meaning true effects may have been systematically unrepresented. Overall, the review is limited in its ability to explain why bullying prevails over time and culture and why there is a lack of adverse consequences for bullies. As one potential answer, some have argued that pure bullying perpetration may have evolved as a solution to environmental and social challenges (Volk et al., 2012). In fact, there is increasing evidence to support the argument that bullying has an evolutionary basis and this will be the focus of chapter 2.

1.8 Summary and conclusions

Bullying in childhood and adolescence is a specific type of aggressive behaviour. Bullying is ubiquitous, though prevalence rates are difficult to compare, partly due to methodological differences between studies. What is clear is that a combination of informants (e.g., self-reports and peer nominations) are needed, especially to identify bullies. The importance of individual factors in bullying and victimisation is equivocal, but viewing bullying as an evolved and adaptive behaviour could explain why bullying perpetration peaks during adolescence, why bullying is more common when resources are scarce and there is greater inequality, and why there are few ethnic differences in bullying perpetration. Using a strong theoretical framework to guide further research on bullying means new knowledge and understanding of bullies can be generated, which could subsequently be used to guide interventions aimed at reducing this major social and public health problem.

2 Theoretical background: The evolutionary theory of intrasexual competition

Human development and social relationships have long been of interest to researchers. Several theories as to why bullying occurs have been proposed, most of which fall into three broad categories: cognitive, socioecological and evolutionary theories. Although cognitive and socioecological theories of bullying offer valuable insights into bullying behaviours, they cannot account for the ubiquity of bullying across time and culture. This chapter outlines the theoretical framework used to guide this research – the evolutionary theory of intrasexual competition. Intrasexual competition is a core tenant of sexual selection: the two key tactics used in intrasexual competition - self-promotion and competitor derogation - will be discussed in general and in relation to bullying perpetration, whilst the theoretical and empirical differences between bullies and bully-victims will be highlighted.

2.1 Evolutionary theory

Evolutionary theories of behaviour acknowledge that adaptations to development are influenced by ecological and biological interactions (Ellis, Del Giudice, Dishion, Figueredo, Gray, Griskevicius et al., 2012; Geary & Bjorklund, 2000; Miller, 2011; Volk et al., 2012; Walters & Crawford, 1994). Evidence is accumulating to show that factors like problematic peer relationships, psychopathology and bullying are best

explained by the interplay between genes and the environment (Geary & Bjorklund, 2000; St Pourcain, Haworth, Davis, Wang, Timpson, Evans et al., 2014). In a study of twin pairs, genetics explained almost three quarters (73%) of the variation in bullying victimisation and almost two-thirds (61%) of the variation in bullying perpetration, with the remaining variance being explained by unique environmental factors (Ball et al., 2008). The argument for bullying as an evolved behaviour is therefore plausible because bullying has a genetic component and has the capacity to achieve social goals (Connolly, Pepler, Craig, & Taradash, 2000; Volk et al., 2015), thus fulfilling the two prerequisites of evolutionary adaptation (Darwin, 1872; Volk et al., 2012). The evolutionary theory of bullying derives from Darwin's theory of evolution, and specifically the theory of sexual selection and intrasexual competition (Koh & Wong, 2015; Volk et al., 2012). The next section will give a brief background of the theory of sexual selection and intrasexual competition, before drawing attention to the similarities and differences between intrasexual competition and bullying and current gaps in our theoretical understanding of bullies.

2.1.1 Natural and sexual selection

Darwin's theory of natural selection posits that, through evolutionary processes (i.e., the temporal interplay between genetic and environmental influences), traits that promote survival are selected and passed on to future generations (Darwin, 1872). Sexual selection is a specific type of natural selection, whereby traits that prioritise reproductive success, and not necessarily survival, are selected (Darwin,

1888). The large and colourful tail of a peacock is a prime and classic example. The tail is beneficial for reproductive purposes because it can signal good genetic quality and is thus attractive to peahens, but the tail is detrimental to survival because it is physically burdensome and increases the likelihood of being caught by a predator. Because sexual selection prioritises reproductive success over survival, one could argue that humans (and all other species) have evolved to attract sexual partners (Buss, 1988a; Darwin, 1888; Miller, 2011).

How we attract a partner depends on the traits and characteristics the partner finds attractive, which varies as a function of species and sex. Human males, irrespective of ethnic or socioeconomic group, consistently consider females with a low waist-to-hip ratio (WHR), symmetrical and youthful features to be physically attractive (Khallad, 2005; Singh, Dixson, Jessop, Morgan, & Dixson, 2010). This is likely because in human evolutionary history the primary aim of a male was to ensure his genes were passed on to future generations. To ensure this, he needed to select and mate with females of high reproductive quality. A low WHR, symmetry and youthfulness are external signals of a female's reproductive potential. A low WHR is, firstly, a sign of sexual dimorphism, indicating the female has reached puberty and is reproductively viable; secondly, a low WHR can signal health, in contrast to a high WHR, which is associated with excess adiposity (i.e., fat) and poorer health; and thirdly, female bodies with a low WHR are more likely to be symmetrical (Singh, 1993, 2002). Symmetrical features are an indication of pathogen resistance and few genetic mutations (Thornhill & Gangestad, 1993), whilst youthfulness is desirable

(Furnham, Mistry, & McClelland, 2004) because it indicates the female is in the early stages of her reproductive years (Kenrick & Keefe, 1992).

On the other hand, females from different countries and cultures are attracted to males who are dominant (Kenrick, Neuberg, Zierk, & Krones, 1994) and are of high social status (Buss, 1988a; Shackelford, Schmitt, & Buss, 2005). This is likely because in evolutionary history the primary aim of a female was to ensure the survival of her offspring, and the best method of ensuring this was to select and mate with males who were willing and able to provide resources. Resources could be material (e.g., wealth, possessions), which signal the ability to provide food and shelter, or physical (e.g., muscle size, strength or ability), which signal health and the ability to provide protection (Buss, 1988a). Males with higher levels of resources are more likely to be of higher social status (Reijntjes, Vermande, Thomaes, Goossens, Olthof, Aleva et al., 2016), and thus social status is a signal of mate quality.

Males are thus attracted to physically attractive females (i.e., young adult females with symmetrical features and a low WHR) and females are attracted to high status males (i.e., strong, fit and dominant males who have access to material resources). However, attractive females and high status males are a finite resource (Cox & Fisher, 2008). As a consequence, males and females must compete with members of the same sex (i.e., intrasexually) for access to the highest quality mates (Arnocky & Vaillancourt, 2014; Trivers, 1972).

2.1.2 Intrasexual competition

Intrasexual competition is the competition between members of the same sex for access to a limited resource (Cox & Fisher, 2008). Intrasexual competition is most common amongst males and females who are single or dating in comparison to those who are married or common-law (Fisher, Cox, & Gordon, 2009). The two key tactics of intrasexual competition are self-promotion and competitor derogation (Buss & Dedden, 1990; Schmitt & Buss, 1996).

2.1.2.1 Self-promotion

Mating opportunities will be greater for those who embody or emulate the characteristics that are most desired by the opposite sex (Schmitt & Buss, 1996). For example, males are most likely to talk about their athletic capabilities, show off their muscles and drive expensive cars (Buss, 1988a), whilst females tend to enhance and attract attention to their physical appearance via the use of make-up, stylish and attractive outfits and engage in high levels of grooming (Buss, 1988a; Walters & Crawford, 1994). A tactic that appears to be equally common amongst males and females is altering the size and shape of the body (Hayes & Ross, 1987; Prichard & Tiggemann, 2008; Vaillancourt, 2013). For instance, to attract partners, females are more likely to diet, whilst males are more likely to lift weights. Keeping physically fit and exercising appear to be two of the most effective tactics of self-promotion for both males and females (Buss, 1988a), likely because the body is a signal of sexual fitness for both sexes.

Arguably the most extreme form of altering the body is through cosmetic procedure. Such procedures are used to enhance the appearance (e.g., symmetry) and attractiveness of the face (e.g., rhinoplasty/ nose reshaping) and body (e.g., liposuction/ fat removal). Liposuction is the most common surgical procedure in the US (American Society of Plastic Surgeons, 2015). In females it has become increasingly common for the fat that is removed from the waist to be inserted into the buttocks (i.e., micro-fat grafting), which ultimately gives the appearance of a low WHR (Singh et al., 2010). In males, liposculpture, which falls under the liposuction umbrella, is performed to give the appearance of "six pack" abdominal muscles. Overall the body seems to play a crucial role in self-promotion for both males and females.

2.1.2.2 Competitor derogation

The second key tactic to increase mating opportunities is to reduce the value of competitors through aggressive acts (i.e., derogations) (Buss & Dedden, 1990; Schmitt & Buss, 1996). Derogations are generally sex dependent (Buss & Dedden, 1990). For example, although males and females are equally likely to derogate their rivals' physical appearance, females are more likely to derogate their rivals' sexual behaviour (e.g. calling them "promiscuous" or "frigid"), whereas males are more likely to derogate their rivals' physical strength, dominate or physically defeat their rival or outshine them in sports (Buss & Dedden, 1990). Competitor derogations are successful (Fisher, 2004; Vaillancourt & Sharma, 2011) because they reduce the

rivals appeal and perceived attractiveness (Fisher, 2004), whilst simultaneously increasing one's own value by means of social comparison (Arnocky et al., 2012).

Sex differences in specific derogation tactics appear to be consistent with sex differences in bullying tactics, i.e., females are less likely to use direct types of derogations. A female being physically aggressive with another female is deemed to be the least effective tactic in intrasexual competition (Walters & Crawford, 1994). Females particularly prefer indirect aggression because it can reduce the value of the target with minimum risk of confrontation (Vaillancourt, 2005); the potential consequences of physical injury on reproductive capability is too risky for females (Campbell, 1995; Daly & Wilson, 1990; Vaillancourt, 2005; Vaillancourt, 2013).

Males and females are likely to use a combination of tactics. Evidence suggests that bullies use prosocial (e.g., "I influence others by being really nice about it") and aggressive acts in order to win peer approval and admiration (Garandeau & Cillessen, 2006; Hawley, 2003; Hawley, Little, & Card, 2008; Olthof et al., 2011). Thus, there are similarities between bullying and competitor derogations. The key difference, however, is that whilst derogations can be one offs, like a "bitchy" comment upon encountering a "sexy peer"(Vaillancourt & Sharma, 2011), derogations need to be repeatedly targeted at the same individual with whom there is a power imbalance to be considered as bullying.

2.1.2.3 Intrasexual competition and bullying

Intrasexual competition and bullying both become most evident during adolescence and pubertal maturation (Analitis et al., 2009; Nansel et al., 2001; Pellegrini & Long, 2002). Puberty produces a series of hormonal, physiological, physical and behavioural changes that function to drive reproductive capability (Forbes & Dahl, 2010). The onset of sexual maturation activates a set of goals and challenges for adolescents, including increased sensation seeking, increased competition with peers (Forbes & Dahl, 2010; Steinberg, 2008) and interest in sexual and romantic relationships. In terms of achieving these goals, bullies appear to be particularly successful. In comparison to non-bullies, bullies may not be well-liked, especially female bullies (Vaillancourt & Hymel, 2006), but they are often at the top of the social hierarchy, seen as popular, powerful, "cool" and attractive by their peers (Juvonen et al., 2003; Reijntjes, Vermande, Olthof, Goossens, Van De Schoot, Aleva et al., 2013; Vaillancourt, Hymel, & McDougall, 2003) and have high levels of resource control (Olthof et al., 2011; Reijntjes et al., 2016). Bullies also have more contact with members of the opposite sex, date earlier, engage in more dating activities and have more sexual experiences (Connolly et al., 2000; Volk et al., 2015).

Bullying and competitor derogation can both be risky, and risky behaviours are more common when resources are scarce (Campbell, 1995; Elgar, Craig, Boyce, Morgan, & Vella-Zarb, 2009; Ellis et al., 2012; Tippett & Wolke, 2014). For example, Lereya et al. (2014) found that girls in single sex schools (where males are scarce)

experienced higher levels of intrasexual competition and indirect bullying compared to girls in mixed sex schools. Risky behaviours are also more common when the individual is at the top or the bottom of the social hierarchy where the competition is more extreme and costs and benefits are greater (Ellis et al., 2012). For instance, those at the top of the hierarchy may choose to use aggressive tactics to maintain their rank (Garandeau et al., 2014b), whilst those at the bottom of the hierarchy may use any means necessary to improve their social standing.

At this point it is important to reiterate the distinction between bullies and bully-victims. As highlighted in chapter one, there are important differences between those who purely bully (bullies) and those who bully but also get victimised (bully-victims): bullies are often popular and at the top of the social hierarchy, whereas bully-victims are often unpopular and disliked by the peer group (Garandeau et al., 2014a; Juvonen et al., 2003; Yang & Salmivalli, 2014); bullies use proactive aggression to achieve specific outcomes (Sutton et al., 1999; Unnever, 2005), whereas bully-victims use more reactive and physical types of aggression (Pellegrini et al., 1999; Unnever, 2005); bullies tend to have good psychological and physical health, whereas bully-victims tend to suffer the poorest mental and physical health out of all the bullying roles (Copeland et al., 2013; Juvonen et al., 2003; Wolke et al., 2013). The differences between bullies and bully-victims might be explained by the early adversity that bully-victims are more likely to experience, such as punitive parenting, bullying by siblings, poverty and physical abuse (Baldry & Farrington, 1998; Lereya, Samara, et al., 2013; Tippett & Wolke, 2014, 2015; Wolke, Tippett, &

Dantchev, 2015). Such harsh conditions can cue a range of behavioural and physiological responses that enable bully-victims to adapt to environmental stress, such as short-term planning and engaging in high risk behaviours (Ellis et al., 2012). However, unlike bullies, the behaviours of bully-victims are not linked to positive outcomes (Copeland et al., 2013; Juvonen et al., 2003; Wolke et al., 2013). Thus, the bullying performed by bully-victims is likely the result of maladaptive functioning, rather than an adaptive response (Volk et al., 2012). For the remainder of this thesis, "bullying" will be in reference to pure bullies, as will any reference to bullying as an adaptive or evolved behaviour.

As outlined, there is reasonably strong evidence that bullying is akin to repeated competitor derogation. Bullies are most likely to target aspects of the victim's appearance or behaviours that are of primary importance to members of the opposite sex, thereby reducing the victim's appeal as a potential mate, just like the derogations used to devalue potential rivals. For example, verbal bullying is the most prevalent type of bullying (Coyne et al., 2006; Craig et al., 2009; Wang et al., 2009) and verbal insults tend to focus on physical appearance, particularly facial features, body size and shape or references about sexual behaviours (e.g., "tart") or orientation (e.g., "gay") (Almenara & Ježek, 2015; Cash, 1995; Crozier & Dimmock, 1999; Park et al., 2009; Poteat & Espelage, 2005). Theoretically then, bullies may be targeting peers who they perceive to be potential rivals. Amongst adolescent girls, some have found that self-perceived mate value, attractiveness and social status are positively associated with victimisation (Andrews, Hanish, Updegraff, Martin, &

Santos, 2016; Arnocky et al., 2012; Cunningham, Taylor, Whitten, Hardesty, Eder, & DeLaney, 2010), whilst other research suggests that overweight girls are more likely to be victimised (van Geel, Vedder, & Tanilon, 2014). Overweight girls may be less likely to be viewed as potential rivals, considering that slim bodies are globally idealised (Swami, Frederick, Aavik, Alcalay, Allik, Anderson et al., 2010) and excess adiposity is considered to be unattractive (Singh et al., 2010). Findings for adolescent boys appear to be similarly complex, with the most and least attractive and socially dominant peers being targeted by bullies (Andrews et al., 2016; Cunningham et al., 2010). Meta-analysis suggests that overweight boys and girls are at increased risk of being bullied (van Geel et al., 2014). Thus, in addition to potentially targeting rivals, bullies may be inclined to derogate peers who are different in some way.

In contrast to the clear links between bullying and competitor derogation, the relationship between bullying and self-promotion has received little empirical investigation. Considering the competitive nature of bullies, it is possible they will use both derogation and self-promotion to a greater extent than their non-competitive peers, especially considering that self-ratings of physical attractiveness, on which bullies tend to score highly (Leenaars, Dane, & Marini, 2008), has been associated with increased use of both competitor derogation and self-promotion (Fisher et al., 2009). As the body is critical in self-promotion, it is possible that bullies may desire to alter and improve their body by weight control or even through cosmetic surgery. Examining whether self-promotion is another strategy

that bullies use to obtain and maintain social dominance would provide further evidence to consider adolescent bullying within the context of intrasexual competition.

2.2 Summary and conclusions

Bullying perpetration is likely an evolved behaviour, as it enables bullies to become socially dominant and in a strong position to compete with peers for access to key resources, including desirable mates. There is increasing evidence that male and female bullies repeatedly derogate competitors through aggressive acts, but the extent to which bullies engage in self-promotion tactics is unknown. As body shape and size are of central importance to males and females in the context of intrasexual competition, the next chapters will review existing evidence on the relationship between bullying and body weight and image (chapter 3), weight control strategies (chapter 4) and the most invasive form of self-promotion, cosmetic surgery (chapter 5).

3 Bullying, body weight and body image

Despite maxims like “don’t judge a book by its cover” physical appearance plays an important role in our judgements of others (Langlois, Kalakanis, Rubenstein, Larson, Hallam, & Smoot, 2000). Such judgements happen fairly automatically and were likely advantageous in our evolutionary history. This chapter reviews literature that has investigated whether adolescents whose appearance deviates from average in terms of weight status are at increased risk of bullying involvement. This chapter also reviews literature that has investigated bullying involvement amongst those who *perceive* their physical appearance deviates from ideal, and the extent to which real and perceived weight might interact to predict bullying victimisation or perpetration.

3.1 Objective weight category

By measuring height and weight, individuals can be grouped into an objective weight category. Height and weight measurements are firstly used to calculate body mass index (BMI), which is an anthropometric measurement that can assess whether an individual is a healthy weight for their height: BMI is calculated by dividing weight (in kilograms) by height (in meters) squared (kg/m^2). In children and adolescents, BMI calculations also account for sex and age. Using guidelines such as

the World Health Organization (2007) growth reference charts (appendix A), each BMI can be ranked into a percentile score and weight category (Table 1).

Table 1 World Health Organization BMI percentile scores and weight categories for children and adolescents and associated adult body mass index cut-offs

Percentile score*	Weight category	Adult BMI cut-off
<3rd	Very underweight	<16
>3rd to <15th	Underweight	>16 to <18.50
>15th to <85th	Average	≥18.50 to <25
>85th to <97th	Overweight	≥25 to <30
>97th	Obese	≥30

*Calculated using the World Health Organization BMI-for-age and sex cut offs (appendix A).

Worldwide, approximately one in three people are overweight or obese (Ng, Fleming, Robinson, Thomson, Graetz, Margono et al., 2014) and prevalence rates continue to increase in high, middle and low income countries (De Onis, Blössner, & Borghi, 2010; Ng et al., 2014). The health consequences of overweight and obesity are well known and include an increased risk of diabetes, cardiovascular disease and premature death (De Onis et al., 2010; Must, Spadano, Coakley, Field, Colditz, & Dietz, 1999; Must & Strauss, 1999; Reilly & Dorosty, 1999). Overweight and obesity have been associated with social, psychological and educational problems like low school achievement and increased risk of depression (Bell, Byrne,

Thompson, Ratnam, Blair, Bulsara et al., 2007; Falkner, Neumark-Sztainer, Story, Jeffery, Beuhring, & Resnick, 2001; Gibson, Byrne, Blair, Davis, Jacoby, & Zubrick, 2008; Gortmaker, Must, Perrin, Sobol, & Dietz, 1993; Mustillo, Worthman, Erkanli, Keeler, Angold, & Costello, 2003). Excess adiposity affects boys and girls fairly equally (Ng et al., 2014; Ogden, Carroll, Curtin, McDowell, Tabak, & Flegal, 2006) but the consequences appear to have a greater impact on girls. Systematic reviews, longitudinal studies and large-scale cross-sectional studies report adverse consequences for obese girls but not obese boys, including poor academic attainment and an increased risk of emotional problems and suicide (Booth, Tomporowski, Boyle, Ness, Joinson, Leary et al., 2014; Falkner et al., 2001; McElroy, Kotwal, Malhotra, Nelson, Keck, & Nemeroff, 2004; Mustillo et al., 2003). Overweight and obesity may directly cause these social, psychological and educational problems, or additional factors may mediate these relationships. For instance, excess adiposity has been associated with parental neglect (Whitaker, Phillips, Orzol, & Burdette, 2007), psychological, sexual and physical abuse (Veldwijk, Proper, Hoeven-Mulder, & Bemelmans, 2012) and peer bullying (van Geel et al., 2014). Excess adiposity may be especially problematic for females because of the evolutionary ideals previously outlined (e.g., low WHR).

In contrast to overweight, undernutrition and underweight are particularly problematic in low and middle income countries, mostly because of environmental and economic factors (Black, Allen, Bhutta, Caulfield, De Onis, Ezzati et al., 2008). Similar to the health effects of overweight, severe underweight is associated with

high disease burden and risk of mortality (Black et al., 2008; Flegal, Graubard, Williamson, & Gail, 2005). Over time the prevalence of underweight in high income countries has decreased and is significantly lower than the prevalence of overweight: in the UK approximately 3% of children are underweight, whilst 30% are overweight (De Onis, Blössner, Borghi, Frongillo, & Morris, 2004; National Obesity Observatory, 2015; Wang, Monteiro, & Popkin, 2002). Underweight is more common in Asian ethnicities, particularly males (National Obesity Observatory, 2015; Taylor, Viner, Booy, Head, Tate, Brentnall et al., 2005), and is likely the result of a distinctive phenotype that puts these males and females at risk of low lean mass (Lear, Kohli, Bondy, Tchernof, & Sniderman, 2009). Amongst males a muscular body is idealised (Hargreaves & Tiggemann, 2009) and underweight or being thin has been associated with depression and problems at school (Eisenberg et al., 2003; Falkner et al., 2001). In contrast, the majority of females have a preference to be thin, which is likely driven by evolutionary and psychological factors (Ali & Lindström, 2006; Swami et al., 2010). Some have suggested that females internalise messages from the media that imply a thin body is the ideal (Stice & Shaw, 1994; Thompson & Stice, 2001), but other evidence suggests that, rather than comparison with media figures, it is peer competition that is the biggest driver of thin body preoccupation (Ferguson, 2013; Ferguson, Muñoz, Garza, & Galindo, 2014).

3.1.1 Objective weight category and bullying involvement

Over recent years there has been an upsurge of research investigating whether overweight and obese children and adolescents are at increased risk of being

bullied (Kukaswadia et al., 2011; Mikolajczyk & Richter, 2008; Pearce, Boergers, & Prinstein, 2002; Reulbach et al., 2013). A recent meta-analysis concluded that obese and overweight girls and boys were more likely to get bullied and that bullying interventions should therefore be targeted at overweight and obese youths (van Geel et al., 2014). Due to a lack of studies, the review did not examine the effects for underweight youths. Other studies that have examined the overweight and peer victimisation association have found that a number of additional factors are important. For instance, longitudinal and cross-sectional studies suggest that effects tend to vary by bullying type (e.g., direct, indirect, verbal), extent of overweight (e.g., overweight vs obese) and sex (e.g. increased physical bullying of obese girls) (Griffiths et al., 2006; Kukaswadia et al., 2011; Mikolajczyk & Richter, 2008; Pearce et al., 2002; Wang, Iannotti, & Luk, 2010; Wang, Iannotti, Luk, et al., 2010). There are other cross-sectional and longitudinal studies that suggest the overweight and victimisation relationship disappears once factors like body dissatisfaction and depressive symptoms have been accounted for (Farrow & Fox, 2011; Giletta, Scholte, Engels, & Larsen, 2010; Sutter, Nishina, & Adams, 2015). Current evidence as to whether overweight girls and boys are more likely to be bullied thus remains debatable.

Few studies have examined the relationship between bullying perpetration and excess adiposity. Teacher and self-reports suggest that male bullies are physically strong (Lagerspetz, Björkqvist, Berts, & King, 1982; Unnever, 2005), but when objective weight has been examined, the results tend to suggest that bullies are

more likely to be obese or overweight (Griffiths et al., 2006; Janssen, Craig, Boyce, & Pickett, 2004; Kukaswadia et al., 2011; Liu, Chen, Yan, & Luo, 2016). Again, the effects tend to differ by bullying type, extent of overweight and sex. For instance, Kukaswadia et al. (2011) found that obese girls were nearly three times more likely to be an indirect bully, whilst there were no effects for boys or those who were overweight. The majority of studies have used self-report methods of data collection (Adams & Bukowski, 2008; Frisén et al., 2009; Gunstad, Paul, Spitznagel, Cohen, Williams, Kohn et al., 2006; Janicke, Marciel, Ingerski, Novoa, Lowry, Sallinen et al., 2007; Janssen et al., 2004; Kukaswadia et al., 2011; Mikolajczyk & Richter, 2008) and thus may have been underpowered because of the low prevalence of self-reported bullies (Copeland et al., 2013; Wolke, Woods, Stanford, et al., 2001). Thus, it has yet to be determined whether male or female bullies are at increased likelihood of being overweight.

When research into bullying was in its infancy, Olweus (1978) suggested that boys who are smaller and weaker may be especially at risk of being bullied. Surprisingly, few studies have explored this empirically (van Geel et al., 2014). Of the extant literature, one study found that underweight boys were at increased risk of physical victimisation and underweight girls were at increased risk of indirect victimisation (Wang, Iannotti, & Luk, 2010), another found underweight boys were at lower risk of victimisation (Griffiths et al., 2006), whilst two found no association (Mikolajczyk & Richter, 2008; Reulbach et al., 2013). Even fewer studies have investigated the relationship between underweight and bullying perpetration. One study found that

underweight boys were less likely to be bullies (Liu et al., 2016) and another study found that underweight girls were more likely to be bullies. However, in the latter study, the effect disappeared once socioeconomic factors had been accounted for, suggesting that bullying and dominance in underweight girls during childhood may be driven by higher socioeconomic status (Griffiths et al., 2006). Overall, results are equivocal as to whether boys and girls who are overweight or underweight are more likely to get bullied or bully others.

3.2 Perceived weight category

If bullying is not related to objective weight category, perhaps it is related to perceptions about weight status. By asking youths (or adults) “how would you describe your weight” and giving them five possible responses (i.e., “very underweight”, “slightly underweight”, “about average”, “slightly overweight” and “very overweight”) it is possible to assign participants to a perceived weight category. Often, the “very” and “slightly” categories are combined and three weight perception categories are compared: average, underweight and overweight.

Weight perceptions tend to vary by individual factors. Generally, females are more likely to perceive themselves as overweight (O'Dea & Caputi, 2001; Talamayan, Springer, Kelder, Gorospe, & Joye, 2006; Tiggemann & Rothblum, 1988), whereas males are more likely to perceive themselves as underweight (Herman, Hopman, & Rosenberg, 2013; O'Dea & Caputi, 2001; Wilson, Viswanathan, Rousson, & Bovet, 2013). Again, this is in line with the evolutionary theory of what is considered to be

attractive for each sex. Regarding ethnicity, the findings are inconsistent: some report overweight perception is more common in white females (Paeratakul, White, Williamson, Ryan, & Bray, 2002) and less common in black males (Ricciardelli, McCabe, Williams, & Thompson, 2007), whilst others report no ethnic differences (Brener, Eaton, Lowry, & McManus, 2004). Regarding SES, some evidence suggest that low SES group members are more likely to perceive themselves to be too thin (O'Dea & Caputi, 2001). This is likely because where economic deprivation is high, heavier and larger bodies are perceived to be more fertile and attractive (Brown, 1991) because they can signal access to food and wealth (Marlowe & Wetsman, 2001).

Overweight and underweight perception have been associated with a range of adverse outcomes, including psychological difficulties (e.g., emotional problems, low self-esteem), disordered eating behaviours (Connor-Greene, 1988; Ge, Elder Jr, Regnerus, & Cox, 2001), increased use of steroids amongst boys (Jampel, Murray, Griffiths, & Blashill, 2016) and are potentially linked to bullying involvement.

3.2.1 Weight perception and bullying involvement

Weight perception is one factor that could explain the inconsistencies in the relationship between bullying and objective weight category. Several studies have reported that a perception of overweight or underweight was associated with increased peer victimisation (Frisén et al., 2009; Holubcikova, Kolarcik, Geckova, Van Dijk, & Reijneveld, 2015; Reulbach et al., 2013). Girls who perceive themselves to be overweight appear to be at increased risk of victimisation and appearance

teasing, whilst boys who perceive themselves to be underweight are at increased risk of victimisation and threats from peers (Brixval, Rayce, Rasmussen, Holstein, & Due, 2012; Frisén et al., 2009).

Few studies have explored the link between weight perception and bullying perpetration. In a large study of over 8,000 nine-year olds in Ireland, Reulbach et al. (2013) found that bullying perpetration was associated with self-perceived weight: girls and boys with body perceptions other than average (i.e., very skinny, skinny, overweight, and very overweight) were more likely to bully others compared to children who described themselves as just the right size. However, the authors did not differentiate between bullies and bully-victim, meaning the findings may be confounded: as highlighted, bully-victims are a distinct group in terms of precursors to and outcomes of bullying involvement (Juvonen et al., 2003; Lereya, Samara, et al., 2013). Recently, Holubcikova et al. (2015) assessed weight perceptions and bullying involvement and found that a perception of overweight was associated with being a bully-victim (and victim), whilst a perception of underweight was associated with being a male bully-victim. However, the studies by Reulbach and Holubcikova and colleagues did not control for BMI. This is important because if weight perceptions were accurate, it was indeed those who were overweight or underweight that were more likely to be involved in bullying.

3.3 Interactions between objective and perceived weight

Weight perceptions that are inaccurate i.e., misperceived, may interact with objective weight category to predict bullying involvement. Inaccurate weight perceptions are common in average weight children and adolescents (Lee & Lee, 2016), but appear to be most common in those whose weight deviates from average (i.e., underweight or overweight) (Cattelino, Bina, Skanjeti, & Calandri, 2015; Kornilaki, 2014). For example, in a cross-sectional study of over 3,000 adolescents, 22% of those who were average weight had an underweight misperception, whilst 49% of those who were overweight had an average weight misperception (Hayward, Millar, Petersen, Swinburn, & Lewis, 2014). Overweight misperceptions are more common amongst girls (Talamayan et al., 2006), whilst underweight misperceptions are more common amongst boys (Cattelino et al., 2015; Kornilaki, 2014). Regarding other individual characteristics, weight misperceptions appear to be more common amongst children and adolescents of lower SES, especially amongst males (O'Dea & Caputi, 2001) and amongst those of white ethnicity (Talamayan et al., 2006).

The consequences of an inaccurate weight perception differ depending on the direction of the perception. Weight perceptions that deviate away from average are associated with more psychological and health difficulties. For instance, underweight misperception in boys has been associated with depressive symptoms (Byeon, 2015) and lower quality of life (Hayward et al., 2014); overweight misperception in boys and girls has been associated with dangerous dietary habits

(Talamayan et al., 2006) and an increased risk of becoming obese (Sutin & Terracciano, 2015). In contrast, average weight misperception appears to be beneficial: it has been associated with a decreased risk of depressive symptoms in underweight boys (Byeon, 2015) and can exert protective effects against future increases in BMI in overweight youths (Sonneville, Thurston, Milliren, Kamody, Gooding, & Richmond, 2015).

3.3.1 Interactions between objective and perceived weight and influences on bullying involvement.

Few studies have investigated whether body weight and body image interact to predict bullying involvement. Lenhart, Daly, and Eichen (2011) found that an average weight misperception amongst obese adolescents was protective against victimisation, whilst Kaltiala-Heino, Lankinen, Marttunen, Lindberg, and Fröjd (2016) found no interaction between actual and perceived overweight in relation to bullying involvement amongst mid-adolescents (i.e., 15-17 year olds). It is yet to be examined how underweight perception might interact with actual weight to predict bullying involvement, and further research is warranted to determine whether body weight or body image (i.e., actual or perceived underweight or overweight) independently or jointly predict bullying involvement.

3.4 Summary and conclusions

Much research has been undertaken to understand who is at the greatest risk of bullying involvement. Overweight and obese youths are frequently purported to

experience greater victimisation, however not all studies report this. Questions remain as to whether bullying and victimisation are more or less common amongst objectively overweight or underweight adolescents, or amongst those who have negative and inaccurate perceptions about their weight. Adolescent who do not, or perceive they do not, meet the evolutionary standards of beauty for males and females in terms of weight status may be at increased risk of victimisation. In contrast, adolescent who are average weight or perceive themselves to be “about right” may be protected against bullying victimisation. There is currently a lack of research on bullies. Because of sex differences in the extent to which adolescents perceive themselves to be underweight or overweight, any relation to bullying may be sex specific.

4 Bullying and tactics to alter appearance: weight control

Adaptations or modifications to appearance can be found across time and culture. Humans often attempt to alter the characteristics that signal high mate value and reproductive potential, which generally means a slim and curvaceous body for females (Harrison, 2003) and a slim and muscular body for males (McCabe & Ricciardelli, 2004). Obtaining either of these ideals may require a significant amount of weight control through diet and exercise. This chapter provides an overview of diet and exercise strategies to control weight and reviews several potential drivers of unhealthy weight control behaviours, including individual, psychological and sociocultural factors, with a focus on the influence of bullying involvement.

4.1 Diet and exercise in weight control

The two most commonly used tactics to control weight are diet and exercise. Diet refers to any predetermined strategy to restrict or increase food intake and can include extreme diet behaviours like binging, purging and taking diet pills, powders or supplements; exercise refers to any activity that is intended to result in weight loss, weight gain or weight maintenance, and can include an array of activities, like typical cardiovascular sports (e.g., running) to more weight based training (e.g., body building). As such, weight control can involve both healthy and unhealthy behaviours. Diet and exercise are most commonly used for weight reduction and early research tended to focus on middle aged adults who were moderately obese

(Miller, Koceja, & Hamilton, 1997). Subsequently, researchers increasingly began to examine the weight control behaviours of average and underweight adults, adolescents and children.

Exercise, fitness and a healthy diet clearly have many health benefits, including improved cognitive functioning, psychological wellbeing and reduced mortality (Bauman, 2004; Blair, Kohl, Barlow, Paffenbarger, Gibbons, & Macera, 1995; Emery, Huppert, & Schein, 1995; Liu, 2003; Penedo & Dahn, 2005). However, just as healthy behaviours cluster together so too do unhealthy behaviours (Berrigan, Dodd, Troiano, Krebs-Smith, & Barbash, 2003; Busch, Van Stel, Schrijvers, & de Leeuw, 2013). For example, compulsive exercise (e.g., “when I don’t exercise I feel guilty”) can predict disordered eating attitudes and behaviours amongst students and adults (Adkins & Keel, 2005; Holland, Brown, & Keel, 2014).

Among children and adolescents, exercise and dieting appear to be the most prevalent forms of weight control (Hoare & Cosgrove, 1998; Neumark-Sztainer, Story, Falkner, Beuhring, & Resnick, 1999). In a nationally representative sample of 8-15 year olds in the US, half were attempting to lose weight and 92% used exercise as a strategy (Brown, Skelton, Perrin, & Skinner, 2016). Special diets, like the use of food supplements (e.g., protein powders) are now commonly used as a strategy to increase weight and muscle mass amongst adolescent boys and girls (Field, Austin, Camargo, Taylor, Striegel-Moore, Loud et al., 2005).

4.2 Drivers

Healthy weight control behaviours appear to be driven by the motivation to be better at sports (Brown et al., 2016), whilst unhealthy weight control behaviours appear to be driven by a combinations of individual, psychological and sociocultural factors (Ricciardelli & McCabe, 2001)

4.2.1 Individual characteristics

A number of individual characteristics have been examined with regards to weight control, particularly sex, age, ethnicity, socioeconomic status and body mass index. Sex differences in weight control are evident in children, adolescents and adults (Buchanan, Bluestein, Nappa, Woods, & Depatie, 2013; Farrow & Fox, 2011; Haines, Neumark-Sztainer, Eisenberg, & Hannan, 2006; Keel, Fulkerson, & Leon, 1997; McCabe & Ricciardelli, 2003; McCreary & Sasse, 2000; McCreary & Saucier, 2009). Sex differences are likely present because of the different evolutionary and societal pressures on males and females. Females tend to feel more pressure to be thin (McCreary & Sasse, 2000) and therefore attempt to lose weight (McCabe, Ricciardelli, & Finemore, 2002) by engaging in restrained and disordered eating (Buchanan et al., 2013; Farrow & Fox, 2011; Haines et al., 2006; Keel et al., 1997; McCabe et al., 2002) and extreme weight loss behaviours (McCabe & Ricciardelli, 2005). The majority of previous research tended to focus on females, but it is now clear that males similarly engage in weight control behaviours. Males feel more pressure to be muscular (McCabe et al., 2002) and are driven to engage in diet and exercise strategies to increase weight and muscle (McCabe & Ricciardelli, 2005;

McCabe et al., 2002; McCreary & Sasse, 2000). Drive for muscularity and body building are associated with increased exercise (e.g., weight training) and dieting to gain weight (McCreary & Sasse, 2000). Even 8-11 year old boys are attempting to increase muscle by eating special foods and exercising (McCabe & Ricciardelli, 2003). Although adult and adolescent males are more likely to exercise than females (Kantanista, Osiński, Borowiec, Tomczak, & Król-Zielińska, 2015), males appear to be at similar risk of engaging in disordered eating behaviours like skipping meals (Brown et al., 2016) and using laxatives (Buchanan et al., 2013). Thus, although there are sex differences in the ultimate goal of weight control, males and females may be more similar than different regarding disordered behaviours (Latzer, Azaiza, & Tzischinsky, 2012).

Age differences in diet and exercise behaviours are less robust. Weight control behaviours have been found in children as young as eight years old (McCabe & Ricciardelli, 2003), and whilst Hoare and Cosgrove (1998) found that abnormal eating behaviours increased with age, not all studies find age to be a significant predictor (Botta, 2003; Farrow & Fox, 2011). In a study of 8-11 year olds, around half of all of the girls and boys had engaged in cognitions and behaviours to lose weight, including dieting, changing their eating habits and exercising to lose weight, and there were no significant differences between the 8 and 11 year olds (McCabe & Ricciardelli, 2003). Other research suggests that pubertal stage, rather than age, may be the critical factor. McCabe et al. (2002) found that the main predictor of weight control strategies amongst girls and boys was pubertal stage, whilst Keel et

al. (1997) similarly found that pubertal development predicted disordered eating amongst girls.

Some research has suggested that weight control behaviours appear to be more prevalent amongst females of higher socioeconomic status (Story, French, Resnick, & Blum, 1995), whereas other evidence suggests that high and low socioeconomic groups are at similar risk (Rogers, Resnick, Mitchell, & Blum, 1997). Socioeconomic factors seem to affect the types of weight control strategies that are used. For instance, adolescents from higher socioeconomic groups may engage in healthier dieting and exercise regimes because they can afford special diets and sport memberships, whilst those from lower socioeconomic groups may be more likely to engage in disordered behaviours (Neumark-Sztainer et al., 1999; Story et al., 1995).

Evidence for ethnic differences in weight control and body satisfaction amongst females is relatively strong. Overall, meta-analysis suggests that white females are more dissatisfied with their body than black females, especially in young adulthood (Roberts, Cash, Feingold, & Johnson, 2006). Neumark-Sztainer et al. (1999) found that white females were more likely than black females to use weight control tactics like dieting and exercise, and Haff (2009) found that when black girls did engage in weight change behaviours they were more consistent with weight perceptions e.g., trying to put weight on if they perceived themselves to be underweight. Ethnic differences in the use of weight control strategies amongst males is equivocal. In a large cross-sectional study of Israeli-Arab adolescents, Latzer et al. (2012) found that similar rates of boys and girls (16.4% and 18.7%,

respectively) had high scores on a measure of attitudes towards disturbed eating; and whilst Farrow and Fox (2011) found that white adolescent boys were less satisfied with their bodies in comparison to non-white adolescent boys, ethnicity does not seem to predict eating disturbances (Botta, 2003).

It is clear that weight control is inextricably linked to body mass index (BMI). Much research suggests that disordered eating is highly prevalent amongst overweight (Brown et al., 2016; Farrow & Fox, 2011; Keel et al., 1997; Neumark-Sztainer et al., 2002; Neumark-Sztainer et al., 1999) and underweight males and females (Neumark-Sztainer et al., 2002; Neumark-Sztainer et al., 1999). Dieting, exercise and disordered eating seem to positively correlate with BMI, whilst the use of diet supplements negatively correlates with BMI (Neumark-Sztainer et al., 1999).

4.2.2 Psychological factors

Self-evaluations of the body and its appearance is an established risk factor for problematic weight control behaviours, as has been shown in meta-analysis and longitudinal studies (Cash & Deagle, 1997; Cattarin & Thompson, 1994; Stice & Agras, 1998). For example, over a five year period, body dissatisfaction predicted fasting to lose weight, the use of food substitutes, skipping meals and smoking to supress appetite amongst boys and girls; in girls, body dissatisfaction predicted lower levels of exercise and more extreme diet behaviours, like the use of diet pills, vomiting and diuretics (Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006).

Feeling dissatisfied with the body (i.e., low body-esteem) can manifest as a specific perception of being overweight or underweight. Girls and boys who perceive themselves to be overweight are at increased risk of unhealthy weight control behaviours like using food substitutes, diet pills, laxatives and vomiting (Lee & Lee, 2016; Talamayan et al., 2006), whilst a perception of very underweight and very overweight amongst boys has been associated with increased use of anabolic steroids (Jampel et al., 2016), which can increase body size, weight and strength (Haupt & Rovere, 1983).

Numerous studies have reported that body dissatisfaction and drive for thinness or muscularity are closely related to self-esteem (Brunet, Sabiston, Dorsch, & McCreary, 2010; Cohane & Pope, 2001; McCreary & Sasse, 2000). A large 13-year longitudinal study found a strong bi-directional relationship between body satisfaction and self-esteem in male and female adolescents and adults (aged 13-26 years) (Wichstrøm & von Soest, 2016). These findings were corroborated by another five year longitudinal study showing that dissatisfaction with the body during adolescence was predicted by low self-esteem and depression (Paxton, Eisenberg, & Neumark-Sztainer, 2006). Some have shown that self-esteem is a mediating factor in the relationship between weight status and peer victimisation (Fox & Farrow, 2009) and between peer victimisation and eating disorders (Frank & Acle, 2014). Thus, body-esteem and self-esteem may both be critical factors in the development of disordered weight control behaviours. Emotional problems seem to play an important role, too: body dissatisfaction can predict low self-esteem and

emotional problems (Van den Berg, Wertheim, Thompson, & Paxton, 2002) and emotional problems has a mediating effect on the relationship between verbal bullying and body dissatisfaction in girls (Farrow & Fox, 2011). Previous researchers have used self-esteem and emotional problems together as an indicator of psychological functioning (McCreary & Sasse, 2000; Van den Berg et al., 2002), which has been associated with drive for muscularity and body building (McCreary & Sasse, 2000; Wolke & Sapouna, 2008) and bulimic tendencies (Van den Berg et al., 2002). Thus, as body-esteem, self-esteem and emotional problems appear to be closely connected, all three factors may be relevant indicators of psychological functioning and weight control behaviours.

4.2.3 Sociocultural factors

Numerous studies have investigated the extent to which sociocultural factors, like messages from the media, parents and peers can influence weight control behaviours. Regarding the media, meta-analysis suggests that the thin-ideal portrayed in magazines, television and films has significant but small effects on body image in adolescent females (Groesz, Levine, & Murnen, 2002). There is little evidence as yet that the media is a causal risk factor of disordered eating (Levine & Murnen, 2009). For instance, longitudinal studies show that messages from the media had little impact on extreme weight change behaviours amongst adolescent boys or girls (McCabe & Ricciardelli, 2005): the strongest predictors for boys and girls were messages from parents (fathers and mothers, respectively) and from best friends (girls only). In addition to messages from parents and peers, cross-sectional

studies have investigated the role of abuse and bullying victimisation in relation to unhealthy weight control behaviours. In a large sample of adolescents, the risk of disordered eating was highest amongst girls and boys who had experienced any sexual abuse or physical abuse by an adult (Neumark-Sztainer, Story, Hannan, Beuhring, & Resnick, 2000). Even feelings of unsafety at school have been linked to emotional problems and dieting behaviours amongst girls (Haff, 2009).

4.2.4 Teasing and bullying

Weight teasing appears to be particularly common during adolescence, especially amongst girls and obese boys, but is also common in underweight youths (Neumark-Sztainer et al., 2002). Longitudinal research suggests that 21% males and 23% females experienced weight-related teasing (Haines et al., 2006). Weight and shape teasing by peers can reduce body satisfaction (Paxton et al., 2006; Van den Berg et al., 2002), predict thin body preoccupation and binge eating amongst boys and girls, and predict social pressure to be thin (Agras, Bryson, Hammer, & Kraemer, 2007) and dieting (Haines et al., 2006) amongst girls.

It is well documented that appearance teasing can lead to disordered eating (Menzel et al., 2010), but there is emerging evidence that any type of peer victimisation (e.g., physical, indirect, cyber) can have adverse effects on body-esteem (Lereya et al., 2014) and eating disorder symptoms (Copeland et al., 2015). Farrow and Fox (2011) found that peer victimisation was correlated with emotional symptoms, restrained eating and body dissatisfaction.

Retrospective reports suggest the effects of victimisation on weight control behaviours can be long-lasting. One study found that approximately one in five adult male body builders reported they had been victimised by peers during adolescence, and these men had increased levels of muscle dysmorphia symptoms i.e., obsessing about being small and weak (Wolke & Sapouna, 2008). In a sample of female adolescents and adults with eating disorders, 92% reported experiencing verbal, direct, indirect and/or cyber aggression (Frank & Acle, 2014). However, prospective research suggests that the longitudinal effects of bullying on eating disorder symptoms may be limited to adolescence (Copeland et al., 2015).

Surprisingly, few studies have investigated the mechanisms by which peer victimisation might lead to unhealthy weight control. Van den Berg et al. (2002) found that body dissatisfaction mediated the relationship between teasing and eating disorder symptoms, whilst Copeland et al. (2015) found that emotional problems mediated the relationship. As highlighted, body-esteem, self-esteem and emotional problems may all be relevant mediators in the relationship between peer victimisation and disordered weight control.

Research on the relationship between bullying and weight control behaviours has primarily focussed on victims. Current evidence may therefore be confounded because the majority of studies have not distinguished between victims and bully-victims. Although victimisation is damaging for both victims and bully-victims, it is bully-victims that appear to suffer the greatest consequences. In fact, when researchers have distinguished between victims and bully-victims, it is bully-victims

that appear to be at the greatest risk of eating disorders (Copeland et al., 2015; Kaltiala-Heino, Rimpelä, Rantanen, & Rimpelä, 2000). Pure bullies have rarely been assessed. Studies of general aggression have shown positive correlations between aggression and eating disorder symptoms in older adolescents (Miotto, De Coppi, Frezza, Petretto, Masala, & Preti, 2003), but again, no distinction was made between those who were aggressive and victimised (i.e., bully-victims) and those who were purely and repeatedly aggressive (i.e., bullies). When bullies and bully-victims have been examined as separate groups, it seems that bullies are at increased risk of eating disorder symptoms too (Copeland et al., 2015; Kaltiala-Heino et al., 2000). This is surprising considering that eating disorder symptoms appear to be primarily driven by reduced psychological functioning, which is uncharacteristic of bullies (Copeland et al., 2013; Juvonen et al., 2003; Wolke et al., 2013). If bullies are indeed engaging in weight control behaviours, it is plausible that this is a strategic attempt to improve their appearance and compete intrasexually and not a result of psychological dysfunction.

4.3 Summary and conclusions

Evidence is inconclusive as to the causal influences of individual, psychological and sociocultural influences on weight control behaviours. In fact, although individual and psychological factors may be of some influence, they are likely to be mediating or moderating effects. Body dissatisfaction is a well-established risk factor for unhealthy weight control and has strong associations with general self-esteem and emotional problems. Taken together, body-esteem, self-esteem and emotional

problems could be considered as a composite measure of psychological functioning, and it is likely that psychological functioning is a mediating factor between bullying victimisation and disordered weight control behaviours. Few studies have investigated weight control behaviours amongst bullies and bully-victims. If bullying perpetration is a strategic attempt to compete intrasexually through self-promotion, psychological functioning may play less of a role in the weight control strategies used by bullies.

5 Bullying and tactics to alter appearance: cosmetic surgery

Modifications to appearance can be temporary or permanent, and although some modification techniques are used as a way to look different from the norm (Myers, 1992), many alter their appearance in an attempt to enhance attractiveness. Cosmetic surgery is an increasingly prevalent and accepted method of appearance enhancement (American Society of Plastic Surgeons, 2015; Delinsky, 2005). This chapter provides an overview of several potential drivers of cosmetics surgery, including individual and psychological factors, with a focus on the extent to which bullying involvement may be a key driver of desire to alter appearance via cosmetic surgery.

5.1 Cosmetic surgery

Cosmetic medical procedures refer to any surgical or minimally-invasive procedures that are intended to improve physical appearance. Cosmetic medical procedures is now the accepted term, rather than cosmetic surgery, as many of the popular treatments are non-surgical and minimally invasive (Sarwer & Crerand, 2004). From herein, cosmetic procedures will be used when discussing surgical and non-surgical procedures and cosmetic surgery will be used when discussing purely surgical procedures. Over recent decades, cosmetic procedures have gained popularity and prevalence rates have steadily increased. Between 2014 and 2015, 15.9 million cosmetic procedures were undertaken in the US; 226,000 of those procedures were

performed on 13-19 year olds (American Society of Plastic Surgeons, 2015). In 2015, 51,000 adults underwent cosmetic surgery in the UK - an increase of 13% since 2014 (The British Association of Aesthetic Plastic Surgeons, 2015). In both the US and UK, over 90% of procedures are undergone by adult women, but prevalence rates are rising amongst adolescents and males (American Society of Plastic Surgeons, 2015; The British Association of Aesthetic Plastic Surgeons, 2015).

5.1.1 Drivers

In recent decades' researchers began to examine the drivers of desire for cosmetic surgery. The overarching question seems to have been to what extent is cosmetic surgery a normal tactic to improve appearance, and to what extent is it driven by psychological dysfunction. The drivers examined so far include sociocultural factors, like mainstream media, celebrity influences and more recently the use of social networking sites (De Vries, Peter, Nikken, & De Graaf, 2014; Delinsky, 2005; Henderson-King & Brooks, 2009; Markey & Markey, 2009; Swami, Taylor, & Carvalho, 2009), interpersonal factors, like vicarious experience (i.e., knowing someone who has undergone a procedure) and concerns with social standing (Brown, Furnham, Glanville, & Swami, 2007; Delinsky, 2005; Henderson-King & Brooks, 2009; Javo & Sørlie, 2009), individual factors like sex, age, socioeconomic status and ethnicity (Honigman, Phillips, & Castle, 2004; Markey & Markey, 2009; Swami, Campana, & Coles, 2012), and psychological factors like body dissatisfaction and psychological dysfunction (Henderson-King & Henderson-King, 2005; Javo &

Sørlie, 2009; Markey & Markey, 2009; Pertschuk, Sarwer, Wadden, & Whitaker, 1998; Sarwer & Crerand, 2004).

5.1.1.1 Individual factors

As the overwhelming majority of cosmetic procedures are performed on females, sex is a particularly important individual factor. Females seeking cosmetic surgery tend to be more invested in their appearance (Sarwer, LaRossa, Bartlett, Low, Bucky, & Whitaker, 2003), whereas males seem to be driven by a fear of becoming unattractive (Henderson-King & Henderson-King, 2005). Despite these differences, there are a number of shared characteristics. For example, both sexes report greater interest in their health and fitness (Sarwer & Crerand, 2004; Sarwer et al., 2003), have lower self-ratings of attractiveness preoperatively and are more self-conscious postoperatively (Brown et al., 2007; Henderson-King & Henderson-King, 2005; Slator & Harris , 1992).

Sex differences in the uptake of cosmetic procedures may be a product of concerns about physical appearance and age related factors. In females, appearance concerns seem to be most prevalent amongst 18-21 year olds (69%) and remain high until 60 years of age (63%); in males, concerns seem to be most prevalent amongst 18-21 year olds (56%) and consistently decrease with age (Harris & Carr, 2001). This relationship between age, sex and appearance concern was supported by Brown et al., (2007) who found an inverse relationship between age and interest in cosmetic procedures amongst males but not females, and Swami, Chamorro-

Premuzic, Bridges, & Furnham (2009) similarly found that age was not associated with interest in cosmetic surgery in females. As attractiveness is the primary feature on which males select mates (Shackelford, Schmitt, et al., 2005), a lack of age differences in the extent to which females desire to be attractive is expected.

With regards to the relationship between cosmetic surgery and socioeconomic factors, in the UK the number of cosmetic procedures performed has been correlated with increased gross domestic product i.e., economic growth (Nassab & Harris, 2013). Research from the US similarly found that the average household income of individuals who undergo cosmetic procedures was in the highest economic quartile (Prendergast, Ong'uti, Ortega, Khoury, Onwuka, Bolorunduro et al., 2011). This suggests that the prevalence of cosmetic procedures increases as more disposable income is available. Few studies have reported on the educational level of cosmetic candidates, but results from one study suggested patients were older and less educated than controls (Sarwer et al., 2003). Thus, it is possible that individuals with lower education who are able to secure a higher income (either themselves or via a partner) may be most likely to undergo cosmetic procedures.

Another individual factor that may be related to desire for cosmetic procedures is ethnicity, though current literature is scant. The few studies examining this have been based in the UK and US and have used samples of university students. The results have been inconsistent in that, in the UK, Swami et al. (2012) found white women were more interested in cosmetic procedures than Asian and African Caribbean women, whereas in the US, Delinsky (2005) found no ethnic differences.

Generally, females and males of white ethnicity tend to have lower body satisfaction than other ethnicities (Swami et al., 2012) and may therefore be more driven to alter their appearance. However, research suggests the prevalence of cosmetic procedures is increasing in ethnic minority groups (Prendergast et al., 2011).

5.1.1.2 Psychological factors

From the cosmetic surgeon's perspective, the psychological functioning of the candidate should be of the upmost importance, as candidates with poor psychological functioning are at greater risk of poor postoperative outcomes (Honigman et al., 2004). Many cosmetic candidates have good psychological functioning prior to and following a cosmetic intervention, but a substantial proportion do not (Frederick, Lever, & Peplau, 2007; Jackson et al., 2012; Javo & Sørlie, 2009; Markey & Markey, 2009; Pertschuk et al., 1998; Sarwer et al., 2003). It is now commonly accepted that cosmetic procedures should be contraindicated in candidates with body dysmorphic disorder (BDD): BDD is a psychiatric disorder whereby the primary symptom is a pre-occupation with a slight or imagined defect in appearance, and is present in 5-15% of cosmetic candidates (Sarwer & Spitzer, 2012). General body dissatisfaction appears to be a reliable predictor of desire for cosmetic procedures (Brown et al., 2007; Henderson-King & Henderson-King, 2005; Markey & Markey, 2009; Swami et al., 2012; Swami, Chamorro-Premuzic, et al., 2009; von Soest, Kvalem, Skolleborg, & Roald, 2006).

Other types of dysfunction have also been associated with appearance evaluations and cosmetic procedures. General self-esteem appears to be related to self-perceptions of attractiveness in women (Swami, Chamorro-Premuzic, et al., 2009; von Soest et al., 2006) but does not appear to be directly related to an interest in cosmetic procedures (Sarwer et al., 2003; Swami, Chamorro-Premuzic, et al., 2009; von Soest et al., 2006). On the other hand, emotional problems have been associated with an increased desire for cosmetic surgery. With regards to specific surgeries, depression appears to be more common in aesthetic rhinoplasty (i.e., nose reshaping) compared to functional rhinoplasty patients (Naraghi & Atari, 2015). Similarly, amongst breast augmentation patients 40% (vs 13% of controls) had accessed mental health services within the last two years (Sarwer et al., 2003). Overall, cosmetic surgery candidates appear to be more likely to have used psychiatric medications and be at higher risk of current or historical depression or anxiety (Meningaud, Benadiba, Servant, Herve, Bertrand, & Pelicier, 2001; Sarwer, Zanville, LaRossa, Bartlett, Chang, Low et al., 2004). There are many factors that can affect psychological functioning in adults, including trauma caused by neglect, sexual, physical and emotional abuse (Beitchman, Zucker, Hood, DaCosta, Akman, & Cassavia, 1992; Norman, Byambaa, De, Butchart, Scott, & Vos, 2012) and bullying or teasing during childhood and adolescence.

5.1.1.3 Bullying and teasing

Several studies have investigated the association between bullying and cosmetic surgery using adult samples. Overall, cosmetic patients or candidates report

appearance teasing more frequently than controls (Jackson et al., 2012; Javo & Sørlie, 2009; Sarwer et al., 2003; Veale, Eshkevari, Ellison, Costa, Robinson, Kavouni et al., 2014; von Soest et al., 2006). In a study of 449 patients undergoing cosmetic surgery and dentistry in Australia, 40% reported a history of appearance teasing. Prevalence rates differed depending on the procedure being sought: 61% of rhinoplasty patients, 51% of breast augmentation patients and 42% of body procedure patients reported a history of being teased (Jackson et al., 2012). Compared to patients who had not been teased, those who reported teasing had higher depression, anxiety, body dysmorphic symptoms and lower body satisfaction scores. Some researchers have found that although teasing can uniquely predict interest in cosmetic procedures, the relationship appears to be mediated by poor body esteem or body dissatisfaction (Markey & Markey, 2009; von Soest et al., 2006). Thus, bullying or teasing may exert its effect on cosmetic surgery interest by impacting how the individual feels about their body.

The majority of research on the role of bullying and teasing as a driver of cosmetic surgery has been conducted with cosmetic procedure candidates or university students. A key limitation of this literature is that bullying is reported retrospectively. Retrospective designs are problematic because current or prior psychological problems can lead to biased reporting (Mackinger, Pachinger, Leibetseder, & Fartacek, 2000; Richters, 1992). As most bullying occurs during childhood and adolescence and over 70% of cosmetic candidates report they were teased at secondary school (Jackson et al., 2012), a methodologically sound

approach would be to assess the extent to which adolescents who are currently involved in bullying desire cosmetic surgery. Although the prevalence of cosmetic surgery is increasing amongst adolescence (American Society of Plastic Surgeons, 2015), few studies have examined whether desire for cosmetic surgery differs between those involved in bullying (victims, bully-victims and bullies) compared to their uninvolved peers, and whether effects are moderated by sex. Though boys and girls tend to be bullied at similar rates (Nansel et al., 2001; Reulbach et al., 2013; Salmivalli et al., 1996) the sex ratio of cosmetic procedures is highly skewed (American Society of Plastic Surgeons, 2015; The British Association of Aesthetic Plastic Surgeons, 2015), suggesting the mechanisms between bullying involvement and interest in cosmetic surgery may be different for boys and girls. Furthermore, it has yet to be examined whether psychological functioning is a key mediator in the relationship between bullying involvement and desire for cosmetic surgery amongst adolescent girls and boys. Finally, there is a lack of research investigating whether bullies desire cosmetic surgery. There are thus several gaps in the literature that warrant further exploration.

5.2 Summary and conclusions

Much research has investigated the extent to which cosmetic surgery is driven by a healthy desire to improve one's appearance (i.e., self-promotion) or whether psychological dysfunction plays a major role. Approximately half of cosmetic procedure candidates appear to be at increased risk of emotional difficulties and poor body esteem, which may be related to a history of being teased or bullied

during childhood or adolescence. Limitations of the current literature include a focus on adults and victims. Thus, important questions remain as to whether adolescents who are currently being bullied desire cosmetic surgery to a greater extent than peers uninvolved in bullying, and whether the relationship is mediated by psychological distress. The extent to which bullies and bully-victims desire cosmetic surgery has yet to be explored. It is possible that bullies, victims and bully-victims may have an increased desire for cosmetic surgery compared to uninvolved adolescents, though the mechanisms will likely be different: amongst bullies, desire for cosmetic surgery may be a self-promotion tactic as opposed to being driven by reduced psychological functioning.

6 Research aims and objectives

A number of gaps in the literature have been identified with regards to the relationship between bullying involvement, body weight, body image, weight control behaviours and desire for cosmetic surgery. This chapter summarises the rationale behind each of the three studies included within this thesis and outlines the specific research aims and objectives.

Overall, there were two key aims of this research:

1. To determine whether body weight or body image independently or jointly predict bullying role amongst males or females (study 1).
2. To examine the extent to which bullies, victims and bully-victims are preoccupied with self-promotion through body alteration and whether this is related to sex and psychological functioning (study 2 and 3).

6.1 Adolescent bullying involvement amongst boys and girls: is it body weight or body image that matters? (Study 1)

As reviewed in chapter in chapter 2 and 3, physical appearance is important from an evolutionary perspective, and much research has investigated whether those whose physical appearance deviates from average in terms of body weight are at increased risk of bullying involvement. As yet, the evidence is equivocal regarding overweight and few studies have investigated whether those who are underweight are at increased risk of bullying involvement, despite such youths being especially

vulnerable to physical attacks. Previous research suggests that any relationship between weight status and bullying involvement may be mediated by body image and there may be specific effects for males and females. To my knowledge, no study has investigated the independent and joint effects of body weight and body image on bullying involvement as a bully, victim or bully-victim in male and female adolescents. Study 1 thus has the following objectives:

- To investigate whether body weight or body image (i.e., actual or perceived underweight or overweight) is independently associated with bullying role (bully, victim or bully-victim) amongst male or female adolescents.
- To investigate whether body weight and body image interact to predict bullying role amongst male or female adolescents.

6.2 Associations between bullying and weight loss preoccupation in adolescents (study 2)

As reviewed in chapter 4, weight control as a tactic to alter appearance is prevalent amongst adults, adolescents and children of all shapes and sizes, although those who are bullied may be at elevated risk of engaging in disordered diet and exercise behaviours, potentially via reduced psychological functioning. Less clear is the extent to which bullies might also be preoccupied with controlling their weight. Weight control may be considered as a form of self-promotion, meaning psychological functioning may have little impact on the diet and exercise behaviours used by bullies. To my knowledge, no study has investigated whether

psychological functioning is the mechanism by which bullying involvement leads to weight loss preoccupation amongst male and female bullies, victims or bully-victims. Study 2 thus has the following objectives:

- To investigate whether bullies, victims and bully-victims are at increased risk of weight loss preoccupation compared to adolescents uninvolved in bullying.
- To investigate whether psychological functioning mediates the relationship between bullying role and weight loss preoccupation.
- To investigate whether sex is a key moderator of the relationship between bullying and weight loss preoccupation.

6.3 Adolescent desire for cosmetic surgery: associations with bullying and psychological functioning (study 3)

As reviewed in chapter 5, cosmetic surgery is the most invasive type of body alteration and self-promotion. Evidence suggests that a substantial proportion of adults seeking cosmetic procedures have poor psychological functioning, which may be a result of bullying during childhood or adolescence. So far research has focussed on victims and adults, whilst the extent to which bullies might also desire cosmetic surgery is unknown. To my knowledge, no study has investigated whether adolescent bullies, victims or bully-victims desire cosmetic surgery; or whether psychological functioning is the mediating factor. It is hypothesised that psychological functioning may have little impact on the

extent to which bullies desire cosmetic surgery. Study 3 thus had the following objectives:

- To investigate whether bullies, victims and bully-victims have a higher desire for cosmetic surgery compared to adolescents uninvolved in bullying.
- To determine whether the relationship between bullying role and desire for cosmetic surgery is direct or mediated by psychological functioning.
- To investigate whether any effects of bullying on desire for cosmetic surgery are sex-specific.

6.4 Overview of key study variables

An overview of the key variables used within each of the three studies is shown in Table 2, whilst detailed descriptions of each measure are provided in chapter 7.

Table 2 Summary of variables used in each study

	STUDY		
	1	**2**	**3**
Predictor(s)	Actual weight category & Perceived weight category	Bullying role	Bullying role
Covariates	Parent education Ethnicity Pubertal Stage	Parent education Ethnicity Pubertal Stage Age Body mass index	Parent education Ethnicity Age
Moderator (or stratification variable)	(Sex)	Sex	Sex
Mediator	-	Psychological functioning (latent composite variable generated using the self-esteem scale, body-esteem scale and the emotional problems subscale of the SDQ)	Psychological functioning (as in study 2)
Outcome	Bullying role	Adapted version of the Eating Behaviours component of the CAPA	Adapted version of the Acceptance of Cosmetic Surgery Scale

7 Method

7.1 Design and setting

A two-stage sampling approach was used (Figure 2). During Stage 1, adolescents were recruited from secondary schools in the Warwickshire, West Midland and surrounding areas of the UK, and were screened for bullying involvement using self-report and peer nominations. All those who screened positive for bullying others (i.e., bullies) were invited to take part in Stage 2, alongside a random sample of victims, bully-victims and adolescents uninvolved in bullying. At Stage 2, all participants were asked to complete a battery of assessments.

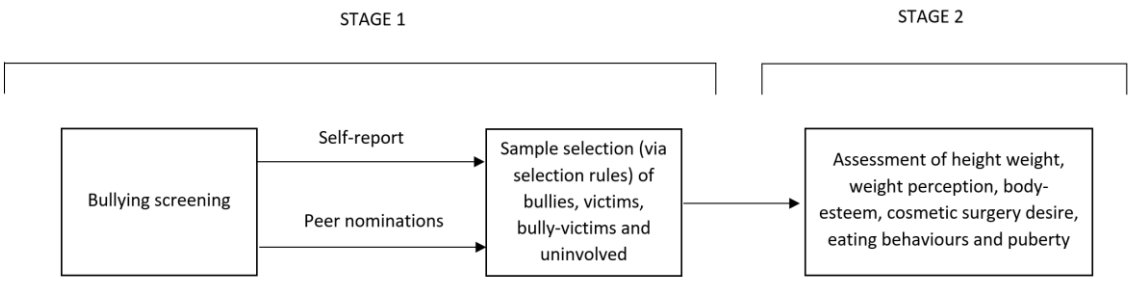

Figure 2 Overview of study design

7.2 Study size

A power analysis was conducted using estimated prevalence rates of bullying and using normative data on the Strengths and Difficulties Questionnaire. The prevalence rate of bullies within the population is estimated to be around 4%

(Tippett et al., 2013), compared to victims at 20% and bully-victims at 5% (Copeland et al., 2013). With the lowest prevalence, bullies were therefore used as the lead group. To detect a small effect size (*d*=.3) between bullying groups at 80% power, at least 100 adolescents per group were needed (Lereya et al., 2014). Thus, at least 2,400 adolescents needed to be screened. Previous research suggests that attrition in school-based studies occurs at a rate of approximately 30%, due to absence and pupils moving schools (Bond, Carlin, Thomas, Rubin, & Patton, 2001; Pellegrini & Long, 2002; Rothon, Head, Klineberg, & Stansfeld, 2011). Accounting for 30% attrition, the power calculation indicated an initial sample of 3,250 needed to be screened for bullying involvement.

7.3 Sample

A total of 160 schools were approached to take part in the study. Six originally agreed to participate, but one withdrew before data collection commenced. Five schools took part in the study, meaning the participation rate of schools was 3.1%. Despite multiple attempts at contacting schools through emails and telephone calls, the majority (*n*=122) gave no response. As shown in the STROBE diagram (Vandenbroucke, von Elm, Altman, Gotzsche, Mulrow, Pocock et al., 2007) in Figure 3, when a reason was offered, usually time or resource (i.e., computer) constraints prevented participation. Of the participating schools, one was a girls' only school and the remaining four were mixed sex schools. As bullies and bully-victims are more likely to be male (e.g., Cook et al., 2010; Espelage & Holt, 2001; Nansel et al., 2001; Salmivalli et al., 1996; Tippett et al., 2013), including an all-girls school

increased the opportunity to generate a large enough sample of female bullies for further investigation. Four schools were located within a city or town and one was in a rural location. All schools were comprehensive schools (i.e., non-fee paying) and one was a Grammar School (i.e., pupils had to pass an exam to enter the school). A multi-level analysis, clustered at the school level, revealed there were no significant differences between the schools ($p>.250$).

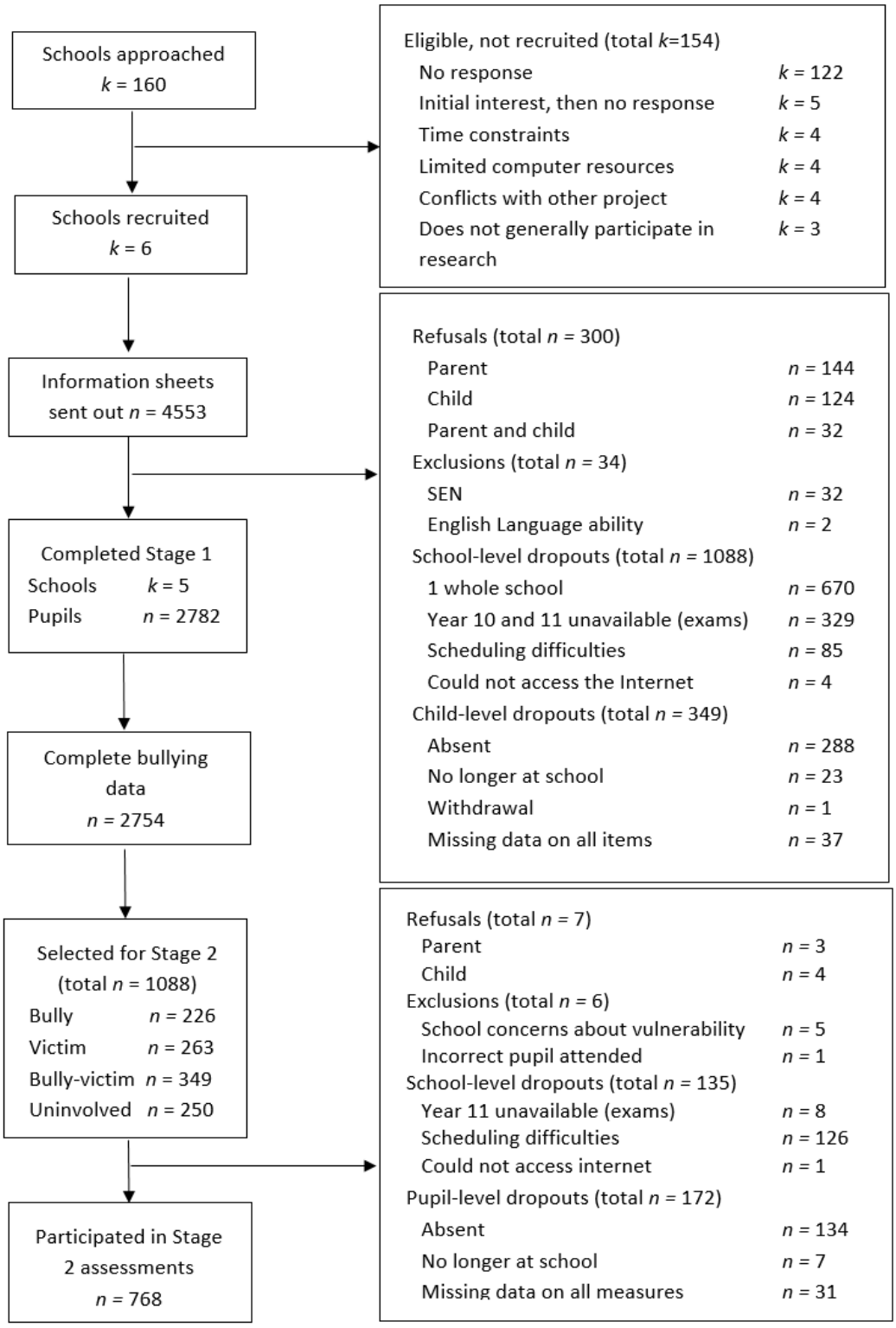

Figure 3 STROBE flow diagram of participant recruitment and dropout

After refusals, exclusions and dropouts, 2,782 pupils (61%) competed Stage 1. Excluding the whole school that dropped out, the participation rate of Stage 1 was 71.6%. Regarding refusals (parent and/or child) and dropouts (due to absence), there were no significant differences between boys and girls ($p>.05$). However, there were significant differences between year groups: pupils in year 7 (OR=.64, 95% CI=.47 to .89, p=.005) and year 9 (OR=.69, 95% CI=.50 to .95, p=.021) were less likely to participate in the study.

At the end of Stage 1, pupils were selected to take part in Stage 2 based on their bullying involvement as reported by themselves and by peers. Four out of five schools used a vertical tutoring system (i.e., peers from every year group), meaning the majority of pupils were less familiar with the peers in their tutor group. As the power calculation was based on a bullying perpetration prevalence of 4% (Tippett et al., 2013) and the prevalence of self-reported bullies in this study was 1.9%, peer reports were included to generate a large enough sample of bullies. The selection rules, shown in Table 3, allowed the use of both self- and peer reports to select bullies and bully-victims. The selection of victims was restricted to self-reports, justifiably as peers tend to make nominations based on victim reputation, rather than current victim status (Boulton, 2013).

Table 3 Selection rules used to identify adolescents as a bully, victim, bully-victim or uninvolved in bullying

Role	Rule
Uninvolved	Neutral on self-report measures (traditional AND cyber) AND zero peer nominations.
Victim	Victim on self-report traditional measure AND not a bully or bully-victim on self-report cyberbullying OR peer nominations.
Bully	Self-reported traditional bully OR self-reported cyberbully OR peer nominated bully AND not a victim or bully-victim on any measure.
Bully-victim	Bully-victim on any measure. Any combination of bully-victim in one measure AND bully OR victim in another measure (e.g., self-reported traditional bully-victim AND peer nominated bully). Any combination of bully AND victim on different measures (e.g., self-reported traditional victim AND peer nominated bully).

Once the selection rules had been followed, there were large numbers of victims (*n*=660; 24%), bully-victims (*n*=402; 14.6%) and uninvolved adolescents (*n*=1442; 52.4%), in comparison to bullies (*n*=250; 9%). A subsample of victims, bully-victims and uninvolved adolescents were thus selected using Microsoft Excel's random number generator.

Of the sample selected for Stage 2, 52% were female, 82% were White British and 45.5% had parents who had been to university. There were no significant

differences in individual characteristics between those who were selected for Stage 2 and those who took part.

7.4 Measures

All measures were selected in order to answer the research questions and on the basis of good reliability and validity in similar contexts or populations. All participants were given identical questionnaires but the ordering of measures was counterbalanced, except for data on individual characteristics, which were collected at the beginning of Stage 1. Different measures were used at each stage of the study.

7.4.1 Stage 1

The primary aim of Stage 1 was to collect data on bullying involvement, individual characteristics and two psychological factors (i.e., self-esteem and emotional problems).

7.4.1.1 Individual characteristics

Data on sex and year group were provided by the school, whilst data on sex, date of birth, ethnicity and parent education (a proxy for socioeconomic status), were self-reported by each pupil. Ethnicity had six possible responses (White British; White other; Mixed/multiple ethnic groups; Asian/Asian British; Black; Other). As most pupils were White British, there were too few participants in each of the other ethnic category to allow meaningful comparisons (e.g., the next largest ethnic group was Asian at 6.1%). Ethnicity was subsequently dummy coded into 0=White

British and 1=Other. Parent's highest level of education i.e., did not complete school (<11 years), basic schooling (11 years), college i.e., further education (11-13 years) or university (>13 years), was dummy coded into 0=13 years or less (≤13) and 1=more than 13 years (>13) of education.

7.4.1.2 Self-reported traditional bullying

Bullying was measured using the Bullying and Friendship Interview schedule (Wolke et al., 2000). This measure has been used in many studies assessing bullying behaviour, showing good stability and predictive validity (e.g., Griffiths et al., 2006; Horwood, Waylen, Herrick, Williams, & Wolke, 2005; Schäfer, Korn, Brodbeck, Wolke, & Schulz, 2005; Schreier, Wolke, Thomas, Horwood, Hollis, Gunnell et al., 2009). The scale included 13 behavioural descriptions and assessed three different types of bullying, i.e., direct (e.g., "been hit or beaten up"), indirect (e.g., "had lies / nasty things spread about you") and cyber (e.g. "had embarrassing pictures posted online without permission") (Table 11; p.143). The same items were repeated with slight wording adaptations to assess bullying perpetration. Pupils were asked how frequently any of these behaviours have occurred during the past six months, with responses were on a four-point scale: never; sometimes (1-3 times); quite a lot (more than 4 times); to a lot (at least once a week). A pupil was identified as being involved in bullying if their response to any of the items was "quite a lot" or "a lot". Cronbach alphas for the victimisation (α=.84) and bullying items (α=.86) were excellent.

7.4.1.3 Peer nominations

The peer nominations procedure was developed as originally performed by Coie, Dodge, and Coppotelli (1982). Pupils were provided a list of names of the peers within their tutor group and asked four questions: one question each on direct victimisation, indirect victimisation, direct bullying and indirect bullying. Below are examples of direct and indirect victimisation; the same questions were used with slight wording alterations to assess direct and indirect bullying perpetration.

> *"Some people are repeatedly hit, shoved around, beaten up, threatened, blackmailed, insulted, called nasty names, played tricks on, or stolen from. Which people in your form/tutor group have these things happened to?"*
>
> (Direct victimisation)
>
> *"Some people are repeatedly left out of get-togethers, parties, trips or groups, are ignored on purpose, are not wanted around, or have nasty lies, rumours or stories told about them on purpose. Which people in your form/tutor group have these things happened to?"*
>
> (Indirect victimisation)

Pupils were asked to nominate up to three peers (i.e., excluding themselves) for each item. Peer nominations were transformed into z-scores, calculated using the number of nominations received and standardised at the tutor group level. Pupils were identified as a bully, victim or bully-victim if their z-score was one or more

standard deviations away from the mean; pupils with zero nominations on all items were identified as uninvolved in bullying.

7.4.1.4 Strengths and difficulties questionnaire (SDQ)

The SDQ is a widely used 25-item measure of behavioural and emotional difficulties in 11-17 year olds (Goodman, 1997; Goodman, Ford, Simmons, Gatward, & Meltzer, 2000). Overall, the scale has good internal consistency, test-retest reliability and concurrent validity (Muris, Meesters, & van den Berg, 2003). The scale has five subscales, which measure prosocial behaviour, hyperactivity-inattention, peer problems, conduct problems and emotional problems. For the purposes of this research, only the emotional problems subscale was used. This consists of five items: "I get a lot of headaches, stomach-aches or sickness"; "I worry a lot"; "I am often unhappy, down-hearted or tearful"; "I am nervous in new situations, I easily lose confidence"; and "I have many fears, I am easily scared", with responses on a three-point scale (0=not true; 2=certainly true). Cronbach alpha for the emotional problems subscale in the current study was good (α=.75).

7.4.1.5 Rosenberg's self-esteem scale

The Rosenberg's self-esteem scale is a 10-item measure of global self-esteem (Rosenberg, 1965), responded to on a four-point scale (0=strongly agree; 3=strongly disagree). The scale has been used in numerous studies assessing the relationship between bullying and self-esteem (e.g., Giletta et al., 2010; Wolke & Sapouna, 2008). The scale has good reliability (Robins, Hendin, & Trzesniewski, 2001),

concurrent validity (Hagborg, 1993), strong convergent validity (Robins et al., 2001) and can predict dieting psychopathology amongst patients with eating disorders (Griffiths, Beumont, Giannakopoulos, Russell, Schotte, Thornton et al., 1999). Cronbach alpha in the current study was excellent (α=.89).

7.4.2 Stage 2

The Stage 2 measures were piloted under study conditions using a sample of six pupils that had been identified as uninvolved in bullying from one of the participating schools. The piloting of the Stage 2 measures was to assess the readability and acceptability of items, as well as any potential sources of bias.

7.4.2.1 Pubertal Development

The Pubertal development scale (PDS) (Petersen, Crockett, Richards, & Boxer, 1988) is a measure of pubertal onset and development. Up to five questions can be asked of boys and girls: that is, skin changes, growth spurt and body hair in both sexes; voice change and facial hair in males; breast development and menarche in females. The scale is responded to on a four-point scale (0=not yet started; 3=seems complete). The validity of the PDS has been assessed by comparing self-reported development with physician ratings of Tanner Stages (i.e., the gold standard test) (Tanner, 1962). Petersen et al. (1988) suggested that the PDS should be used in circumstances where Tanner Stage drawings, depicting images of sex characteristics that vary by stage of development, including pubic hair for males and females, genital size for males and breast size for females, would be

unacceptable. Acceptability is likely influenced by sex, age, ethnicity, pubertal status and the assessment setting (Coleman & Coleman, 2002). In consideration of the design of the current study, particularly that pupils would be assessed in a group setting, use of the PDS was chosen over the use of tanner Stage drawings. Correlations between the PDS and physician rated Tanner Stage range between r=.61 and r=.67, suggesting the PDS is an adequate indicator of pubertal maturation. In the current study, males were asked about body hair growth, facial hair growth and voice deepening, whilst girls were asked about body hair growth, breast development and menstruation. Cronbach alpha in the current study was acceptable for girls (α=.67) and boys (α=.75).

7.4.2.2 Body Mass Index (BMI)

Weight was measured to the nearest 0.1 kilogram (kg) using Tanita BC-1000 portable electronic scale (Tanita Corporation, Tokyo, Japan), whilst wearing lightweight clothes with shoes and jackets removed. Height was measured to the nearest 0.1 centimeter (cm) using a portable stadiometer (Leicester height measure, Child Growth Foundation, UK). Body mass index (BMI) was calculated by dividing weight by height squared (kg/m^2). Extreme outliers (BMI>40) were excluded prior to converting the BMI into a percentile score using international BMI for age and sex cut-offs (Cole, Flegal, Nicholls, & Jackson, 2007). Finally, pupils were grouped into one of three body weight categories: 0=average weight (>15th to <85th percentile), 1=underweight (<15th percentile) or 2=overweight (>85th percentile).

7.4.2.3 Weight perception

Adolescents were asked “How would you describe your weight?”, with responses on a five-point Likert scale from “very underweight” to “very overweight”. Pupils were subsequently grouped into one of three body image categories: 0=average (“about right”), 1=underweight perception (“very/ slightly underweight”) or 2=overweight perception (“very/ slightly overweight”). This item has been used in numerous studies to assess weight perception in adolescents (e.g., Gray, Crawford, Follansbee-Junger, Dumont-Driscoll, & Janicke, 2012; Holubcikova et al., 2015; Lunde, Frisén , & Hwang, 2007; Wilson et al., 2013).

7.4.2.4 Body Esteem Scale for adolescents and adults

The Body Esteem Scale for adolescents and adults was used to measure feelings about the body, weight and appearance (Mendelson, Mendelson, & White, 2001). The scale has 23 items that are responded to on a five-point scale (0=never; 4=always) and consists of three subscales (appearance=10 items, weight=8 items, and attributions=5 items) (appendix B). The scale has been validated in education settings in samples of 11-25 year olds in Canada and Europe (Confalonieri, Gatti, Ionio, & Traficante, 2008; Cragun, DeBate, Ata, & Thompson, 2013; Mendelson et al., 2001). Cronbach alpha for the total scale in the current study was excellent (α=.93).

7.4.2.5 Diet and exercise cognitions and behaviour

The Child and Adolescent Psychiatric Assessment (CAPA) is an interview schedule that was developed to diagnose a variety of psychiatric illnesses in adolescents aged 9-17 years (Angold & Costello, 2000). The eating behaviour component of the CAPA has been used in a previous study assessing eating behaviours and bullying involvement (Copeland et al., 2015). For the current study, several adaptations were made. The first adaptation was to make the questions suitable for self-completion, rather than interviewer led. Other adaptations include the rewording of items (e.g., “are you afraid of getting fat?” to “are you afraid of putting on weight?”) and the inclusion of associated items (e.g., “are you afraid of losing weight?”). The items used in the current study are reported in Table 8 (p.123) Responses were on a three-point scale (0=never; 2=often), except for one item on dieting (“have you ever dieted?” response of “no” or “yes”) and one item on weighing frequency (response of “once or more a day”, “once or more a week”, “once or more a month”, “hardly ever/ never”). Responses to all items were subsequently dummy coded (0=no, 1=yes). Following factor analysis, Cronbach alpha in the current study was good (α=.76).

7.4.2.6 Desire for cosmetic surgery

Three items adapted from the Acceptance of Cosmetic Surgery Scale (Henderson-King & Henderson-King, 2005) were used to assess interest in cosmetic surgery. The adapted items i.e., “I would like to have cosmetic surgery so that others would find me more attractive”; “I would consider having cosmetic surgery as a way to change

my appearance so that I would feel better about myself"; "If I was offered cosmetic surgery for free, I would consider changing a part of my appearance that I do not like", have been used in a sample of undergraduate students (Park et al., 2009). Responses were on a five-point scale (0=not at all; 5= very much). Cronbach alpha in the current study was excellent (α=.93)

7.5 Procedure

The study received full ethical approval from the Department of Psychology Ethical Committee at the University of Warwick. Stage 1 took place between October 2014 and June 2015. Stage 2 took place approximately two months after the end of Stage 1, between March and July 2015.

7.5.1 Stage 1

School recruitment took place between July 2014 and March 2015. Head teachers and the Heads of Pastoral Care in secondary schools were contacted and asked to participate in The Bullying, Appearance, Social Information Processing and Emotions Study (The BASE study). Initially, written details about the study were posted or emailed to each school, then follow-up phone calls were made. Once a school agreed to participate, each pupil was invited to participate in a "Relationships, Health and Emotions Study", because at no point was the term "bullying" to be used. Information sheets and consent forms for each pupil (appendix C) and their parents/guardians were delivered to the school in sealed envelopes, alongside information sheets for teachers. The information sheets

described what would be asked of participants in Stage 1 and 2 and the consent form sought consent to take part in both stages (if selected). Written informed consent was obtained from each pupil prior to any data collection. As recommended by schools, parents were asked to return an opt-out form if they did not want their child to participate.

Each school arranged the timing of data collection and this varied within each school. For example, in one school, data was collected once per week over a two-hour period for several weeks; in another school, data was collected throughout the school day for approximately two weeks. For data quality purposes, all pupils completed the online questionnaire during school hours, with at least one investigator present and one member of teaching staff to ensure the study protocol was adhered to, deal with any technical issues, answer questions, and deal with any ethical or behavioural (teachers only) issues. As organised by the schools, pupils were directed to a computer lab or classroom in groups of around 20-30 pupils. Once seated, all pupils were read aloud the standardised instructions (appendix D), reminding them about the purpose of the study and that all answers would be kept confidential. Each pupil was given a password that allowed them access to the electronic questionnaire. Pupils were also given a list of names of the peers in their tutor group, which they used to answer the peer nomination questions. Each session lasted between 50-60 minutes, although the questionnaire took approximately 30 minutes to complete. Once the questionnaire had been completed, pupils were directed to an online problem solving game that they

played until the end of the session. The game helped to manage the different reading and response times by pupils of different ages and abilities.

7.5.2 Stage 2

Approximately two weeks prior to the start of Stage 2, pupils were informed by their school that they had been invited to take part in Stage 2. This gave pupils and parents time to withdraw from the study, if they desired. As in Stage 1, each school arranged the timing of data collection and all pupils completed the electronic questionnaire during school hours with an investigator and teacher present in groups of around 10-25 pupils. At the start of the session, pupils were reminded about the purpose of the study and that they could withdraw at any time without giving a reason (appendix E). Pupils were also informed that once they had completed the questionnaire verbal consent would be sought for height and weight to be measured. Pupils were given their password to access the electronic questionnaire. Once the questionnaire had been completed, height and weight were measured with shoes, socks and blazer removed. Pupils were free to leave the session once they had completed all aspects of the study they had consented to.

7.5.3 Post-study

Debrief forms were provided to all schools following the completion of Stage 2 (appendix F). As a thank you, pupils that completed Stage 1 and 2 of the study were entered into a prize draw and one pupil from each school won a £50 voucher. A research report was written for each school, detailing the prevalence of bullying by

type (e.g., direct, indirect), measure (i.e., self-report, peer nominations), sex and year group.

8 Adolescent bullying involvement amongst boys and girls: is it body weight or body image that matters?

8.1 Abstract

This study investigated whether body weight or body image independently or jointly predict bullying involvement amongst 11-16 year olds. Adolescents (*n*=2782) were screened for bullying involvement and then a stratified sub-sample that comprised of bullies (*n*=150), victims (*n*=140), bully-victims (*n*=303) or those uninvolved in bullying (*n*=174) had height and weight measured and completed a questionnaire item on weight perception. Multinomial logistics regression models revealed that underweight perception was associated with being a male bully-victim, whilst overweight perception was associated with being a female victim or bully-victim. There were no independent or joint effects of actual underweight or overweight on bullying role. Adolescent bullies appear to target peers with a poor body image, rather than those who are under- or overweight, although reverse causality and reciprocal effects cannot be discounted. This study advances knowledge on who bullies target and further highlights the detrimental effects of poor body image on peer relationships.

Lee, Guy, Dale & Wolke
Under review: Body Image

8.2 Introduction

Bullying is aggressive behaviour that is intentional, repeated and characterised by a real or perceived power imbalance (Gladden et al., 2014). Bullying causes a range of adverse consequences in victims and bully-victims (i.e., those who bully but also get victimised), including decreased physical and psychological health and increased risk of self-harm and suicide (Wolke & Lereya, 2015). Bullies, on the other hand, are generally well-adjusted psychologically and often popular amongst peers (Copeland et al., 2013; Juvonen et al., 2003; Wolke et al., 2013). Bullying perpetration peaks around the same time as the onset of sexual maturation (Analitis et al., 2009), the time when puberty activates a set of goals and challenges for adolescents, including competition with peers for sexual and romantic relationships (Forbes & Dahl, 2010). Some have thus argued that bullying perpetration may be a strategic attempt to compete with peers for social dominance and access to high quality mates (Volk et al., 2012; Volk et al., 2015).

Questions remain as to who bullies may target. Meta-analysis suggests that overweight girls and boys are more likely to be victimised (van Geel et al., 2014), but surprisingly little research has investigated whether physically weaker adolescents (i.e., those who are underweight) are similarly at increased risk. Of the extant literature, one study found that underweight boys and girls were at increased risk of victimisation (Wang, Iannotti, & Luk, 2010), another found underweight boys were at lower risk (Griffiths et al., 2006), whilst two found no association (Mikolajczyk & Richter, 2008; Reulbach et al., 2013). Thus, results are

equivocal as to whether boys and girls who are underweight are more likely to get bullied.

Alternatively, bullies may target peers with a psychological vulnerability, like poor body image (e.g., a perception of being underweight or overweight). In fact, evidence suggests that the increased risk of victimisation amongst overweight adolescents is mediated by poor body image (Fox & Farrow, 2009). Meta-analysis suggests there is a positive association between body image and victimisation (Kaltiala-Heino et al., 2016; Menzel et al., 2010), but there is a lack of studies investigating whether this effect extends specifically to a perception of being underweight. Whilst overweight perception is more common amongst females (O'Dea & Caputi, 2001; Talamayan et al., 2006; Tiggemann & Rothblum, 1988), underweight perception is more common amongst males (Herman et al., 2013; O'Dea & Caputi, 2001; Wilson et al., 2013). Underweight perception can leave males at increased risk of depression, social anxiety, steroid use (Byeon, 2015; Isomaa, Isomaa, Marttunen, Kaltiala-Heino, & Björkqvist, 2011; Jampel et al., 2016) and possibly victimisation. To our knowledge only one study has investigated underweight perception and victimisation amongst adolescents (Holubcikova et al., 2015). The results suggested that male bully-victims were more likely to perceive that they were underweight, but as actual weight was not adjusted for in the analysis we cannot be certain that these adolescents were not indeed underweight. Consequently, it is unknown whether boys or girls with underweight perception are at increased risk of being victimised after controlling for body weight and other

important covariates, like pubertal stage, socioeconomic status and ethnicity, which may similarly confound the relationship (Forbes & Dahl, 2010; Menzel et al., 2010; Paeratakul et al., 2002).

Another possibility is that body weight and body image may interact to predict bullying involvement. One study found that an average weight perception amongst obese adolescents was protective against victimisation (Lenhart et al., 2011), whilst a study of mid-adolescents (i.e., 15-17 year olds) found no interaction between actual and perceived overweight in relation to bullying involvement (Kaltiala-Heino et al., 2016). It is yet to be examined how underweight perception might interact with actual weight to predict bullying involvement. Understanding how body weight or body image relate to bullying involvement and whether these two factors interact to increase or reduce victimisation could have practical implications for the targeting of future interventions.

Finally, previous research has mainly focused on the association between peer victimisation and body weight or body image, whilst bullies have rarely been assessed. Teacher and self-reports suggest that bullies are physically strong (Lagerspetz et al., 1982; Unnever, 2005), whereas objective measures suggest bullies are more likely to be overweight or obese (Griffiths et al., 2006; Janssen et al., 2004; Kukaswadia et al., 2011). Few studies have investigated the body image of bullies; one study found no relationship between being a bully and under- or overweight perception (Holubcikova et al., 2015), whilst another found 9-year old bullies were at increased risk of perceiving themselves to be overweight or

underweight (Reulbach et al., 2013). A key limitation of the extant literature is that most studies do not differentiate between bullies and bully-victims. This is important because bullies and bully-victims are distinct in terms of precursors to and consequences of bullying (Copeland et al., 2013; Juvonen et al., 2003; Wolke et al., 2013). Research on bullies may have been hampered due to the low prevalence (e.g., 1-4%) of bullies using self-report measures (Copeland et al., 2013; Tippett et al., 2013; Wolke et al., 2014). As prevalence rates using peer nominations can be as high as 13-14% (Boulton & Smith, 1994; Pellegrini, Bohn-Gettler, Dupuis D, Hickey M, Roseth C, & D, 2011), a combination of self-reports and peer nominations may more reliably generate a large enough sample of bullies for further investigations (Branson & Cornell, 2009).

To address current gaps in knowledge, the aim of this study was to investigate whether body weight or body image (i.e., actual or perceived underweight or overweight) was independently associated with bullying role (bully, victim or bully-victim) and whether body weight and body image interacted to predict bullying role amongst adolescent boys and girls.

8.3 Method

8.3.1 Design

A two stage sampling approach was used. In Stage 1, secondary school pupils (aged 11-16 years) were screened for bullying involvement using self-report and peer nominations. All those who screened positive for bullying others (i.e., bullies) were

invited to take part in Stage 2. In Stage 2, bullies and a random selection of victims, bully-victims and uninvolved adolescents completed a battery of measures.

8.3.2 Sample

School recruitment took place between July 2014 and February 2015. Head teachers of secondary schools in the UK were approached with full details of the study (*k*=160). Five schools (mixed sex *n*=4; single sex (girls) *n*=1) agreed to participate. All school pupils (*n*=3883) were invited to participate via written information sheets sent home in sealed envelopes. Parents were asked to return an opt-out form if they did not want their child to participate. Seventy-two percent (*n*=2782) of pupils gave their informed active consent and had passive parental consent. Pupils from each school who completed Stage 1 and 2 were entered into a prize draw to win a £50 voucher.

During Stage 1, self-report and peer nominations were used to identify those who were bullies, victims, bully-victims or uninvolved in bullying: the decision rules used to assign screened pupils to the potential bullying roles are shown in Table 3 (p.74). As there were a large number of pupils who were victims, bully-victims or uninvolved in bullying, a sub-selection balanced by sex were selected using Microsoft Excel's random number generator. In total 1088 pupils were selected for Stage 2.

In Stage 2, 306 of the selected pupils were absent from school or could not take part due to school organisational difficulties (i.e., one school was unable to allocate

the maximum time and computer resources needed for the study). Three parents refused their child's participation (bully *n*=1; uninvolved *n*=2), four pupils refused to participate (bully-victims *n*=4) and five were excluded due to school concerns about vulnerability (victim *n*=1; bully-victim *n*=3; uninvolved *n*=1). The final stage 2 sample consisted of 767 pupils (70.6% of selected sample). Just over half (52.9%) were female, the majority were White British (85%) and the mean age was 13.6 years (*SD*=1.4).

8.3.3 Measures

Electronic questionnaires were completed during school hours on a PC, laptop or tablet, with at least one investigator present. Bullying and individual characteristics were obtained at Stage 1 and the remaining measures were assessed at Stage 2, approximately 2 months later.

8.3.3.1 Bullying role

Bullying role was assessed using self-report and peer nominations. *Self-reported bullying* was based on the Bullying and Friendship Interview schedule, a validated measure of bullying behaviour (Wolke et al., 2000). The scale included 13 behavioural descriptions and assessed three different types of victimisation, i.e., direct (e.g., "been hit or beaten up"), indirect (e.g., "had lies / nasty things spread about you") and cyber (e.g. "had embarrassing pictures posted online without permission"). The same items were repeated with slight wording adaptations to assess bullying perpetration. Pupils were asked how frequently any of these

behaviours had occurred during the past six months with responses of never, sometimes, quite a lot (several times a month) or a lot (at least once a week). Response of “quite a lot” or “a lot” indicated bullying involvement (Wolke et al., 2000).

For the *peer nominations*, pupils were given a list of names of all the peers in their tutor group and asked to nominate up to three pupils (not themselves) who were victims or perpetrated bullying behaviours (e.g., “Some people are repeatedly hit, shoved around, beaten up, threatened, blackmailed, insulted, called nasty names, played tricks on or stolen from. Which people in your form / tutor group have these things happened to?”). Z-scores were calculated based on the total number of nominations received at the tutor group level. Pupils were identified as involved in bullying if their z-score was one standard deviation above (>1 SD) the tutor group mean on any of the bullying items (bullies), victimisation items (victims) or on both (bully-victims). Pupils were identified as uninvolved if they received zero nominations on the bullying and victimisation items.

8.3.3.2 Weight and Height

Weight was measured to the nearest 0.1 kilogram (kg) using Tanita BC-1000 portable electronic scale (Tanita Corporation, Tokyo, Japan), whilst wearing lightweight clothes with shoes and jackets removed. Height was measured to the nearest 0.1 centimeter (cm) using a portable stadiometer (Leicester height measure, Child Growth Foundation, UK). Body mass index (BMI) was calculated by

dividing weight by height squared (kg/m^2). Extreme outliers (BMI>40) were excluded prior to converting the BMI into a percentile score using international BMI for age and sex cut-offs (Cole et al., 2007). Finally, pupils were grouped into one of three body weight categories: 0=average weight (>15th to <85th percentile), 1=underweight (<15th percentile) or 2=overweight (>85th percentile).

8.3.3.3 Weight perception

Adolescents were asked "How would you describe your weight?" with responses on a five-point Likert scale from "very underweight" to "very overweight". Pupils were subsequently grouped into one of three body image categories: 0=average ("about right"), 1=underweight perception ("very/ slightly underweight") or 2=overweight perception ("very/ slightly overweight").

8.3.3.4 Individual characteristics

Sex, age, ethnicity and parent education were self-reported at Stage 1. Ethnicity was dummy coded as White British or "Other" as there were too few participants in each ethnic category to allow meaningful comparisons (e.g., the next largest ethnic group was Asian at 6.1%). Parent's highest level of education i.e., did not complete school (<11 years), basic schooling (11 years), college (11-13 years) or university (>13 years), was dummy coded into 0=13 years or less (≤13) and 1=more than 13 years (>13) of education. Pubertal development was assessed at Stage 2 using the self-report Pubertal development scale (Petersen et al., 1988). Scale scores were transformed into five pubertal (Tanner) stages (Carskadon & Acebo, 1993). In

females, ratings of body hair growth, breast development and menarche were assessed; in males, ratings of body hair growth, voice change and facial hair growth were assessed. Scale scores were transformed into five pubertal (Tanner) stages (Carskadon & Acebo, 1993), where higher scores indicated more advanced development.

8.3.4 Procedure

The study and all materials were reviewed by the University of Warwick's Ethics Committee. Secondary schools around the West Midland area of the UK were contacted and invited to participate in The Bullying, Appearance, Social Information Processing and Emotions Study (The BASE study). Once a school agreed, information sheets and consent forms were sent to pupils and parents in sealed envelopes. Informed consent for Stage 1 and 2 were obtained from all pupils prior to Stage 1. Parents returned an opt-out form if they did not want their child to participate. Pupils completed the electronic questionnaires in groups of 20-30 pupils in a classroom or computer lab during school hours (over a 50-60 minute period). At the start of each session, pupils were reminded about the purpose of the study and were read aloud the standardised instructions. At least one investigator was present throughout the period for ethical and data quality purposes. All measures were counterbalanced. Data collection took place between October 2014 and July 2015, with approximately two months between stage 1 and stage 2.

8.3.5 Data analysis

All analyses were performed using Stata version 14. Firstly, missing data were analysed and handled using multiple imputation with chained iterations (Schlomer, Bauman, & Card, 2010). Bivariate analyses (Chi-squared (χ^2); analysis of variance) were used to examine the associations between bullying role and the individual characteristics (Table 4). To determine whether body weight or body image predicted bullying involvement, hierarchical multinomial logistic regression models were conducted. In step 1, we used bullying role (i.e., bully, victim, bully-victim) as the outcome and entered body weight and body image (i.e., actual or perceived underweight or overweight) as the predictors. In step 2, we adjusted for covariates (i.e., pubertal stage, ethnicity and parent education). In step 3, we removed the covariates and included an interaction term between body weight and body image. Because of sex differences in the extent to which boys and girls perceive themselves to be underweight or overweight the models were stratified by sex. In all models the "uninvolved" bullying role was used as the reference category. Model results are presented as odds ratios (OR) with 95% confidence intervals (95% CI).

8.4 Results

The percentage of missing items ranged from 0.5% (ethnicity) to 41.5% (actual body weight). Measured height and weight data were missing mostly due to school time constraints (*n*=278) or refusals (*n*=82). The data met the assumption of MCAR

according to Little's test of covariate-dependent missingness ($\chi^2(768)=334.08$, $p=1.00$), allowing missing values to be imputed.

The majority of the total sample were bully-victims (39.6%) and victims were mostly girls (67.9%) (Table 4). At the bivariate level there were no significant differences between the bullying roles in terms of body weight; that is, underweight and overweight adolescents were not more likely to be victims, bully-victims or bullies. There were significant differences between the bullying roles in terms of body image: over half of all bully-victims (54%) and victims (56.6%) perceived themselves to have a body weight that was different from average. Note that in Table 4, values following imputation are reported as the differences between the raw and imputed data were minimal (<3%).

Table 4 Individual characteristics, stratified by bullying role

	BULLYING ROLE				
	Uninvolved	**Bully**	**Victim**	**Bully-Victim**	*p*
N	174	150	140	303	
%	22.7	19.6	18.3	39.5	
Sex (%)					***<.01***
Female	50.6	51.3	67.9	48.2	
Male	49.4	48.7	32.1	52.8	
Ethnicity (%)					*.48*
White British	84.4	81.2	87.0	86.1	
Other	15.6	18.8	12.0	13.9	
Parent education (%)					*.56*
≤13 years	65.5	70.7	71.4	71.3	
>13 years	34.5	29.3	28.6	28.7	
Pubertal stage (mean ± SE)	2.50 ± 0.02	2.64 ± 0.02	2.63 ± 0.02	2.54 ± 0.01	*.31*
Body weight category (%)					*.89*
Average	62.8	60.7	58.8	58.6	
Underweight	11	13.3	11.5	9.7	
Overweight	26.2	26	29.8	31.7	
Body image category (%)					***<.01***
Average	63.4	64.8	43.9	46	
Underweight	14.8	13.9	12.7	18.1	
Overweight	21.7	21.3	43.4	35.9	

Note Changes to values between raw and imputed data were minimal (<3%), hence values following imputation are reported.

The multinomial logistic regression models revealed that body image predicted bullying role for boys (Table 5) and girls (Table 6), even after adjusting for body weight and the covariates. For boys, an underweight perception was associated with being a bully-victim (OR=2.30, 95% CI=1.02, 5.19, p<.05); for girls, an

overweight perception was associated with being a victim (OR=4.26, 95% CI=1.87, 9.70, p<.01) or a bully-victim (OR=3.17, 95% CI=1.40, 7.13, p<.01). Body weight (underweight and overweight) was not associated with any bullying role and none of the interactions between body weight and body image were significant for boys or girls. In all of the models only two covariates were significant. Girls of “Other” ethnicity were at lower odds of being a bully-victim (OR=0.42, 95% CI=0.20, 0.91, p<.03) and girls at an advanced pubertal stage were at higher odds of being a bully (OR=1.92, 95% CI=1.00, 3.67, p<.05).

Table 5 Adjusted odds ratios with 95% confidence intervals of body weight and body image categories as predictors of being a bully, victim or bully-victim amongst boys

	BULLYING ROLE								
	Bully			**Victim**			**Bully-victim**		
	OR	95% CI	*p*	OR	95% CI	*p*	OR	95% CI	*p*
Body weight									
Underweight	1.33	0.39, 4.53	*.65*	0.61	0.14, 2.75	*.52*	0.94	0.31, 2.87	*.92*
Overweight	0.94	0.38, 2.30	*.89*	0.67	0.20, 2.28	*.52*	0.83	0.35, 1.95	*.67*
Body image									
Underweight	1.14	0.43, 3.02	*.79*	1.39	0.42, 4.57	*.59*	**2.30**	**1.02, 5.19**	***<.05***
Overweight	0.74	0.28, 1.92	*.54*	2.19	0.75, 6.34	*.15*	2.04	0.93, 4.46	*.08*

Note Abbreviations: OR, odds ratios; 95% CI, 95% confidence intervals. Significant values are typeface bold. The uninvolved bullying role was used as the reference category. *Note* The models were adjusted for ethnicity, pubertal stage and parent education. None of the covariates were significant and there were no interactions between body weight and body image in predicting bullying role (p>.05).

Table 6 Adjusted odds ratios with 95% confidence intervals of body weight and body image categories as predictors of being a bully, victim or bully-victim amongst girls

	BULLYING ROLE								
	Bully			**Victim**			**Bully-victim**		
	OR	95% CI	*p*	OR	95% CI	*p*	OR	95% CI	*p*
Body weight									
Underweight	1.44	0.47, 4.47	*.52*	1.28	0.41, 3.96	*.67*	0.60	0.16, 2.20	*.43*
Overweight	0.94	0.27, 3.33	*.92*	0.75	0.28, 2.03	*.57*	0.85	0.31, 2.29	*.74*
Body image									
Underweight	0.83	0.31, 2.22	*.71*	1.30	0.50, 3.39	*.59*	1.47	0.64, 3.35	*.37*
Overweight	1.15	0.44, 3.01	*.78*	**4.26**	**1.87, 9.70**	***<.01***	**3.17**	**1.40, 7.13**	***<.01***

Note Abbreviations: OR, odds ratios; 95% CI, 95% confidence intervals. Significant values are typeface bold. The uninvolved bullying role was used as the reference category. *Note* The models were adjusted for ethnicity, pubertal stage and parent education. Being at a later stage of pubertal development was predictive of being a bully (OR=1.92, 95% CI=1.00, 3.67, p<.05) and ethnic minority girls were at lower odds of being a bully-victim (OR=0.42, 95% CI=0.20, 0.91, p<.03). There were no interactions between body weight and body image in predicting bullying role (p>.05).

8.5 Discussion

This study found that body image was associated with bullying role amongst adolescent boys and girls, even after adjusting for actual weight and covariates. Underweight perception was associated with being a male bully-victim, whilst overweight perception was associated with victimisation amongst females (victims and bully-victims). Actual body weight was not associated with bullying involvement and body weight and body image did not interact to predict bullying role. Bullies neither differed in actual body weight nor in their body image compared to adolescents uninvolved in bullying. Amongst females, advanced pubertal stage was associated with being a bully, whilst those of "Other" ethnicity were at lower risk of being a bully-victim.

An association between bullying victimisation and overweight or underweight perception has been reported previously (Frisén et al., 2009; Holubcikova et al., 2015; Reulbach et al., 2013). As far as we are aware this is the first study to systematically assess underweight and overweight perception amongst bullies, victims and bully-victims, whilst controlling for actual weight and other potential confounders. Our results extend existing evidence by showing that poor body image is predictive of bullying victimisation in boys and girls. Thus, rather than targeting peers who look physically weak or different (i.e., underweight or overweight), it appears that bullies may be targeting psychologically vulnerable peers' who are more dissatisfied with their body. The lack of association between actual overweight and increased risk of victimisation is consistent with studies that

have assessed objective and perceived weight simultaneously (Brixval et al., 2012; Kaltiala-Heino et al., 2016). A genetically-sensitive longitudinal study similarly found no differences in body weight between bullied and non-bullied children during childhood, but found a dose-response relationship between bullying chronicity and risk of becoming overweight in adulthood (Baldwin, Arseneault, Odgers, Belsky, Matthews, Ambler et al., 2016). Thus, overweight is likely to be an outcome, rather than the cause, of victimisation. Overall, the findings indicate that bullying victimisation affects adolescents regardless of actual body weight, thereby limiting the need for bullying interventions specifically targeted at adolescents based on body weight (van Geel et al., 2014).

Underweight perception was only found in male bully-victims. Previous research suggests that the least attractive and socially dominant males are at increased risk of victimisation (Andrews et al., 2016; Cunningham et al., 2010), but these studies did not distinguish between victims and bully-victims. Bully-victims are especially disliked and unpopular amongst peers (Juvonen et al., 2003; Unnever, 2005), and are at the highest risk of psychological and social vulnerabilities (Wolke & Lereya, 2015). A perception of underweight in male bully-victims could therefore be related to self-(O'Moore & Kirkham, 2001) and peer-perceptions (Vaillancourt & Hymel, 2006) of unattractiveness and low social status. Longitudinal research is needed to investigate the temporal associations between body image, social status and risk of victimisation in victims and bully-victims. Currently, the findings add further

support to the notion that interventions to improve body image may prove additionally beneficial for peer relationships (Kaltiala-Heino et al., 2016).

Like victims and bully-victims, bullies were predominantly of average weight, but did not have body image misperception. This is consistent with research showing that bullies are often considered to be physically fit and attractive by both themselves and others (Cunningham et al., 2010; O'Moore & Kirkham, 2001; Vaillancourt & Hymel, 2006) and have good psychological functioning (Copeland et al., 2013; Wolke et al., 2013). Female bullies were more advanced in pubertal development than adolescents uninvolved in bullying. Post-hoc analyses (results not shown) revealed the only significant difference in pubertal stage amongst females was between bullies and the uninvolved group. Thus, female bullies, victims and bully-victim were at similar stages of sexual development and therefore potential competitors for sexual and romantic partners. Bullying is an effective strategy for mate competition because it reduces the appeal and perceived attractiveness of the victim (Fisher, 2004), leaving bullies to have increased dating and sexual opportunities (Connolly et al., 2000; Volk et al., 2015). Thus, advanced pubertal development and its associated effects on sexual competition may be a key trigger for adolescent bullying perpetration amongst females.

It was noteworthy that female bully-victims were less likely to be of "Other" ethnicity, considering that previous researchers have found few ethnic differences in bullying perpetration (Eslea & Mukhtar, 2000; Seals & Young, 2003). The finding is similar to a population-based study that reported small but significant effects of

increased bullying perpetration amongst Pakistani and Caribbean girls (Tippett et al., 2013). As there were few participants in this study with “Other” ethnicity, it was not possible to disentangle whether the effects were specific to certain ethnic groups. The results suggest there may be something specific about the relationship between bullying involvement and ethnicity amongst girls, which warrants further research.

There are several limitations of this study. Firstly, there was missing data on objective height and weight. Missing height and weight data were not related to bullying role, sex, weight perception, pubertal stage or ethnicity, but were related to parent education (pupils with more highly educated parents were at lower odds of missing data). Parent education was a proxy for socioeconomic status (SES) and as lower SES groups are disproportionally affected by obesity (Wardle, Brodersen, Cole, Jarvis, & Boniface, 2006) we may have lost participants at the highest risk of overweight. Missing data also meant we were unable to examine the effects for those at the extreme ends of the weight scale; it is possible that increased bullying involvement might only be a risk for those with the highest (Griffiths et al., 2006) or lowest levels of adiposity. Missing data may also mean that we were underpowered to detect an effect in male victims (n=45). The second limitation is the cross-sectional design, which restricts assumptions regarding causality. Bullies may be targeting adolescents with poor body image, as investigated in this study, but reverse causality is also likely, whereby poor body image is a consequence of victimisation (Cash, 1995; Frisén et al., 2009; Lunde, Frisén, & Hwang, 2006). A

probable scenario is that these effects are reciprocal i.e., poor body image increases risk of being victimised and victimisation further damages body image (Webb, Zimmer-Gembeck, & Mastro, 2016), potentially via influences on eating behaviours (Copeland et al., 2015) and increasing body weight (Baldwin et al., 2016). Longitudinal research is needed to examine these temporal effects and possible mechanisms. Finally, the non-representative sample limits the generalisability of the findings beyond the current context. A particular strength of this study is the relatively large sample of bullies, which can be difficult to obtain (Copeland et al., 2013; Wolke, Woods, Stanford, et al., 2001).

In conclusion, this study did not identify any association between being targeted by bullies and being underweight or overweight in comparison to average weight peers. Instead, bullies appear to target those with a poor body image, specifically boys with underweight perception and girls with overweight perception. Thus, adolescents who feel they do not meet the ideal body standards associated with their sex are likely to be targeted by bullies. Bullies themselves were mostly of average weight and had a realistic body image. Overall the results provide further support that bullies are not biased in their self-perceptions and are strategic in their behaviour. The results add further weight to the detrimental effects of poor body image and suggest that interventions to improve body image may likewise improve peer relations. As this is a cross-sectional study, reverse causality and reciprocal effects cannot be discounted and we recommend that longitudinal studies be conducted to determine the temporal associations between body image and

bullying, which could further our theoretical understanding of adolescent bullies and their harmful behaviour, and the long-term outcomes for those who are victimised.

9 Associations between bullying and weight loss preoccupation in adolescents

9.1 Abstract

Adolescent bullying is associated with a range of adversities for those who are bullied (i.e., victims and bully-victims), including reduced psychological functioning and eating disorder symptoms. Bullies are generally well-adjusted psychologically, but previous research suggests that bullies may also engage in problematic diet behaviours. This study investigates a) whether adolescents involved in bullying (bullies, victims, bully-victims) are at increased risk of weight loss preoccupation and whether psychological functioning mediates this relationship and b) whether sex is a key moderator. In Stage 1, adolescents (*n*=2782) from five UK secondary schools were screened for bullying involvement using self- and peer reports. In Stage 2, a sample of bullies, victims, bully-victims and uninvolved adolescents (*n*=767) completed a battery of assessments. The measures included the eating behaviours component of the Child and Adolescent Psychiatric Assessment, which was reduced to one factor (weight loss preoccupation) and used as the outcome variable. Measures of self-esteem, body-esteem and emotional problems were reduced to a latent (mediator) variable of psychological functioning. The results showed that bullies, victims and bully-victims were at increased risk of weight loss preoccupation compared to adolescents uninvolved in bullying. The mechanism by

which bullying involvement related to increased weight loss preoccupation varied by bullying role: in bullies the effect was direct, in victims the effect was indirect (via reduced psychological functioning) and in bully-victims the effect was both direct and indirect. Sex significantly moderated the relationship in bullies: weight loss preoccupation was only statistically significant in bullies who were boys. In conclusion, bullying involvement during adolescence is associated with weight loss preoccupation. Bullies are likely driven by a desire to increase attractiveness and social status; whereas weight loss preoccupation in bullied adolescents may have maladaptive influences on diet and exercise behaviours due to its association with reduced psychological functioning. Peer victimisation should be considered as a potential modifiable risk factor for weight loss preoccupation and associated maladaptive diet and exercise behaviours.

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9.2 Introduction

Bullying, defined as the intentional and repeated harm caused by peers where there is a real or perceived power imbalance (Gladden et al., 2014), is pervasive (Analitis et al., 2009; Due et al., 2005). Bullied adolescents, i.e., victims and bully-victims (those who bully others and get bullied themselves), experience wide-ranging and long-lasting adverse effects on their psychological and psychiatric health, such as low self-esteem (O'Moore & Kirkham, 2001), depression

(Zwierzynska, Wolke, & Lereya, 2013), psychosis (Wolke et al., 2014) and self-harm (Lereya, Winsper, Heron, Lewis, Gunnell, Fisher et al., 2013).

Bullying can be physical (e.g., hitting, kicking), indirect (e.g., spreading rumours in person or online) or verbal (e.g., name calling). It is well documented that being bullied verbally, particularly about appearance, can negatively affect body-esteem (i.e., body image) and lead to disordered eating (Menzel et al., 2010). There is emerging evidence that any type of peer victimisation (e.g., physical, indirect, cyber) can have similar adverse effects on body-esteem (Lereya et al., 2014) and diet behaviours (Copeland et al., 2015) in victims and bully-victims.

Bullies, those who perpetrate bullying and are never victimised, also appear to be at increased risk of eating disorder symptoms (Copeland et al., 2015; Kaltiala-Heino et al., 2000). This is noteworthy because bullies tend to be well-adjusted psychologically and suffer few negative consequences as a result of harming others (Wolke et al., 2013). Bullying is principally a means to achieve status and access to resources (Volk et al., 2012). Research suggests that bullies are bi-strategic, in that, to obtain dominance in the peer group they reduce the status of their victim through aggressive (Arnocky & Vaillancourt, 2012; Vaillancourt & Sharma, 2011) and prosocial acts (Garandeau & Cillessen, 2006; Hawley et al., 2008; Olthof et al., 2011). During adolescence, attractiveness is a highly valued status characteristic (Prokhorov, Perry, Kelder, & Klepp, 1993) and this is often represented as a slim and curvaceous ideal for females (Harrison, 2003) and a slim and muscular ideal for males (McCabe & Ricciardelli, 2004). Obtaining either of these ideals may require a

significant amount of weight control through diet and exercise. Research to date has not investigated the extent to which bullies, victims and bully-victims are preoccupied with losing weight.

If bullies, victims and bully-victims are all at increased risk of weight loss preoccupation, is it via the same pathways? Copeland and colleagues found that increased emotional problems was the mechanism by which bullying involvement led to eating disorder symptoms (Copeland et al., 2015), which is not surprising considering the comprehensive effects that being bullied has on psychological functioning (Arseneault, Milne, Taylor, Adams, Delgado, Caspi et al., 2008). However, bullies tend to have good psychological functioning (Copeland et al., 2013), are often popular in the peer group and enjoy high social status (Vaillancourt & Hymel, 2006). It is thus plausible that bullies are preoccupied with losing weight irrespective of psychological functioning.

Reduced psychological functioning may mediate the relationship between bullying involvement and a preoccupation with controlling weight, but there are potentially moderating factors in addition. Research indicates that girls are at greater risk of disordered eating and body dissatisfaction (Frisén, Berne, & Lunde, 2013), whilst boys are more likely to engage in eating and exercise strategies to build muscle or lose weight (Brown et al., 2016; McCabe et al., 2002). Other factors that can influence body-image and weight control behaviours are body mass index, pubertal stage, age, ethnicity and socioeconomic status (Agras et al., 2007; Frisén et al.,

2013; Haff, 2009; Robinson, Chang, Haydel, & Killen, 2001; Snoek, van Strien, Janssens, & Engels, 2008; Story et al., 1995).

This study investigates whether bullies, victims and bully-victims are at increased risk of weight loss preoccupation compared to adolescents uninvolved in bullying, whether psychological functioning mediates the relationship between bullying role and weight loss preoccupation, and whether sex is a key moderator.

9.3 Methods

9.3.1 Design and sample

A power analysis was conducted based on research indicating that 100 participants per group (e.g., victims, uninvolved) are sufficient to detect moderate differences in body image (Lereya et al., 2014). Bullies have the lowest self-reported prevalence rate (1-4%) (Copeland et al., 2013; Wolke, Woods, Stanford, et al., 2001) so were used as the lead group. A minimum of 2500 pupils needed to be screened to obtain 100 bullies. However, attrition in school-based studies occurs at a rate of around 30%, thus an initial sample of 3250 was needed.

A two stage sampling approach was used. In Stage 1, secondary school pupils (aged 11-16) were screened for bullying involvement using self-report and peer nominations. All those who screened positive for bullying others (i.e., bullies) were invited to take part in Stage 2, alongside a random selection of victims, bull-victims and adolescents uninvolved in bullying. Pupils from each school who completed stage 1 and 2 were entered into a prize draw to win a £50 voucher.

School recruitment took place between July 2014 and February 2015 and data collection took place between September 2014 and July 2015. Head teachers of secondary schools in the UK were approached with full details of The Bullying, Appearance, Social Information Processing and Emotions Study (The BASE study) (k=160) (Figure 3, p72). Five schools (mixed sex *n*=4; single sex [girls] *n*=1) agreed to participate in the study. All pupils (*n*=3883) were invited to participate via written information sheets sent home in sealed envelopes. Parents were asked to return an opt-out form if they did not want their child to participate. As shown in the STROBE diagram (Vandenbroucke et al., 2007), 2782 (71%) pupils provided informed written consent and were screened for bullying involvement. Decision rules to assign screened pupils to the potential bullying roles are shown in Table 3 (p.74). As there were a large number of pupils who were victims, bully-victims or uninvolved in bullying, a sub-selection balanced by sex were selected using Microsoft Excel's random number generator. In total, 1088 pupils were selected for Stage 2.

In Stage 2, 306 of the selected pupils were absent from school or could not take part due to school organisational difficulties (i.e., one school was unable to allocate the maximum time and computer resources needed for the study). Three parents refused their child's participation (bully *n*=1, uninvolved *n*=2), four pupils refused to participate (bully-victims *n*=4) and five were excluded due to school concerns about vulnerability (victim *n*=1, bully-victim *n*=3, uninvolved *n*=1). In total 767 pupils had data on the outcome measure (weight loss preoccupation). Just over half of the sample (52.9%) were female and the mean age was 13.6 years (SD=1.4).

9.3.2 Measures

Electronic questionnaires were completed in a school IT lab or classroom on a PC, laptop or tablet, with at least one investigator present. Data on bullying and individual characteristics were obtained at Stage 1 and the remaining measures were assessed at Stage 2, approximately two months later.

9.3.2.1 Bullying role

Bullying role was assessed at Stage 1 using self-report and peer nominations. *Self-reported bullying* was based on the Bullying and Friendship Interview schedule (Wolke et al., 2000), a validated measure of bullying behaviour (Griffiths et al., 2006; Schreier et al., 2009). The scale included 13 behavioural descriptions and assessed three different types of bullying, i.e., direct (e.g., “been hit or beaten up”), indirect (e.g., “had lies / nasty things spread about you”) and cyber (e.g. “had embarrassing pictures posted online without permission”). The same items were repeated with slight wording adaptations to assess bullying perpetration. At no point was the term “bullying” used. Pupils were asked how frequently any of these behaviours had occurred during the past six months with responses of never, sometimes, quite a lot (several times a month) or a lot (at least once a week). Response of “quite a lot” or “a lot” indicated bullying involvement (Schreier et al., 2009; Wolke et al., 2000).

For the *peer nominations*, pupils were given a list of names of all the peers in their tutor group and asked to nominate up to three pupils (not themselves) who were

victims or perpetrators of bullying behaviours (e.g., “Some people are repeatedly hit, shoved around, beaten up, threatened, blackmailed, insulted, called nasty names, played tricks on or stolen from. Which people in your form / tutor group have these things happened to?”). Z-scores were created using the total number of nominations received per pupil within each tutor group. Pupils were identified as involved in bullying if their z-score was one standard deviation above the tutor group mean on the bullying item (bullies), victimisation item (victims) or on both items (bully-victims). Pupils were identified as uninvolved if they received zero nominations on the bullying and victimisation items.

9.3.2.2 Individual characteristics

Sex, age, ethnicity and parent education (a proxy for socioeconomic status) were self-reported at Stage 1. Ethnicity was dummy coded as White British or Other, as there were too few participants in each ethnic category to allow meaningful comparisons (e.g., the next largest ethnic group was Asian at 6.1%). Parent’s highest level of education i.e., did not complete school (<11 years), basic schooling (11 years), college (11-13 years) or university (>13 years), was dummy coded into 0=13 years or less (≤13) and 1=more than 13 years (>13) of education. Pubertal development was assessed at stage 2 using the Pubertal development scale (Petersen et al., 1988). In females, ratings of body hair growth, breast development and menarche were assessed; in males, ratings of body hair growth, voice change and facial hair growth were assessed. Scale scores were transformed into five pubertal (Tanner) stages (Carskadon & Acebo, 1993). The stages were on a five-

point scale (1 to 5), with higher stages indicating more advanced development. Height and weight were measured at stage 2. Weight was measured to the nearest 0.1 kilogram using Tanita BC-1000 portable electronic scale (Tanita Corporation, Tokyo, Japan), whilst wearing lightweight clothes with shoes and jackets removed. Height was measured to the nearest 0.1 centimetre using a portable stadiometer (Leicester height measure, Child Growth Foundation, UK). Body mass index (BMI) was calculated by dividing weight in kilograms by height in meters squared (kg/m^2) and was subsequently converted into a percentile score using international BMI for age and sex cut-offs (World Health Organization, 2007): percentile scores ranged between 1 (<3rd percentile; severely underweight) and 5 (>97th percentile; obese).

9.3.2.3 Psychological functioning

Pupils completed Rosenberg's Self-Esteem Scale (Rosenberg, 1965) and the Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1997) at Stage 1 and the Body Esteem Scale for Adolescents and Adults (Mendelson et al., 2001) at Stage 2. Rosenberg's Self-Esteem Scale is a 10-item scale, responded to on a 4-point scale (0=strongly agree; 3=strongly disagree), with higher scores indicating higher self-esteem. The Body Esteem Scale for adolescents and adults is a 23-item scale, responded to on a 5-point scale (0=never; 4=always), with higher scores indicating higher body-esteem. The SDQ is a 25-item scale consisting of five factors: hyperactivity-inattention, emotional problems, peer problems, conduct problems, and prosocial behaviour. For the purpose of this study only the emotional problems subscale was used (5-items). Responses were on a 3-point scale (0=not true;

2=certainly true) and higher scores indicated higher emotional problems. For consistency with the self-esteem and body-esteem scores, the emotional problems score was reverse coded, so that higher scores indicated fewer emotional problems (and higher esteem). Total scores on the self-esteem, body-esteem and emotional problems scales were used to generate a composite (latent) variable of psychological functioning, whereby higher scores indicated higher psychological functioning and wellbeing.

9.3.2.4 Weight loss preoccupation

At Stage 2 pupils completed an adapted version of the eating behaviours component of the Child and Adolescent Psychiatric Assessment (CAPA) version 5.0 (Angold & Costello, 2000). The CAPA is an interview schedule that has been used to diagnose a variety of psychiatric illnesses in children and adolescents, including eating disorders (Copeland et al., 2015). The first adaptation was to make the questions suitable for self-completion, rather than interviewer led. Other adaptations include the rewording of items (e.g., “are you afraid of getting fat?” to “are you afraid of putting on weight?”) and the inclusion of associated items (e.g., “are you afraid of losing weight?”). The items used in the current study are reported in Table 8 (see table and footnote). Responses were on a three-point scale (0=never; 2=often), except for one item on dieting (“have you ever dieted?” response of “no” or “yes”) and one item on weighing frequency (response of “once or more a day”, “once or more a week”, “once or more a month”, “hardly ever/ never”). Responses to all items were subsequently dummy coded (0=no, 1=yes).

9.3.3 Analysis

All analyses were performed using Stata 14. Missing and descriptive data were analysed (Table 7). Structural equation models were then built up sequentially. Firstly, exploratory factor analysis was performed on the 18 items of the adapted CAPA, using principal component factor analysis and a loading value of ≥.40 for item inclusion (Table 8): the resulting 7-item factor – weight loss preoccupation – was calculated into a (weighted) factor score and was used as the latent outcome variable in all subsequent analyses. Secondly, confirmatory factor analysis was performed on the total scores of the self-esteem, body-esteem and emotional problems scales, which were used as indicators of psychological functioning (latent mediator variable). Thirdly, recursive structural models were built; that is, we specified predictive links from bullying role to weight loss preoccupation, which included an indirect path via psychological functioning (see Figure 4 for a hypothetical model). Using the uninvolved group as the reference category, dummy variables were created for each bullying role (e.g., uninvolved=0, victim=1) and models were computed for each bullying role separately to examine the unadjusted direct effect of bullying role on weight loss preoccupation, and the indirect (mediated) effect via psychological functioning (Table 9, model 1). We then adjusted the models for sex and the covariates (BMI, pubertal stage, age, parental education and ethnicity) (Table 9, model 2); modification indices (i.e., the Lagrange Multiplier test) were used to estimate which parameters should be included to improve model fits (Tabachnick & Fidell, 2014) (Table 9, model 3). Lastly, we used

multi-group models to test the potential moderating effect of sex. Model fits were assessed using the root-mean square error of approximation (RMSEA), Comparative Fit Index (CFI) and Tucker-Lewis index (TLI) indices: RMSEA values less than 0.06 and CFI and TLI values greater than 0.95 indicate a close (i.e., good) fitting mode, though RMSEA values less than 0.08 and CFI and TLI values greater than 0.90 are acceptable (Browne & Cudeck, 1992; Hooper, Coughlan, & Mullen, 2008; Hu, Bentler, & Kano, 1992). Full information maximum likelihood estimation was used in all modelling to account for missing data. All model estimates are expressed as standardised regression coefficients (β).

9.4 Results

9.4.1 Missing and descriptive data

Missing data on the outcome variable (weight loss preoccupation) were not related to bullying role, BMI percentile, sex, ethnicity, parent education, age, pubertal stage, body-esteem or emotional problems, but was related to self-esteem; adolescents with higher self-esteem had lower odds of missing data (OR=0.91, 95% CI=0.83 to 0.99, *p*=.025). Overall, missing data were highest on BMI percentile (41.4%), body-esteem (30.4%) and pubertal stage (25.8%).

Descriptive data for each bullying role are reported in Table 7. The majority of the sample were bully-victims (39.5%) and victims were mostly girls (67.9%). There were no significant differences between bullies, victims, bully-victims and uninvolved adolescents on any of the covariates.

Table 7 Descriptive data and group differences for each bullying role, presented as percentages (%) or means and standard deviation (M ± SD)

		BULLYING ROLE				
	N	**Uninvolved**	**Bully**	**Victim**	**Bully-victim**	*p*
N	767	174	150	140	303	
%		22.7	19.6	18.3	39.5	
Sex (%)						***.001***
Girls	406	50.6	51.3	67.9	48.2	
Boys	361	49.4	48.7	32.1	51.8	
Ethnicity (%)						*.48*
White British	648	84.4	81.2	87.0	86.1	
Other	115	15.6	18.8	13.0	13.9	
Parent education (%)						*.56*
<13 years	536	65.5	70.7	71.4	71.3	
>13 years	231	34.5	29.3	28.6	28.7	
Age *(M ± SD)*	767	13.5 ± 1.4	13.9 ± 1.4	13.6 ± 1.4	13.6 ± 1.3	*.10*
Pubertal stage *(M ± SD)*	570	2.5 ± 0.8	2.7 ± 0.7	2.6 ± 0.8	2.6 ± 0.7	*.23*
BMI percentile *(M ± SD)*	367	3.2 ± 0.7	3.1 ± 0.9	3.2 ± 0.9	3.3 ± 0.9	*.20*
Psychological functioning *(M ± SD)*	521	0.5 ± 0.8	0.3 ± 0.8	-0.6 ± 0.9	-0.2 ± 1.0	***.001***
Weight loss preoccupation *(M ± SD)*	521	-0.4 ± 0.9	-0.0 ± 1.0	0.1 ± 1.0	0.2 ± 1.0	***.001***

9.4.2 Exploratory factor analysis

The Kaiser-Meyer-Olkin measure of sampling adequacy was .67 and Bartlett's test of sphericity was significant ($\chi^2(153) = 1210.38$, $p < .001$), indicating the minimum standards for conducting factor analysis were met. Eleven items were excluded (see footnote of Table 8) and one factor with seven items was extracted (eigenvalue = 2.15) and identified as weight loss preoccupation. Factor loadings, ordered by size of loading, communalities, and factor reliability are shown in Table 8.

Table 8 Relationships among loadings, communalities and factor reliability (α) for girls, boys and the total sample

	Factor: Weight loss preoccupation	**Communalities**
Items*		
Trying to lose weight	.70	.51
Worried about putting on weight	.64	.44
Exercises to lose weight	.61	.41
Worries about food	.53	.34
Dieted to lose weight	.46	.24
Eaten less	.46	.23
Worries if cannot exercise	.41	.23
Cronbach α (total)	.76	
Girls	.78	
Boys	.73	

*Excluded items were: lost weight; eaten more; put weight on; self-weighs frequently; exercises for muscle; trying to stay the same weight; trying to gain weight; fasted to lose weight; vomited or taken laxatives; taken diet pills or powders

9.4.3 Confirmatory factor analysis

Because all possible coefficients were estimated the model was saturated (RMSEA=0.000, CFI=1.000, TLI=1.000): these fit indices do not represent a perfect, nor a problematic model (UCLA: Statistical Consulting Group, 2016). Factor loadings

were high for self-esteem (.885), body esteem (.705) and emotional problems (.702), suggesting they were strong indicators of total psychological functioning.

9.4.3.1 Structural model

A hypothetical (unadjusted) model is displayed in Figure 4. The fit indices for this model (Table 9, model 1) were poor for bullies, victims and bully-victims.

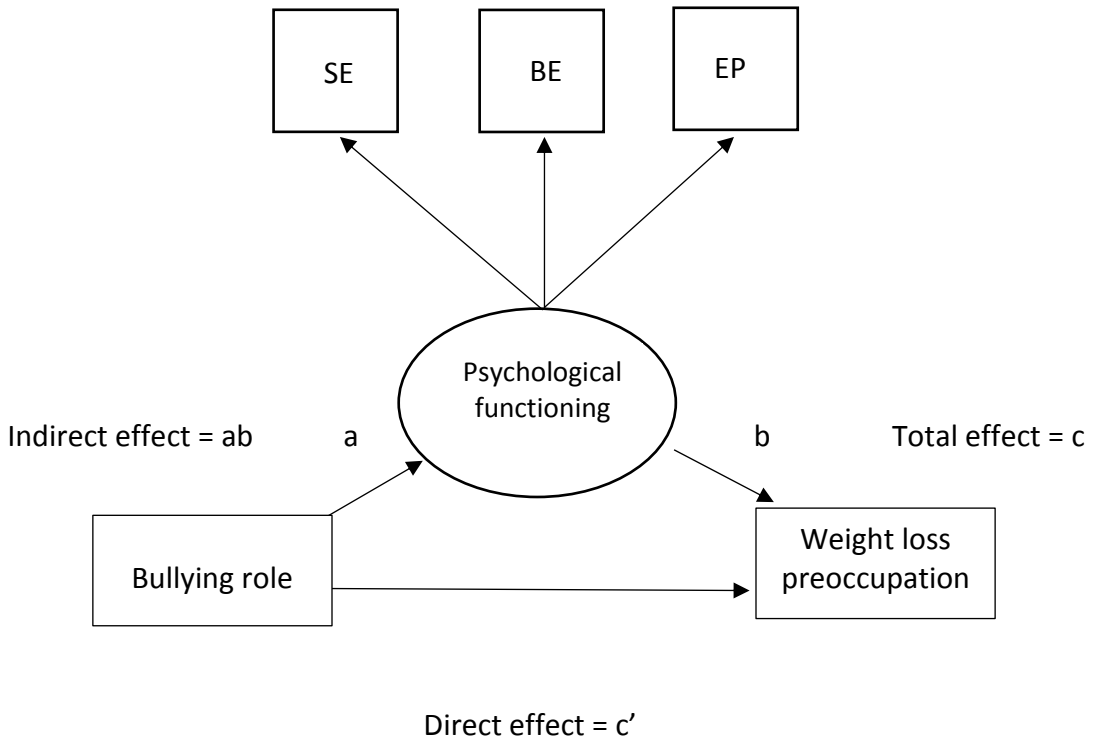

Figure 4 Simplified hypothetical mediation model showing the direct, indirect and total effect paths, and self-esteem (SE), body-esteem (BE) and emotional problems (EP) loading onto the latent psychological functioning (PF) variable.

Note The total effect (c) is the effect of bullying role on weight loss preoccupation with the inclusion of psychological functioning. The direct effect (c') is the effect of bullying role on weight loss preoccupation without the inclusion of psychological functioning. The indirect effect (ab) is the effect of bullying role on weight loss preoccupation, via psychological functioning

In model 2 (Table 9), paths were adjusted for sex, BMI, pubertal stage, age, parental education and ethnicity; i.e., direct paths between each variable and weight loss

preoccupation were included. Fit indices were reduced further when covariates were included into the model.

Table 9 Fit indices (FI) for each specified model for bullies, victims and bully-victims

ROLE	FI	MODEL		
		Model 1[a]	Model 2[b]	Model 3[c]
Bully	CFI	.813	.716	.944
	TLI	.625	.562	.895
	RMSEA	.168	.117	.057
Victim	CFI	.924	.866	.963
	TLI	.848	.793	.930
	RMSEA	.148	.101	.058
Bully-Victim	CFI	.882	.800	.981
	TLI	.763	.691	.964
	RMSEA	.166	.114	.039

[a] Model 1 was the unadjusted model i.e., Figure 4

[b] Model 2 was adjusted for sex, BMI, pubertal stage, age, parental education and ethnicity; i.e., direct paths between each variable and weight loss preoccupation were included.

[c] The Lagrange Multiplier test was used to estimate which parameters should be included to improve model fits. Additional parameters included in model 3 were indirect paths between sex, pubertal stage and BMI percentile on weight loss preoccupation via psychological functioning and error covariance between body-esteem and weight loss preoccupation.

In model 3 (Table 9) modification indices were used to test for the statistical significance of omitted paths. Additional paths were included if the modification index was substantial or the path was theoretically justifiable (Acock, 2013); we included indirect paths between sex, pubertal stage and BMI percentile on weight loss preoccupation via psychological functioning. Previous research indicates that girls, adolescents with early-onset advanced pubertal stage and adolescents with obesity are at increased risk of depression, low self-esteem and poor body image (Allgood-Merten, Lewinsohn, & Hops, 1990; Pesa, Syre, & Jones, 2000; Williams & Currie, 2000), meaning these paths were theoretically plausible. In the current study, girls (M= -.37, SD=.98) had significantly (p<.001) poorer psychological functioning than boys (M= .43, SD=.83) and there were significant negative correlations between psychological functioning and pubertal stage (r=-.13, p=.007) and between psychological functioning and BMI percentile (r=-.21, p<.001). An additional parameter was included to allow for error covariance between body-esteem and weight loss preoccupation. Including these additional parameters produced an acceptable fitting model for bullies and good fitting models for victims and bully-victims (Table 9, model 3). The path estimates of the final model (i.e., model 3) for bullies, victims and bully-victims are reported in Table 10. Path estimates of the covariates are reported in appendix G.

Table 10 Standardised regression coefficients (β) and standard errors in parenthesis (SE) of the total, direct and indirect effect of weight loss preoccupation in bullies, victims and bully-victims

	BULLYING ROLE					
	Bully		**Victim**		**Bully-victim**	
	β (SE)	*p*	β (SE)	*p*	β (SE)	*p*
Total effect (c)	**.218 (.113)**	***<.001***	**.260 (.123)**	***<.001***	**.292 (.102)**	***<.001***
Direct effect (c')	**.183 (.110)**	***.001***	.141 (.153)	*.076*	**.179 (.115)**	***.001***
Indirect effect (ab)	.035 (.040)	*.096*	**.120 (.106)**	***.030***	**.114 (.069)**	***.001***

Note Each bullying role was compared to the uninvolved group. All models controlled for sex, BMI percentile, pubertal stage, age, ethnicity, parent education, and included indirect paths between sex, pubertal stage and BMI percentile on weight loss preoccupation via psychological functioning and error covariance between body-esteem and weight loss preoccupation.

Bullies, victims and bully-victims had increased weight loss preoccupation compared to adolescents uninvolved in bullying (i.e., total effects). In bullies, there was a significant direct relationship between being a bully and weight loss preoccupation; there was no evidence of mediation via psychological functioning. In victims, there was a significant indirect effect; that is, the relationship between victimisation and weight loss preoccupation was mediated by reduced psychological functioning. Bully-victims had characteristics of both bullies and victims as both the direct and indirect paths were significant, though the direct

effect was stronger (β=.179) than the indirect effect (β=.114). Overall, bully-victims had the highest weight loss preoccupation.

9.4.3.2 Multi-group analysis

Total effects for bullies, victims and bully-victims, stratified by sex are displayed in Figure 5. In bullies, the fit indices for the multi-group analysis were good (CFI=.939, TLI=.901, RMSEA=.049) and improved on the previous model fits (Table 9, model 3). There was evidence of moderation by sex on the parameter estimates; there was a strong direct effect of being a bully on weight loss preoccupation in boys (β=.316, SE=.144, p<.001) but not in girls (β=.078, SE=.157, *p*=.305). In contrast, the fit indices in victims (CFI=.925, TLI=.878, RMSEA=.072) and bully-victims (CFI=.938, TLI=.899, RMSEA=.061) were reduced in comparison to the previous model fits (Table 9, model 3); there was no evidence of moderation by sex on the relationship between being bullied and weight loss preoccupation. Moderation effects on the covariates are reported in appendix G.

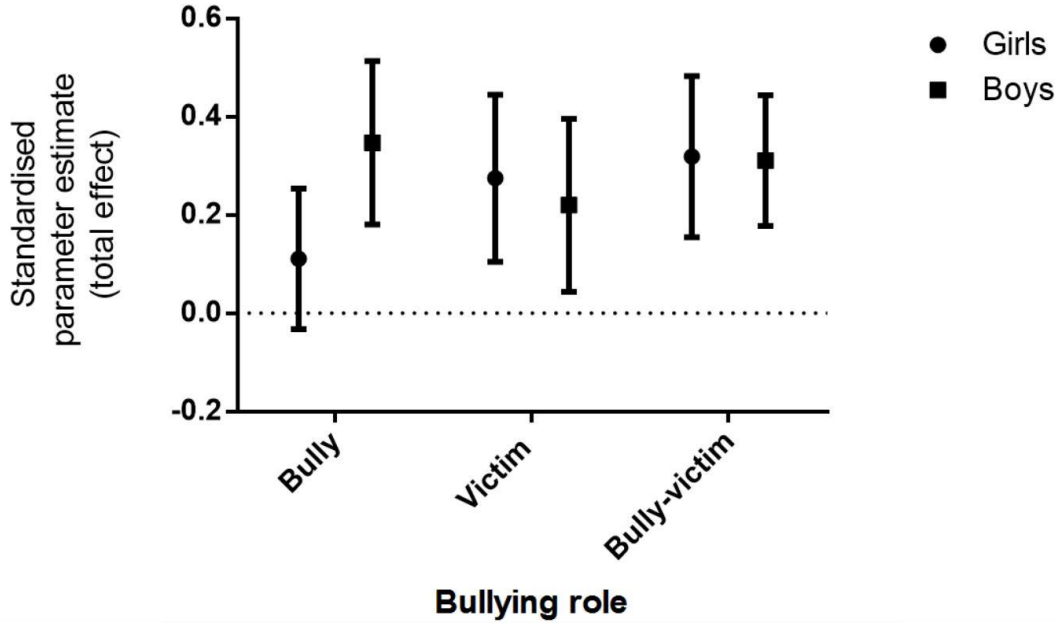

Figure 5 Standardised parameter estimates (β) with standard errors of the total effect of bullying role on weight loss preoccupation, stratified by sex.

Note The uninvolved group were used as the reference category at the zero line. Estimates were adjusted for BMI, pubertal stage, age, ethnicity and parent education

9.5 Discussion

This study found that adolescents involved in bullying in any role were at increased risk of weight loss preoccupation compared to adolescents uninvolved in bullying. There were distinct mechanisms for bullies, victims and bully-victims. Weight loss preoccupation in bullies was direct and unrelated to psychological functioning, whereas in victims the effect was mediated by reduced psychological functioning. Bully-victims had characteristics of both bullies and victims; weight loss preoccupation was directly related to bully-victim status and was partially mediated

by reduced psychological functioning. The relationship between being a bully and weight loss preoccupation was moderated by sex: only bullies who were boys were preoccupied with losing weight.

A novel finding in this study was that bullies were almost equally likely as victims and bully-victims to be preoccupied with losing weight, which was unrelated to their psychological functioning. This supports research suggesting that bullies are psychologically well-adjusted but cool manipulators (Sutton et al., 1999; Wolke et al., 2013). We speculate that bullies may be preoccupied with controlling their weight as a strategy to achieve an ideal body type. This would fit with the theory of bullies striving for social dominance and access to resources (including romantic and sexual opportunities), whereby bullies attempt to enhance their own desirability whilst derogating their competitors (Arnocky & Vaillancourt, 2012; Buss & Dedden, 1990; Vaillancourt & Sharma, 2011). These strategies appear to be fruitful, in that bullies have greater dating success (Arnocky & Vaillancourt, 2012), and adolescents who are both aggressive and have more peer-valued characteristics (like physical attractiveness and athletic capability) are more popular, powerful (Vaillancourt & Hymel, 2006) and tend to have high levels of resources control (Reijntjes et al., 2016).

Another novel finding was that weight loss preoccupation was only present in bullies who were boys. At first, this appears to conflict with research suggesting boys are under pressure and striving to be muscular (McCabe et al., 2002; McCreary & Saucier, 2009). However, body-image in boys tends to have a U-shaped

association, whereby body-satisfaction decreases the further away from 'average' boys perceive their body to be (Reulbach et al., 2013). As teacher and self-reports suggest that male bullies are already physically strong (Lagerspetz et al., 1982; Unnever, 2005), male bullies may therefore be focussed on attaining or maintaining the slim-muscular ideal (McCabe & Ricciardelli, 2004). Male bullies tend to be more narcissistic (Reijntjes et al., 2016) and there is some evidence of an association between narcissism and other-rated attractiveness (Holtzman & Strube, 2010). It is unclear whether male narcissistic bullies are intrinsically more attractive, or they spend an increased amount of time and energy on their appearance.

Overall, girls had more weight loss preoccupation than boys, which is consistent with previous research (Buchanan et al., 2013; Frisén et al., 2013). Surprisingly, girls who were bullies did not have increased weight loss preoccupation compared to adolescents uninvolved in bullying. In children (Hawley, Johnson, Mize, & McNamara, 2007) and adolescents (Dijkstra, Lindenberg, Verhulst, Ormel, & Veenstra, 2009), aggression and popularity are associated with peer and teacher nominated physical attractiveness. Females who aggress against their peers and are popular (i.e., pure bullies) may therefore perceive themselves as attractive and be less concerned about losing weight; although female bullies are inherently competitive, it is possible they do not endorse the thin-ideal (Schleien & Bardone-Cone, 2016).

Being bullied had comprehensive effects on psychological functioning, as has been found previously (Arseneault et al., 2008). The findings here expand on previous

research by suggesting that reduced psychological functioning, as a result of peer victimisation, is driving weight loss preoccupation in victims. Both thin-body preoccupation (Stice & Shaw, 1994; Thompson & Stice, 2001) and poor psychological functioning (i.e., depression and low self-esteem) (Haynos, Watts, Loth, Pearson, & Neumark-Stzainer, 2016) have been associated with pathological eating behaviours. Concerns about the body's shape or size can also influence health on a physical and physiological level: both frequent and infrequent dieting can promote weight gain in girls and boys (Field, Austin, Taylor, Malspeis, Rosner, Rockett et al., 2003), and dissatisfaction with body size or shape can predict variation in inflammatory markers (Černelič-Bizjak & Jenko-Pražnikar, 2014). Peer victimisation can also act as a barrier to adolescents engaging in healthy physical activity (Smith, Troped, McDonough, & DeFreese, 2015). Longitudinal research is needed to examine whether bullied adolescents are at additional risk of future health problems as a result of maladaptive diet and exercise cognitions and behaviours.

Bully-victims had characteristics of both bullies and victims. Like bullies, bully-victims had weight loss preoccupation irrespective of psychological functioning. This may similarly be explained by a desire to increase social status and romantic opportunities, especially as bully-victims are often considered to be unpopular and unattractive (Juvonen et al., 2003; Vaillancourt et al., 2003). However, like victims, weight loss preoccupation was also driven via reduced psychological functioning. Previous research has found that bully-victims are at the greatest risk of eating

disorders (Copeland et al., 2015; Kaltiala-Heino et al., 2000) and we found that overall bully-victims had the highest weight loss preoccupation. This adds to mounting evidence that bully-victims are at the greatest risk of multiple and adverse outcomes (Kaltiala-Heino et al., 2000; Wolke & Lereya, 2015). It is thus important that bullying researchers consider bully-victims as a distinct group (Haynie et al., 2001).

The strengths of this study include: a two-stage sampling process that identified all bullying roles (bullies, victims, bully-victims and uninvolved); a large sample of bullies, which can be difficult to obtain due to low prevalence (e.g., 1-4%) when using self-report measures (Copeland et al., 2013; Wolke, Woods, Stanford, et al., 2001); the use of validated measures of bullying, self-esteem, body-esteem and emotional problems; and a new measure of weight loss preoccupation validated through factor analysis.

There are some limitations to the study. Firstly, the weight loss preoccupation measure contained items relating to diet and exercise thoughts and behaviours; previous research suggests that eating disorder thoughts and behaviours are distinct factors, with the latter being the strongest predictor of depression (Miller, Vaillancourt, & Hanna, 2009). However, an increased odds of eating disorder behaviours in adolescents involved in bullying has been found using the same instrument (Copeland et al., 2015). Secondly, the majority of participants were White British, so there is uncertainty about the applicability of the findings to other ethnic groups. Previous research suggests those with White ethnicity are at the

greatest risk of body dissatisfaction, disturbed eating (Wildes, Emery, & Simons, 2001) and victimisation (Mamun et al., 2013; Tippett et al., 2013). Thirdly, the schools involved in the study were from a relatively small geographical area in the UK, so the findings may not be generalisable beyond the current context. Finally, the cross-sectional design means that causality cannot easily be inferred. However, studies of mono-zygotic twins have established that being bullied is a causal factor of reduced psychological functioning (Arseneault et al., 2008; Silberg, Copeland, Linker, Moore, Roberson-Nay, & York, 2016).

In conclusion, bullying involvement during adolescence is a potentially modifiable environmental risk for weight loss preoccupation. In bullies, strategies to control weight are likely motivated by a desire for status and admiration; in victims, weight loss preoccupation is likely the result of peer victimisation, which adversely impacts psychological functioning. Bully-victims share characteristics of both bullies and victims and bullying researchers should consider bully-victims as a distinct group. Engaging in eating and exercise thoughts and behaviours to lose weight can have maladaptive influences on health, and experiencing peer victimisation should be considered as a potential risk factor.

10 Adolescent desire for cosmetic surgery: associations with bullying and psychological functioning

10.1 Abstract

Adolescent bullying may be a key driver of interest in cosmetic surgery. This study examined the extent of such interest, whether any effects were sex-specific and examined psychological functioning as a potential mechanism through which bullying involvement may lead to a desire for cosmetic surgery. In Stage 1 of the study, 2782 adolescents (11-16 years) were screened for bullying involvement using self-reports and peer nominations. In Stage 2, 752 adolescents who were bullies, victims, bully-victims or uninvolved in bullying, reported their desire for cosmetic surgery. Psychological functioning was constructed as a composite of self-esteem and emotional problems (assessed at stage 1) and body-esteem scores (assessed at stage 2). Adolescents involved in bullying in any role were significantly more interested in cosmetic surgery than uninvolved adolescents. Desire for cosmetic surgery was greatest in adolescents who were bullied (victims and bully-victims). Desire for cosmetic surgery was highest in girls, but sex did not interact with bullying role. Being victimised by peers resulted in poor psychological functioning, which increased desire for cosmetic surgery. In contrast, desire for cosmetic surgery in bullies was not related to psychological functioning, which was in the normal range. In conclusion, bullying victimisation is related to poor psychological

functioning and both are related to a greater desire for cosmetic surgery in adolescents. Cosmetic surgeons should screen candidates for psychological vulnerability and may want to include a short screening questionnaire for a history of peer victimisation.

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10.2 Introduction

Between 2014 and 2015, 15.9 million surgical and minimally invasive procedures were undertaken in the US; 226,000 of those procedures were undertaken in 13-19 year olds (American Society of Plastic Surgeons, 2015). Rates of cosmetic surgery are similarly increasing in the UK (The British Association of Aesthetic Plastic Surgeons, 2015) and across the globe (Holliday, Bell, Jones, Hardy, Hunter, Probyn et al., 2015). As the prevalence of cosmetic procedures has risen, so too has an interest in the drivers that lead people to desire a change in their appearance. Drivers examined so far include individual factors (Honigman et al., 2004; Markey & Markey, 2009; Swami et al., 2012; Swami, Chamorro-Premuzic, et al., 2009) psychological factors (Crerand, Franklin, & Sarwer, 2006; Crerand, Infield, & Sarwer, 2007; De Brito, Nahas, Cordás, Tavares, & Ferreira, 2016; Henderson-King & Henderson-King, 2005; Javo & Sørlie, 2009; Markey & Markey, 2009; Pertschuk et al., 1998; Sarwer & Crerand, 2004; Sarwer et al., 2003; Sarwer & Spitzer, 2012; Sarwer et al., 2004), sociocultural factors influences (De Vries et al., 2014; Delinsky,

2005; Ferguson et al., 2014; Henderson-King & Brooks, 2009; Markey & Markey, 2009; Swami, Taylor, et al., 2009) and interpersonal factors (Brown et al., 2007; Delinsky, 2005; Henderson-King & Brooks, 2009; Jackson et al., 2012; Javo & Sørlie, 2009; Park et al., 2009; von Soest et al., 2006). Some (Ferguson et al., 2014) have found that peers have a strong influence on body image and several studies have found that a large proportion (around 50%) of adults seeking cosmetic surgery report a history of being teased or bullied (Jackson et al., 2012; Javo & Sørlie, 2009; Markey & Markey, 2009; Park et al., 2009; von Soest et al., 2006). Bullying, defined as an imbalanced relationship characterised by intended and repeated aggression (Gladden et al., 2014), can have a range of adverse effects on children and adolescents (Copeland et al., 2015; Fox & Farrow, 2009; Stapinski et al., 2014; Wolke et al., 2014; Wolke & Sapouna, 2008). For bullying victims, the negative effects may be similar to those caused by adult abuse or maltreatment (Lereya, Copeland, Costello, & Wolke, 2015).

There are several gaps in knowledge regarding the relationship between cosmetic surgery and bullying. Firstly, most studies have used a retrospective design in adult samples. Retrospective studies have generally found that cosmetic patients or candidates report appearance teasing more frequently than controls (Jackson et al., 2012; Javo & Sørlie, 2009; Sarwer et al., 2003; Veale et al., 2014; von Soest et al., 2006). However, retrospective studies are problematic because current or prior psychological problems can lead to biased recall (Mackinger et al., 2000; Richters, 1992). In young adults (e.g., undergraduate students), teasing history can uniquely

predict interest in cosmetic surgery (Markey & Markey, 2009; Park et al., 2009). Most bullying occurs during childhood and adolescence (Jackson et al., 2012), but there has been little concurrent investigation of the extent to which adolescents currently involved in bullying desire cosmetic surgery.

Secondly, it is unknown whether all of those involved in bullying are more likely to desire cosmetic surgery or particularly those who are bullied. Adolescents who are purely bullied (i.e., victims) and those who are bullied but also bully others (i.e., bully-victims) tend to suffer the poorest outcomes (Juvonen et al., 2003; Wolke et al., 2013). We might therefore expect that victims and bully-victims to have an increased desire for cosmetic surgery because of poorer psychological functioning (e.g., low self-esteem, body esteem or high depressive symptoms). Those who purely perpetrate bullying (i.e., bullies) tend to have good psychological functioning and suffer few negative long term consequences (Juvonen et al., 2003; Wolke et al., 2013). Some suggest that bullies harm others as a means to achieve dominance and social status, which may increase romantic and sexual opportunities (Volk et al., 2012). We therefore hypothesised that bullies may also have an increased desire for cosmetic surgery as another strategy to achieve their status goals, irrespective of psychological functioning.

Thirdly, the majority of research has focused on females, which is understandable considering the sex ratio of cosmetic procedures is highly skewed (e.g., over 90% of procedures are performed on females) (American Society of Plastic Surgeons, 2015). However, boys, and especially those who have experienced bullying, may

want to increase their muscle bulk and appear stronger, through body building or potentially cosmetic surgery (Wolke & Sapouna, 2008). In adolescents, bullying and victimisation amongst boys and girls is approximately equal: boys tend to be bullies and bully-victims more often than girls, but there are few sex differences in victimisation (Nansel et al., 2001; Reulbach et al., 2013; Salmivalli et al., 1996).

This study addressed the following research questions: 1) do adolescents in all bullying roles (i.e., bullies, victims and bully-victim) have a greater desire for cosmetic surgery than adolescents uninvolved in bullying? 2) Are any effects of bullying on desire for cosmetic surgery sex-specific? 3) Is the relationship between bullying role and desire for cosmetic surgery direct or is it mediated by psychological functioning?

10.3 Method

10.3.1 Design and Participants

Approval for the study was obtained from the University of Warwick's ethical committee. A two-stage sampling process was used. In Stage 1, pupils from all year groups (i.e., 7-11; ages 11-16 years) of five secondary schools in the UK were approached (*n*=3883). As shown in the STROBE diagram (Vandenbroucke et al., 2007) (Figure 3, p.72) 2782 (71%) agreed to take part and were screened for bullying involvement. All those who screened positive for bullying others (bullies) were invited to take part in Stage 2 alongside a sample of adolescents who were identified as victims, bully-victims or uninvolved. As there were a large number of

victims, bully-victims and uninvolved adolescents, a random sub-group balanced by sex were selected using Microsoft Excel's random number generator. In total 1088 pupils were selected for Stage 2. After dropouts and exclusions data was collected from 767 pupils and 752 (69.1%) pupils completed the desire for cosmetic surgery scale. Just over half of the sample (53.3%) were female and the mean age was 13.6 years (*SD*=1.4).

10.3.2 Procedure and Measures

Firstly, school head teachers were approached and following school consent to participate in The Bullying, Appearance, Social Information Processing and Emotions Study (The BASE study), written information sheets were sent to pupils and their parents. Passive consent was obtained from parents and pupils gave their informed consent prior to any data collection. At both stages, electronic questionnaires were completed in a school classroom on a PC, laptop or tablet, with at least one investigator present. All pupils who completed Stage 1 and 2 from each school were entered into a prize draw to win a £50 voucher. Stage 2 was conducted approximately 1-2 months following stage 1.

10.3.2.1 Individual characteristics

Sex, age, ethnicity, and parent education were included as covariates based on previous research indicating an association with cosmetic surgery (Brown et al., 2007; Delinsky, 2005; Nassab & Harris, 2013; Prendergast et al., 2011; Swami et al., 2012; Swami, Chamorro-Premuzic, et al., 2009). Parent's highest level of education

i.e., did not complete school (<11 years), school (11 years), college (11-13 years), or university (>13 years), was used as a proxy for socioeconomic status (Lien, Friestad, & Klepp, 2001) and was dummy coded (0=13 years or less (≤13), 1=more than 13 years (>13) of education). As there were a low proportion of adolescents whose ethnicity was not White British (e.g., the next highest prevalence was Asian at 6.1%), the ethnicity variable was dummy coded (0=White British, 1=Other).

10.3.2.2 Bullying role

We used two measures of bullying: self-report and peer nominations. For s*elf-reported bullying* we used the validated, Bullying and Friendship Interview schedule (Griffiths et al., 2006; Schreier et al., 2009; Wolke et al., 2000). The schedule included 13 behavioural descriptions that relate to direct, indirect and cyber-victimisation (table 11). The items were repeated with slight wording adaptions to assess bullying perpetration. At no point was the term “bullying” used. Adolescents were asked the frequency of each behaviour during the past six months and responses of “quite a lot” or “a lot” indicated bullying involvement (Schreier et al., 2009; Wolke et al., 2000).

Table 11 The Bullying and Friendship Interview schedule and peer nomination items

Bullying and Friendship Interview – victimisation items	
In the past 6 months how frequently has any of the following happened to you? *Answer range: never, sometimes (1-3 times in the past 6 months), quite a lot (several times a month), or a lot (at least once a week).*	
Direct victimisation	Has belongings taken
	Been threatened/ blackmailed
	Been hit/ beaten up
	Been tricked in a nasty way
	Been called bad/ nasty names
Indirect victimisation	Others wouldn't play with you to upset you
	Been made to do things you didn't want to
	Had lies/ nasty things said about you
	Had games spoilt
Cyber- victimisation	Had private email, messages or photos forwarded to someone else or where others could see it
	Had rumours spread about you online
	Got threatening or aggressive emails, instant messages, text messages or tweets
	Had embarrassing pictures posted online without permission
Peer nominations – bullying items	
Some people repeatedly hit, shove around, beat up, threaten blackmail, insult, call nasty names, play tricks, or steal things from others. Which people in your form/tutor group do these things?	
Some people repeatedly leave others out of get-togethers, parties, trips or groups, are ignore people on purpose, not want them around, or spread nasty lies, rumours or stories about people on purpose. Which people in your form/tutor group do these things?	

For the *peer nominations*, adolescents were given a list of names of all peers in their tutor group and asked to nominate up to three pupils (excluding themselves), who perpetrated or were a victim of bullying behaviours (Table 11). Using the total number of nominations received and the total number of peers in the tutor group, z-scores were computed. Adolescents were identified as involved in bullying if their z-score was one standard deviation (*SD*) above (>1) the tutor group mean on the bullying items (bullies), victimisation items (victims), or on both (bully-victims). Adolescents were identified as uninvolved if they received zero nominations.

10.3.2.3 Psychological functioning

We constructed a latent variable of psychological functioning from three scales: self-esteem (Rosenberg, 1965), body-esteem (Mendelson et al., 2001) and emotional problems (subscale of the Strengths and Difficulties Questionnaire) (Goodman, 1997; Goodman et al., 2000). Differences in scale scores for each bullying role are reported in Table 12. Self-esteem and emotional problems were self-reported at Stage 1 and body esteem was self-reported at Stage 2. The latent variable measures total psychological functioning: higher scores indicate higher functioning and wellbeing and lower scores indicate poorer functioning and distress.

10.3.2.4 Desire for cosmetic surgery

We used three items adapted from the Acceptance of Cosmetic Surgery Scale (Henderson-King & Henderson-King, 2005) to assess desire for cosmetic surgery.

These were: 1) “I would like to have cosmetic surgery so that others would find me more attractive”; 2) “I would consider having cosmetic surgery as a way to change my appearance so that I would feel better about myself”; and 3) “If I was offered cosmetic surgery for free, I would consider changing a part of my appearance that I do not like”. Responses were on a 5-point scale (1=not at all, 5=very much). These items have previously been used to assess overall and current interest in cosmetic surgery in a sample of undergraduate students (Park et al., 2009).

10.3.3 Statistical analysis

Between-group comparisons were conducted using chi-square tests, t-tests, analysis of variance (ANOVA) and covariance (ANCOVA). The ANOVA tested the unadjusted associations between bullying roles and desire for cosmetic surgery and the ANCOVA adjusted for covariates (age, parent education and ethnicity) and included sex as a factor. A bullying*sex interaction term was added to the model to test whether any effects were moderated (i.e., sex-specific). These analyses were performed using IBM SPSS 22.0. To examine the potential mechanisms between bullying role and desire for cosmetic surgery, path analyses were performed in Mplus version 7.4 using full information maximum likelihood, which can handle missing data (Muthén & Muthén, 1998-2015). We first estimated the psychological functioning variable using the scale scores of self-esteem, body esteem and emotional problems (reverse scored). Dummy variables were created (e.g. uninvolved=0, victim=1) to examine the direct effect of each bullying role on desire for cosmetic surgery and the indirect (mediated) effect via psychological

functioning. Paths adjusted for covariates were computed for each bullying role separately. To assess model fit, the root-mean square error of approximation (RMSEA), the Comparative Fit Index (CFI) and the Tucker-Lewis index (TLI) were used. RMSEA values less than 0.06 and CFI and TLI values greater than 0.90 indicate an acceptable model (Browne & Cudeck, 1992; Hooper et al., 2008; Hu & Bentler, 1999). Model results are expressed as standardised regression coefficients (β).

10.4 Results

10.4.1 Missing and descriptive data

Missing data on desire for cosmetic surgery (2.5%) and the covariates (1.1%) were low. Missing data was highest on the body-esteem scale (15.4%) (Table 12) and was related to age (odds ratio (OR) = 0.88, 95% confidence interval (95% CI) = 0.79 to 0.99, *p*=.034); the odds of missing data was lower in older adolescents.

Descriptive data for each bullying role are reported in Table 12. The majority of the sample were bully-victims (39.1%) and victims were most likely to be girls (67.6%). Victims and bully-victims had significantly poorer psychological functioning than bullies and uninvolved adolescents. Victims had the lowest body esteem, self-esteem and had the highest emotional problem scores. Overall, mean interest in cosmetic surgery was low (M=1.79, SD=1.06, range 1-5).

Table 12 Descriptive data of the Stage 2 sample, stratified by bullying role

		BULLYING ROLE				
	N*	**Uninvolved**	**Bully**	**Victim**	**Bully-victim**	*p*
N	752	173	146	139	294	
(%)		(22.7)	(19.5)	(18.2)	(39.6)	
Sex (%)	752					***.003***
Boys		49.7	49.3	32.4	50.3	
Girls		50.3	50.7	67.6	49.7	
Ethnicity (%)	748					*.570*
White		84.3	81.4	87.0	85.6	
Other		15.7	18.6	13.0	14.3	
Parent education (%)	750					*.484*
<13 years		65.1	70.6	71.2	71.7	
>13 years		34.9	29.4	28.8	28.3	
Age *(M ± SE)*	750	13.5 ± 1.4	13.9 ± 1.4	13.7 ± 154	13.7 ± 0.9	*.120*
Psychological functioning *(M ± SE)*						
Body esteem	529	3.3 ± 0.7[a]	3.2 ± 0.7[a]	2.7 ± 0.8[b]	2.9 ± 0.6[b]	***<.001***
Self-esteem	743	20.1 ± 0.4[a]	19.3 ± 0.5[a]	14.7 ± 0.6[b]	16.1 ± 0.4[c]	***<.001***
Emotional problems	740	2.7 ± 0.2[a]	3.5 ± 0.2[a]	5.6 ± 0.3[b]	4.5 ± 0.2[c]	***<.001***
Cosmetic surgery						
(M ± SE)	752	1.4 ± 0.7[a]	1.6 ± 0.9[a]	2.1 ± 1.2[b]	2.0 ± 1.1[b]	***<.001***

Note M ± SE = mean and standard error

[abc] Values with identical superscripts do not differ significantly.

* Numbers show missing data

10.4.2 Do adolescents in all bullying roles have a higher desire for cosmetic surgery than adolescents uninvolved in bullying?

Bullies, victims and bully-victims were significantly more interested in cosmetic surgery than uninvolved adolescents. In the unadjusted model (ANOVA), bullying role significantly predicted desire for cosmetic surgery ($F(3,748) = 17.57$, $p<.001$) (see Table 12 for means and standard errors). In the adjusted model (ANCOVA), bullying role ($F(3,738) = 16.99$, $p<.001$), sex ($F(1,738) = 28.46$, $p<.001$), age ($F(1,738) = 16.61$, $p<.001$) and parent education ($F(1,738) = 3.87$, $p<.049$) were significant. Desire for cosmetic surgery was highest in victims (Table 12), in girls ($M = 1.98$, $SD = 1.16$) compared to boys ($M = 1.56$, $SD = 0.89$) and increased as age increased ($\beta=.11$) and as parent education decreased ($\beta=-.16$). When sex was included as a factor, the bullying*sex interaction was not significant ($F(3,735) = 1.18$, $p=.32$), meaning that regardless of whether bullies, victims, and bully-victims were girls or boys they were more interested in cosmetic surgery than uninvolved peers (Figure 6).

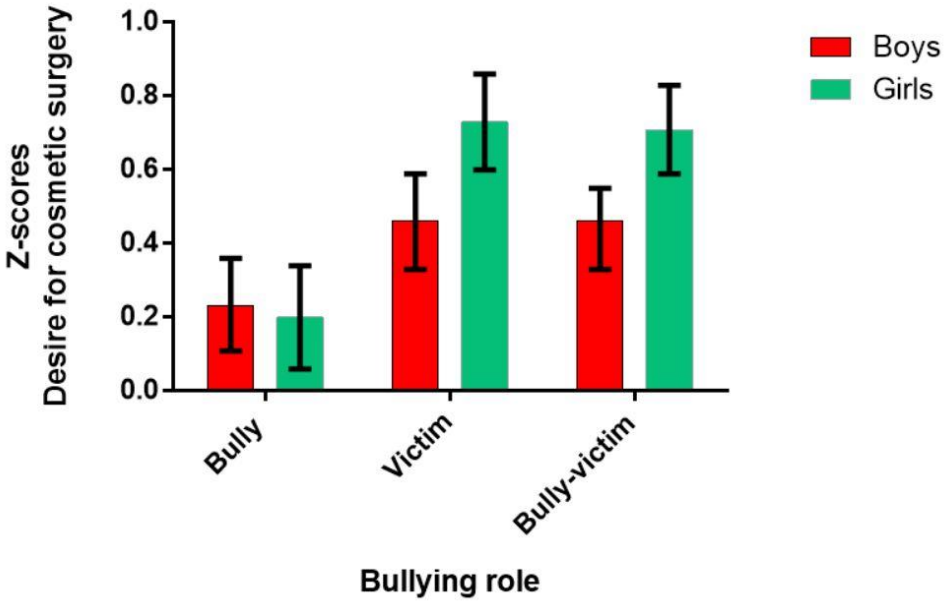

Figure 6 Z-scores (with 95% confidence intervals) of desire for cosmetic surgery in bullies, victims and bully-victims, stratified by sex.

Note The uninvolved group were the reference category on the zero line. The estimates were adjusted for age, ethnicity and parent education. Overall desire for cosmetic surgery was significantly higher in girls than in boys (<.001), but the interaction between sex and bullying role was not significant (p=.32)

10.4.3 Is the relationship between bullying and cosmetic surgery direct or mediated by psychological functioning?

10.4.3.1 Psychological functioning

All possible coefficients were estimated meaning the model was saturated (RMSEA=0.000, CFI=1.000, TLI=1.000); these fit indices do not represent a perfect,

nor a problematic model (UCLA: Statistical Consulting Group, 2016). Factor loadings were high for self-esteem (.885), body esteem (.705) and emotional problems (.702), suggesting they were strong indicators of total psychological functioning.

10.4.3.2 Mediation analyses

The model fits for bullies (RMSEA=0.028, CFI=0.985, TLI=0.975), victims (RMSEA=0.057, CFI=0.973, TLI=0.954) and bully-victims (RMSEA=0.045, CFI=0.978, TLI=0.963) were excellent. Figure 7 shows the hypothetical mediation model and Table 13 shows the total, direct and indirect effect of bullying role on desire for cosmetic surgery.

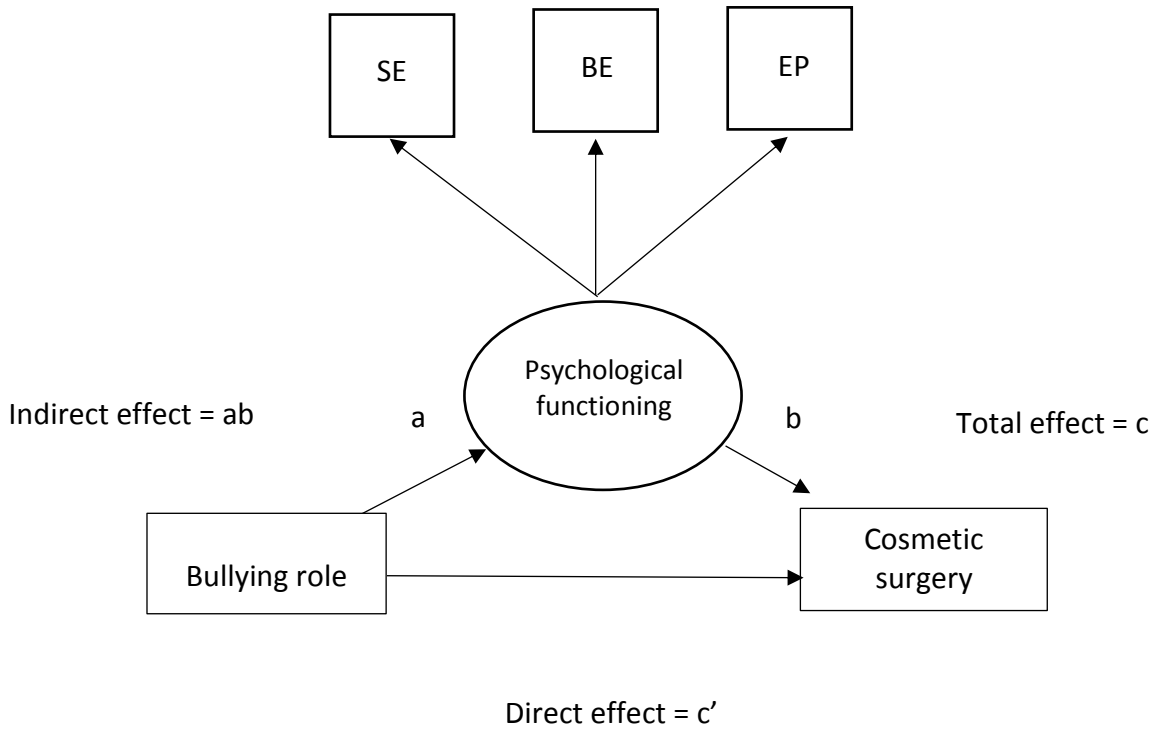

Figure 7 Hypothetical mediation model showing the direct, indirect and total effects, and self-esteem (SE), body esteem (BE) and emotional problems (EP) loading onto the latent psychological functioning variable.

Note The total effect (c) is the effect of bullying role on cosmetic surgery with the inclusion of psychological functioning. The direct effect (c') is the effect of bullying role on cosmetic surgery without the inclusion of psychological functioning. The indirect effect (ab) is the effect of bullying role on cosmetic surgery, via psychological functioning

There were both direct and indirect effects in victims and bully-victims: that is, there was a direct relationship between being bullied and a desire for cosmetic surgery, and another part of the relationship was mediated by poorer psychological

functioning. In victims, the indirect effect was stronger than the direct effect, suggesting that being victimised resulted in poorer psychological functioning, which was driving their desire for cosmetic surgery. In bullies, desire for cosmetic surgery was direct and not related to psychological functioning. Desire for cosmetic surgery in victims was over double that of bullies (i.e., total effect). Examining the top 25th percentile of desire for cosmetic surgery scores revealed that 6.6% (*n*=50) of the sample had extreme scores, the majority of which were victims (11.5%) and bully-victims (8.8%).

Table 13 Standardised regression coefficients (β) and standard errors in parenthesis (SE) of the total, direct and indirect effect of desire for cosmetic surgery in each bullying role

	BULLYING ROLE					
	Bully		**Victim**		**Bully-victim**	
	β (SE)	*p*	β (SE)	*p*	β (SE)	*p*
Total effect	**.163 (.055)**	***.003***	**.348 (.049)**	***<.001***	**.280 (.042)**	***<.001***
Direct effect	**.132 (.054)**	***.014***	**.143 (.067)**	***.033***	**.157 (.048)**	***.001***
Indirect effect	.031 (.021)	*.150*	**.206 (.047)**	***<.001***	**.122 (.026)**	***<.001***

Note Each bullying role was compared to the uninvolved group. Paths were adjusted for age, parent education and ethnicity. Path diagrams that include the covariates for bullies, victims and bully-victims can be found in appendix H. Age contributed to the models for victims (β=0.117 SE=0.051, *p*=.022) and bully-victims (β=0.157, SE=0.042, p<.001): as age increased so did desire for cosmetic surgery.

10.5 Discussion

This study found that involvement in bullying in any role was associated with an increased desire for cosmetic surgery. The mechanisms were different for those who bully others and those who are bullied (victims; bully-victims). Bullies want to look better independent of their psychological functioning, while being bullied was related to reduced psychological functioning and that partly mediated the effect between being victimised by peers and desire for cosmetic surgery. Victims had the greatest desire for cosmetic surgery and the most extreme scores.

The findings of this study offer several new contributions to knowledge. Firstly, previous research indicated that around 50% of adults seeking cosmetic surgery were teased or bullied, mostly during adolescence (Jackson et al., 2012). Results here suggest the relationship between bullying and cosmetic surgery is not limited to adult samples and is present in adolescents who are currently being victimised by their peers. The desire for cosmetic surgery in bullied adolescents is thus immediate and long lasting. Secondly, our findings highlight that being bullied is related to reduced psychological functioning (i.e., reduced body esteem, self-esteem and increased emotional problems), which in turn increases the desire for cosmetic surgery. This supports previous research suggesting that poor body image is one of the key drivers of desire for cosmetic surgery (Markey & Markey, 2009; Pertschuk et al., 1998; Sarwer & Crerand, 2004), and adds to the literature by showing that bullying involvement during adolescence is an important driver of reduced body esteem and emotional functioning. There is now ample evidence that

peer victimisation is a childhood trauma that negatively affects psychological functioning, both concurrently and longitudinally (Lereya, Copeland, Costello, et al., 2015; Lereya, Copeland, Zammit, & Wolke, 2015; Stapinski et al., 2014; Takizawa et al., 2014; Wolke et al., 2014). Childhood trauma has been associated with poor post-operative outcomes (despite a technically good result) and an increased rate of recurrent cosmetic procedures (Constantian & Lin, 2014). Thus, those who are victims of bullying are at increased risk of seeking cosmetic surgery and we speculate, less likely to be satisfied with the outcome due to poorer psychological functioning related to symptoms of body dysmorphia (De Brito et al., 2016; Wolke & Sapouna, 2008), which are present in approximately one fifth of cosmetic surgery candidates (Veale, Gledhill, Christodoulou, & Hodsoll, 2016). Thirdly, this study showed that adolescents who bully others also have an increased desire for cosmetic surgery, which was unrelated to psychological functioning. Pure bullies generally have good psychological and physical health, are well known and often popular in the peer group (De Bruyn, Cillessen, & Wissink, 2010; Juvonen et al., 2003; Wolke et al., 2013). Thus, for bullies, cosmetic surgery may simply be another tactic to increase social status, i.e., another strategy to look good and achieve dominance (Copeland et al., 2015).

Another new contribution is the lack of sex differences in the pathway from being bullied to cosmetic surgery desire. Although desire for cosmetic surgery was greater in girls than in boys, bullied boys and girls are both at increased risk of body dysmorphic symptoms as adults (De Brito et al., 2016; Wolke & Sapouna, 2008),

and therefore may equally want to change their appearance through cosmetic surgery. The lower prevalence of cosmetic surgery amongst males might suggest that they alter their body in other ways, like body building (Wolke & Sapouna, 2008) or disordered eating (Copeland et al., 2015). When males do undergo cosmetic surgery they are more likely to have poorer outcomes (Honigman et al., 2004) and this might be explained by poorer psychological functioning before surgery as a result of peer victimisation. Further research is needed to test this empirically.

Longitudinal research is now needed to determine whether adolescents involved in bullying undergo cosmetic procedures more often than adolescents uninvolved in bullying; to determine if the age at which they have their first procedure is earlier and whether peer victimisation has adverse effects on long-term postoperative outcomes. Our findings already suggest that screening tools for cosmetic candidates should include assessments of bullying in all roles to better counsel candidates for cosmetic surgery and potentially reduce risks to the candidate and surgeon (Paraskeva, Clarke, & Rumsey, 2014). An adapted version of the bullying interview questionnaire (Griffiths et al., 2006; Schreier et al., 2009; Wolke et al., 2000), as used in a study of adult male bodybuilders (Wolke & Sapouna, 2008) could be administered to cosmetic surgery candidates. The brief questionnaire asks about six types of victimisation behaviours (i.e., been kicked, had belongings taken or damaged, been called names, made fun of, socially excluded, had rumours spread about you) in childhood or adolescence, and asks the age at which this first

happened. Responses to include “never/hardly ever”, “occasionally”, “quite a lot” (at least 2–3 times per month), or “a lot” (at least once a week). Victims are those who experience any of the six victimisation behaviours at least 2–3 times per month. The items can be reworded to assess bullying perpetration.

There are some limitations to the study. Firstly, the cross-sectional design means we cannot determine causality. However, meta-analysis has shown that the effects of bullying on poor psychological functioning are stronger than vice versa (Arseneault et al., 2008) and that bullying is an environmental trauma, as shown in studies of discordant monozygotic twins (Silberg et al., 2016). Secondly, we reported on general bullying, but it is possible that specific types of bullying may be more or less likely to increase desire for cosmetic surgery. For example, indirect bullying is often used in intrasexual competition by adolescent girls and is particularly damaging to body esteem (Lereya et al., 2014); it is also possible that the effects of several types of bullying may be cumulative (Markey & Markey, 2009). Thirdly, the outcome measure focused on cosmetic surgery and not minimally invasive procedures (e.g., Botulinum toxin type A), which are increasingly prevalent, even amongst 13 to 19 year olds (up 1% between 2014-15) (American Society of Plastic Surgeons, 2015). The outcome measure was also broad and did not ask about specific types of procedures: evidence suggests those who are bullied may particularly seek rhinoplasty (De Brito et al., 2016; Jackson et al., 2012).

In conclusion, adolescents involved in bullying have an increased desire for cosmetic surgery compared to their non-involved peers. For bullies, their desire

appears to be driven by a need for status and admiration; for the bullied, it is partly related to their reduced psychological functioning. Addressing the mental health of bullied adolescents may reduce their desire for cosmetic surgery. Cosmetic surgeons should screen candidates for psychological vulnerability, as recommended by the Royal College of Surgeons of England (2016), and may want to include a short screening questionnaire (Wolke & Sapouna, 2008) for a history of peer victimisation.

11 Overall Discussion

The overarching aim of this thesis was to gain new understanding about bullies to advance theoretical knowledge and potentially help to guide future interventions. Although the focus of the research was on bullies, there were several gaps in knowledge relating to victims and bully-victims. This chapter summarises the key findings from each of the three studies and offers an integrative discussion of how the results relate to the theory of intrasexual competition and existing knowledge on each bullying role. The strengths and limitations of the research are acknowledged, as are the implications for policy and research.

The aims of this research were:

1. To determine whether body weight or body image independently or jointly predict bullying role amongst males or females (study 1).
2. To examine the extent to which bullies, victims and bully-victims are preoccupied with self-promotion through body alteration and whether this is related to sex and psychological functioning (study 2 and 3).

11.1 Summary of findings

The next section provides a summary of the key findings for bullies, victims and bully-victims in comparison to adolescents uninvolved in bullying. Firstly, the key findings of each study that offer new contributions to the field are highlighted.

11.1.1 Adolescent bullying involvement amongst boys and girls: is it body weight or body image that matters? (Study 1)

- Neither actual underweight nor overweight was related to being a bully, victim or bully-victim.
- Body image was related to being targeted as a victim in both sexes, even after adjusting for actual weight and other covariates.
- Bullies generally had an average body weight and were not biased in their body image.
- Bullies appear to target peers according to their body image, rather than actual body weight.

11.1.2 Associations between bullying and weight loss preoccupation in adolescents (Study 2)

- Involvement in bullying as a bully, victim or bully-victim was associated with increased weight loss preoccupation.

- Weight loss preoccupation was only significant in male bullies and was unrelated to psychological functioning.
- Weight loss preoccupation in victims was explained by reduced psychological functioning as a result of being victimised.
- Bully-victims were at the highest risk of weight loss preoccupation, and this was partly mediated by reduced psychological functioning.

11.1.3 Adolescent desire for cosmetic surgery: associations with bullying and psychological functioning (Study 3)

- Involvement in bullying as a bully, victim or bully-victim was associated with increased desire for cosmetic surgery in adolescent boys and girls.
- Desire for cosmetic surgery was unrelated to psychological functioning amongst bullies.
- Desire for cosmetic surgery amongst bullied adolescents was partly mediated by reduced psychological functioning.
- Victims had the highest and most extreme scores on the desire for cosmetic surgery scale.

11.1.4 Bullies

Male and female bullies were generally of average weight with good body image and psychological functioning, but still seemed to be invested in self-promotion via altering appearance. Male bullies had a tendency to be focussed on weight loss and

had increased desire for cosmetic surgery, whilst female bullies similarly had increased desire for cosmetic surgery and were more likely to be of an advanced pubertal stage. Of particular note is that male bullies were using or were interested in body change strategies that are typically more common amongst females (i.e., weight loss and cosmetic surgery), whilst female bullies were not preoccupied with the typically female desire to lose weight.

11.1.5 Victims

Male and female victims were generally of average weight, but were invested in altering their appearance. Both male and female victims were preoccupied with weight loss and had increased desire for cosmetic surgery, which was mostly mediated by reduced psychological functioning. Out of all the bullying roles it was victims that had the highest desire to alter their appearance through cosmetic surgery. The only difference between male and female victims is that females were more likely to inaccurately believe they were overweight.

11.1.6 Bully-victims

Bully-victims had characteristics of both bullies and victims. Male and female bully-victims were generally of average weight but were invested in self-promotion by altering their appearance. Male and female bully-victims were preoccupied with weight loss and had increased desire for cosmetic surgery; like bullies, part of these effects were unrelated to psychological functioning; like victims, part of the effect was explained by reduced self-esteem, body-esteem and increased emotional problems. Out of all the bullying roles it was bully-victims that were the most

preoccupied with losing weight. Two differences emerged between male and female bully-victims. The first was the direction of their weight perception: females were more likely to (inaccurately) believe they were overweight and males were more likely to (inaccurately) believe they were underweight. The second was that female bully-victims were less likely to be of “Other” ethnicity.

11.2 Integrated discussion

Prior research suggests that bullying perpetration is a behaviour that evolved to promote successful competition against peers for dominance, resources and access to high quality mates (Olthof et al., 2011; Vaillancourt, 2005; Volk et al., 2012). There is reasonably strong evidence that bullying is a type of repeated competitor derogation, which reduces the mate value of potential rivals (Fisher, 2004), and that bullies are bi-strategic controllers who use prosocial as well as aggressive means to achieve dominance (Garandeau & Cillessen, 2006; Hawley et al., 2008; Olthof et al., 2011). Evidence increasingly shows that dominance and status can be achieved through aggressive acts, or via the possession of peer valued characteristics (Vaillancourt & Hymel, 2006) that are typically desirable from an evolutionary perspective (e.g., attractiveness, athleticism, resources) (Buss, 1988a; Miller, 2011). The results presented here support the theory that bullies not only engage in competitor derogation but also engage in self-promotion, i.e., the other core tactic of intrasexual competition. This adds new insights and theoretical understanding about bullies and the potential motivations behind their behaviour; bullies are

actively engaging in or cognizing about strategies to enhance their physical appearance. Hence, bullies are aggressive, strategic and self-promoting.

Few studies have investigated self-promotion tactics amongst bullies. Cosmetic surgery and weight control can both be considered as self-promotion because they have the potential to help the individual obtain or maintain an ideal body type. It was hypothesised that bullies might engage in self-promotion strategies irrespective of psychological functioning (unlike bullied adolescents) and the results supported this hypothesis. However, the findings regarding weight control conflict with a study by Copeland et al. (2015) that found bullies were at increased risk of eating disorder symptoms and this was mediated by emotional problems. There are several possible explanations for why psychological functioning did not mediate the association between being a bully and weight loss preoccupation in this study. Firstly, although the study reported here and the study by Copeland and colleagues both used the eating behaviours component of the Child and Adolescent Psychiatric Assessment (CAPA), there were differences in how that data were collected and analysed: Copeland and colleagues collected the data in an interview format and examined each item separately in the analysis, whereas the data in this study were collected in a questionnaire format, with several additional items included to assess diet and exercise behaviour that promote weight/ muscle gain, and in the analysis the items were reduced into a single factor (i.e., preoccupation with weight loss). Secondly, a handful of studies have found that bullies are at risk of internalising problems (Cook et al., 2010; Kaltiala-Heino, Fröjd, & Marttunen, 2010), whilst

others have found no association (Kumpulainen & Räsänen, 2000; Reijntjes et al., 2013). In a large scale cross-sectional study, Wang, Nansel, and Iannotti (2011) found that depression scores were highest amongst bullies who were frequently physically aggressive in comparison to frequent or occasional verbal, indirect or cyber-bullies. Similarly, the results of a meta-analysis suggest an association between indirect aggression and internalising problems (Card et al., 2008). Thus, specific types of bullying perpetration may be associated with emotional problems amongst bullies. In this study, bullying perpetration was not associated with emotional problems. However, a comprehensive examination of different bullying types and emotional problems was beyond the scope of this thesis.

It seems surprising that male bullies were preoccupied with weight loss whilst female bullies were not. In addition to the possible explanations discussed in chapter 9, there are a couple of points that are worthy of further comment. Firstly, evidence suggests that drive for muscularity and drive for thinness are unrelated (McCreary & Sasse, 2000). This means that males can be driven to be slim and muscular simultaneously. As athleticism and strength are both related to popularity and dominance amongst aggressive males (Vaillancourt & Hymel, 2006), it is reasonable to assume that male bullies may be preoccupied with gaining muscle and retaining a slim physique. Secondly, drawing on animal and human evolutionary literature, Salmon (2014) argues that female aggression and competition may be a tool to instigate eating disorders and drive reproductive suppression in their victims. That is, female bullies may specifically target aspects of

their victims' appearance to trigger disordered eating behaviours that can cause amenorrhea (i.e., menstrual cessation) and thus limit the victims' reproductive potential. This could hence explain why female bullies were not similarly driven to lose weight, as this may reduce their own reproductive potential and thereby conflict with the ultimate goal of intrasexual competition (i.e., to maximise high quality mating opportunities).

General self-promotion has been associated with indirect aggression and Machiavellianism amongst adult males and females using a social network site (i.e., Facebook) (Abell & Brewer, 2014). Machiavelli traits (i.e., the willingness to exploit and manipulate others, low empathy and emotional detachment) have been found amongst preadolescent bullies (Sutton & Keogh, 2000) and bully-victims (Andreou, 2004). Just like pure bullies, youths high in Machiavelli traits are bi-strategic resource controllers who are popular, liked and well-adjusted (Hawley, 2003; Olthof et al., 2011). The preoccupation with oneself and one's appearance is similarly a trait of narcissism, which has been found amongst male bullies (Reijntjes et al., 2016). Overall it seems that bullies have positive self-perceptions (Vaillancourt et al., 2003) and are striving to improve themselves further. Additional research is needed to examine the extent to which Machiavelli and narcissistic tendencies might be driving increased self-promotion amongst male and female bullies.

Self-promotion was also common amongst bullies who also get victimised (i.e., bully-victims). However, the findings supported the theoretical distinction between bullies and bully-victims. Although bully-victims shared some characteristics of

bullies, they also shared characteristics of victims. The reduced psychological functioning experienced by bully-victims is in line with much research indicating that bully-victims are at elevated risk of a multitude of negative outcomes (Copeland et al., 2013; Juvonen et al., 2003; Sourander et al., 2007; Wolke et al., 2013). Although bully-victims may similarly be self-promoting to improve their appearance and status, this is partly driven by low self-esteem, body-esteem and emotional problems. Bully-victims are often low in status and in positive appearance characteristics (e.g., attractive, athletic) that have been ascribed to high status aggressive adolescents (Vaillancourt & Hymel, 2006). It is unclear whether bully-victims are perceived to be unattractive because they are low in status, or whether bully-victims are perceived to be low in status because they are indeed less attractive than their peers. Further unknown is whether the self-promotion tactics that bully-victims engage in enhance their social status in any way. The reactive and highly aggressive nature of bully-victims means they are disliked by peers and unpopular (Pellegrini et al., 1999; Unnever, 2005), meaning self-promotion efforts may do little to improve their plight. Instead, preoccupation with weight loss and cosmetic surgery may cause further damage to bully-victims already fragile psychological and physical health.

Victims were similarly invested in self-promotion, but this was mostly explained by reduced psychological functioning. Adult (Cash, 1995) and child (Crozier & Dimmock, 1999) reports of victimisation suggest that facial attributes and weight are the most commonly criticised aspect of appearance, but there is no evidence as

to whether the attribute criticised is indeed different from average. Empirical studies have examined whether those with visual defects (Horwood et al., 2005), skin conditions (Magin, Adams, Heading, Pond, & Smith, 2008), facial differences (Feragen & Borge, 2010) and excess body weight (van Geel et al., 2014) are more likely to be bullied, but the evidence has been inconsistent. The results here indicate that having an appearance that deviates from average in terms of weight is not a critical factor when it comes to being targeted by bullies. Nonetheless, it is likely that victims (and bully-victims) internalise the messages and treatment they receive from their peers, which seems to manifest in a strong desire to alter their appearance.

Regarding actual body size, bullies, victims and bully-victims were generally of average weight. There are several possible explanations for the lack of association between weight status and bullying involvement in this research. Firstly, this study used objectively measured height and weight, whereas a large proportion of previous studies have relied on self-reported height and weight, the reliability of which is arguable (Gorber, Tremblay, Moher, & Gorber, 2007). Secondly, when self-reports of height, weight and bullying are gathered contemporaneously, responses may be biased due to common method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), a depressive cognitive style (Giletta et al., 2010) or self-stigma in adolescents with a high BMI (Giletta et al., 2010; Podsakoff et al., 2003; Watson & Pennebaker, 1989). As such, effect sizes may be underestimated because of reporting error (Cattelino et al., 2015), or overstated because of a negative

response style. Thirdly, important covariates that have a clear relationship with overweight, like pubertal stage and parent education (a proxy for socioeconomic status) (Austin, Haines, & Veugelers, 2009), have often been overlooked. Pubertal stage is particularly important to consider because of its potential to influence social outcomes (Waylen & Wolke, 2004). Fourthly, the prevalence of overweight in this study (28.2%) was in line with previous studies in the UK (Reilly & Dorosty, 1999), and a rising trend of overweight in recent decades might suggest that excess adiposity has become normalised. In fact, the bullying and overweight association may only be present when self-reports are used (Giletta et al., 2010). Finally, as found in this study and in previous research, the association between weight status and bullying disappears once body image is accounted for (Fox & Farrow, 2009). Ultimately, adolescents may be targeted by bullies because they are different in some way, but not necessarily in body weight. In similar vein, some might argue that bullying could be related to height, which is masked in measures of body mass index (i.e., weight/height^2). However, Frisén and colleagues (2009) found that actual height was not important with regards to bullying victimisation, but that a perception of being too tall was associated with increased victimisation amongst girls. This suggests that psychological characteristics are bigger risk factors than physical characteristics with regards to victimisation. Turning to bullying perpetration, one study found male bullies to be taller and stronger (Unnever & Cornell, 2003), but as these data were self-reported it is unknown whether bullies are indeed taller and stronger, or whether this is a positive misperception.

Tactics to alter body weight or appearance have previously been found amongst victims of peer bullying (Copeland et al., 2015; Jackson et al., 2012; Javo & Sørlie, 2009; von Soest et al., 2006). This research adds to existing knowledge by highlighting one of the key mechanisms by which being bullied can lead to such behaviours. Being bullied has profound effects on how adolescents feel about themselves generally (i.e., self-esteem), how they feel about their body specifically (i.e., body image, body-esteem) and can lead to negative and depressive thought processes (i.e., emotional problems). Ultimately, this seems to manifest in the desire to change the body and these effects may last into adolescence and adulthood. Approximately 20-50% of adults who report they were bullied as youths engage in body change strategies, like body building (Wolke & Sapouna, 2008) and undergoing cosmetic procedures (Jackson et al., 2012), though true prevalence rates are yet to be established. This preoccupation and dislike of the body may put bullied adolescent at increased risk of body dysmorphic disorder, which could further damage psychological and physical wellbeing in the immediate and long-term.

11.3 Strengths and limitations

Firstly, there are several key strengths of this research, including the relatively large sample of pure bullies. Using a combination of self- and peer-reports meant that a large enough sample of bullies could be generated to ensure that the research was sufficiently powered. Another strength of the research is the reliable and valid measures that were used to assess bullying involvement, cosmetic surgery desire,

self-esteem, emotional problems and pubertal development. Through factor analysis it was also possible to generate a new measure (i.e., weight loss preoccupation): further research is needed to test the reliability of this construct. The final strength of the research is the inclusion of relevant covariates. Although the majority of the covariates were non-significant at the bivariate level, they were retained in the modelling because it has been argued that covariates that have been significant in previous research and are theoretically important should be retained, even if the effect is not supported by the data at hand (Cross Validated, 2013).

There are also a number of limitations to this research. The primary limitation is the design; the cross-sectional nature meant that temporal relationships could not be investigated. When this study was initially designed, longitudinal data collection had been planned: bullying was to be measured, along with several of the body image measures, at two time points over a school year. Because of the challenges involved in recruitment, schools were informed that the longitudinal aspect of the study was optional. Screening a whole school for bullying involvement using self- and peer reports is logistically challenging for the schools and time consuming for the researcher (Perry et al., 1988). However, using a combination of self- and peer-reports was the only reliable way of generating a large enough sample of bullies. Difficulties in school recruitment meant that three schools did not complete Stage 1 until the spring or summer term, meaning it would have been uninformative to screen the whole school again such a short time later. Thus, once each school had

completed Stage 2 of the study they were not requested to take part in Stage 3. To gain a full understanding of temporal relations, longitudinal research would need to span from childhood to adulthood. Although there are several cohort studies of this type that measure bullying, they tend to use self-report measures and thus have a low prevalence of self-identified bullies, and do not have the outcomes that were of interest in this research. As such, assumptions regarding causality are tentative and require further examination.

The second limitation is the specific context in which the research was conducted. All schools were recruited from a relatively small geographical area within the UK using a sample of adolescent who were mostly White British. It is thus uncertain whether the findings can be extrapolated beyond the current context. As the research was driven by evolutionary theory, it is possible that the results would translate to different ethnicities and cultures, though different types of self-promotion tactics might be employed. For instance, whereas white females often tan their skin, females with darker skin use bleaching products to lighten their skin (Dadzie & Petit, 2009). Replicating the findings of this research across cultures would provide further support for intrasexual competition to be used as a theoretical framework to guide bullying research.

The third limitation is that some potentially important confounders were not controlled for. For instance, other types of maltreatment (i.e., adult abuse or neglect) or bullying within the family (i.e. by siblings) were not controlled for in the analysis. However, these factors appear to be mostly relevant to adverse

psychological functioning in those who are victimised (Lereya, Samara, et al., 2013; Tippett & Wolke, 2015; Wolke et al., 2015) and might therefore have had little effect on the estimates for bullies, which was the primary focus. Indeed, other research suggests that bullying is as damaging as being maltreated by a parent (Lereya, Copeland, Costello, et al., 2015), so including these factors as covariates in the analysis may have had little impact on the estimates for bullied adolescents.

11.4 Implications and future directions

As discussed in chapter 10, knowing that adolescents who are bullied have the greatest desire for cosmetic surgery has clear implications for cosmetic surgeons. The findings of this research could also have implications for both school policies and bullying interventions, which so far have had limited success in deterring bullying (Eslea & Smith, 1998; Woods & Wolke, 2003). For instance, Woods and Wolke (2003) found that the quality and content of anti-bullying policies in primary schools were unrelated to the prevalence of direct bullying, and that schools had a higher prevalence of indirect bullying when a comprehensive policy was in place. This suggests that anti-bullying policies may encourage children to bully others using indirect bullying tactics that are often invisible and difficult to detect (Garandeau & Cillessen, 2006). However, a later study found that some progress has been made, with most anti-bullying policies in primary and secondary schools at least including a definition of bullying and acknowledging that parents should be informed (Smith, Smith, Osborn, & Samara, 2008). Bullying interventions have similarly been relatively unsuccessful, particularly amongst adolescent bullies (Yang

& Salmivalli, 2014) and those who are highly popular (Garandeau et al., 2014a). This is likely because the benefits of bullying e.g., dominance, popularity, access to resources, increased dating and sexual opportunities (Connolly et al., 2000; Volk et al., 2015) outweigh any potential costs e.g., risk of retaliation, injury, reprimand or punishment, especially when indirect tactics are employed (Björkqvist, Osterman, & Lagerspetz, 1994). It has therefore been suggested that dominant adolescents could be offered opportunities to gain social status using prosocial, rather than antisocial methods (Garandeau et al., 2014a; Smith, Salmivalli, & Cowie, 2012). As bullying is a group process (Salmivalli, 1999; Salmivalli et al., 1996), school policies at least need to tackle the extent to which hierarchies and competition are accepted or encouraged (Garandeau et al., 2014b; Vaillancourt & Hymel, 2006). As bullying is a strategy for competing against peers, reducing the hierarchical and competitive nature of schools may eliminate at least one of the factors that could contribute to a permissive bullying environment.

In addition to the recommendations for future research provided in chapters 8, 9 and 10, this research raised a number of theoretical questions that require further investigation. Firstly, research is needed to investigate how this theoretical framework can be used to examine cross-sex bullying in adolescence. Intrasexual refers to competition between members of the same sex, but there are instances when bullying occurs intersexually (i.e., across sex). It seems that boys are mostly bullied by one or more boys, whilst girls are bullied by girls and boys (Eslea & Smith, 1998; Olweus, 1994; Whitney & Smith, 1993). Is it then possible that at least some

female victims may have been potential love interests of the male bully? This also links into bullying within romantic relationships. Fisher and Cox (2011) found that, second to self-promotion, mate manipulation was the most common tactic used in competition for mates. Mate manipulation can involve both positive (e.g., treating the mate respectfully) and negative (e.g., deceiving or controlling the mate) activities. Buss and colleagues have conducted a series of studies examining mate retention tactics and reassuringly found that the majority of married couples and undergraduate students use “love and care” to retain their mates (Buss, 1988b; Buss & Shackelford, 1997). However, negative mate retention tactics, such as emotional manipulation and aggression towards the mate, were used by approximately 10% of the samples. Emotional manipulation seems to be a unique predictor of violence against women (Shackelford, Goetz, Buss, Euler, & Hoier, 2005) and aggression towards a mate (and others) is associated with Machiavellianism, narcissism and psychopathy (i.e., dark triad traits) (Jonason, Li, & Buss, 2010). As mentioned, these traits are associated with bullying perpetration, suggesting that bullies may be at increased likelihood of aggressing against real and potential romantic partners.

Secondly, further research is needed to determine whether this theoretical framework can be applied to early childhood bullying when pubertal influences are not driving sexual development. During childhood the majority of bullying is verbal (Whitney & Smith, 1993) and refers to the victim’s body size (e.g., “skinny”, “chubby”), sexuality (e.g., “queer”) or sexual behaviours (e.g., “bimbo”) (Crozier &

Dimmock, 1999). Thus, preadolescents engage in bullying tactics that are typical of adolescents. Dominance hierarchies are found in children as young as three years old (Sluckin & Smith, 1977), so it is therefore plausible that although child bullies may not be competing for mates, they are likely competing intra- and intersexually for friendship, dominance and status within the peer group. In adolescence, the competition for a sexual mate is added.

Thirdly, bullies receive mostly positive feedback from peers, who consider them to be attractive and athletic, amongst other things, which aligns the bullies own view of themselves (Vaillancourt et al., 2003). Characteristics like attractiveness, stylish clothing and athleticism are critical aspects of popularity and likeability amongst adolescents (Vaillancourt & Hymel, 2006). What is not clear is whether bullies are popular because they are objectively more attractive and have more peer-valued characteristics than their peers, whether perceptions of attractiveness are a result of popularity, or whether bullies are perceived to be attractive and popular because they spend an increased amount of time and energy on their appearance, as the results of this research might suggest.

Finally, only two types of self-promotion were investigated, but it is possible that bullies engage in other self-promotion strategies. For instance, perhaps bullies are more likely to engage in sports as another means to increase social status and fitness (i.e., attractiveness). Literature on bullying involvement in sports is in its infancy; whilst the prevalence of bullying appears to be higher in school compared to sports contexts (Evans, Adler, Macdonald, & Cote, 2016; Volk & Lagzdins, 2009),

bullying appears to be higher amongst girl athletes compared to the national average for girls (Volk & Lagzdins, 2009). If the risk of bullying involvement is higher amongst adolescents involved in sports, is this because adolescent bullies are engaging in sports as a self-promotion tactic or does the sporting and competitive context encourage bullying behaviour? In a longitudinal study, Endresen and Olweus (2005) found that participation in power or fighting sports (e.g., boxing, martial arts, weightlifting) predicted antisocial behaviour outside of the sports context amongst adolescent males, rather than antisocial behaviour predicting sports participation. Considering that bullies appear to be multi-strategic in their quest for dominance and control, it is likely that bullies will engage in a variety of self-promotion activities and will behave aggressively in order to maintain their acquired social standing.

Overall, this research offers several new contributions to knowledge about bullies, victims and bully-victims, and supports the value of the theory of intrasexual competition in bullying research. Adolescent bullies are aggressive, strategic and self-promoting; bullied adolescents are concerned about their appearance, but this is mostly driven by reduced self-esteem, body-esteem and increased emotional problems likely as a result of being systematically abused by peers. Notwithstanding the merits and limitations of the research, the results highlight important areas for further theoretical and practical investigation. To fully understand the predisposing, precipitating and perpetuating factors of bullying involvement, accumulating

knowledge of bullies, victims and bully-victims is critical to reducing the harm caused by bullying to the individual, community and society.

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Appendices

Appendix A: Growth reference charts

BMI-for-age BOYS
5 to 19 years (percentiles)

World Health Organization

Year: Month	Months	3rd	15th	Median	85th	97th
10: 1	121	13.9	14.9	16.5	18.6	21.1
10: 2	122	13.9	14.9	16.5	18.7	21.1
10: 3	123	13.9	15.0	16.6	18.7	21.2
10: 4	124	14.0	15.0	16.6	18.8	21.3
10: 5	125	14.0	15.0	16.6	18.8	21.4
10: 6	126	14.0	15.1	16.7	18.9	21.5
10: 7	127	14.0	15.1	16.7	19.0	21.6
10: 8	128	14.1	15.1	16.8	19.0	21.6
10: 9	129	14.1	15.2	16.8	19.1	21.7
10: 10	130	14.1	15.2	16.9	19.1	21.8
10: 11	131	14.2	15.2	16.9	19.2	21.9
11: 0	132	14.2	15.3	16.9	19.3	22.0
11: 1	133	14.2	15.3	17.0	19.3	22.1
11: 2	134	14.3	15.3	17.0	19.4	22.2
11: 3	135	14.3	15.4	17.1	19.4	22.2
11: 4	136	14.3	15.4	17.1	19.5	22.3
11: 5	137	14.4	15.4	17.2	19.6	22.4
11: 6	138	14.4	15.5	17.2	19.6	22.5
11: 7	139	14.4	15.5	17.3	19.7	22.6
11: 8	140	14.5	15.6	17.3	19.8	22.7
11: 9	141	14.5	15.6	17.4	19.8	22.8
11: 10	142	14.5	15.6	17.4	19.9	22.9
11: 11	143	14.6	15.7	17.5	20.0	23.0
12: 0	144	14.6	15.7	17.5	20.1	23.1
12: 1	145	14.6	15.8	17.6	20.1	23.1
12: 2	146	14.7	15.8	17.6	20.2	23.2
12: 3	147	14.7	15.9	17.7	20.3	23.3
12: 4	148	14.8	15.9	17.8	20.3	23.4
12: 5	149	14.8	16.0	17.8	20.4	23.5
12: 6	150	14.8	16.0	17.9	20.5	23.6

BMI-for-age BOYS
5 to 19 years (percentiles)

World Health Organization

Year: Month	Months	3rd	15th	Median	85th	97th
12: 7	151	14.9	16.1	17.9	20.6	23.7
12: 8	152	14.9	16.1	18.0	20.6	23.8
12: 9	153	15.0	16.2	18.0	20.7	23.9
12: 10	154	15.0	16.2	18.1	20.8	24.0
12: 11	155	15.0	16.3	18.2	20.9	24.1
13: 0	156	15.1	16.3	18.2	20.9	24.2
13: 1	157	15.1	16.4	18.3	21.0	24.3
13: 2	158	15.2	16.4	18.4	21.1	24.4
13: 3	159	15.2	16.5	18.4	21.2	24.5
13: 4	160	15.3	16.5	18.5	21.3	24.6
13: 5	161	15.3	16.6	18.6	21.3	24.7
13: 6	162	15.4	16.6	18.6	21.4	24.8
13: 7	163	15.4	16.7	18.7	21.5	24.9
13: 8	164	15.5	16.7	18.7	21.6	24.9
13: 9	165	15.5	16.8	18.8	21.7	25.0
13: 10	166	15.5	16.8	18.9	21.7	25.1
13: 11	167	15.6	16.9	18.9	21.8	25.2
14: 0	168	15.6	16.9	19.0	21.9	25.3
14: 1	169	15.7	17.0	19.1	22.0	25.4
14: 2	170	15.7	17.0	19.1	22.0	25.5
14: 3	171	15.8	17.1	19.2	22.1	25.6
14: 4	172	15.8	17.2	19.3	22.2	25.7
14: 5	173	15.9	17.2	19.3	22.3	25.8
14: 6	174	15.9	17.3	19.4	22.4	25.8
14: 7	175	16.0	17.3	19.5	22.4	25.9
14: 8	176	16.0	17.4	19.5	22.5	26.0
14: 9	177	16.1	17.4	19.6	22.6	26.1
14: 10	178	16.1	17.5	19.6	22.7	26.2
14: 11	179	16.1	17.5	19.7	22.7	26.3
15: 0	180	16.2	17.6	19.8	22.8	26.4

BMI-for-age BOYS
5 to 19 years (percentiles)

World Health Organization

Year: Month	Months	3rd	15th	Median	85th	97th
15: 1	181	16.2	17.6	19.8	22.9	26.4
15: 2	182	16.3	17.7	19.9	23.0	26.5
15: 3	183	16.3	17.7	20.0	23.0	26.6
15: 4	184	16.4	17.8	20.0	23.1	26.7
15: 5	185	16.4	17.8	20.1	23.2	26.7
15: 6	186	16.4	17.9	20.1	23.2	26.8
15: 7	187	16.5	17.9	20.2	23.3	26.9
15: 8	188	16.5	18.0	20.3	23.4	27.0
15: 9	189	16.6	18.0	20.3	23.5	27.0
15: 10	190	16.6	18.1	20.4	23.5	27.1
15: 11	191	16.7	18.1	20.4	23.6	27.2
16: 0	192	16.7	18.2	20.5	23.7	27.3
16: 1	193	16.7	18.2	20.6	23.7	27.3
16: 2	194	16.8	18.3	20.6	23.8	27.4
16: 3	195	16.8	18.3	20.7	23.9	27.5
16: 4	196	16.8	18.4	20.7	23.9	27.5
16: 5	197	16.9	18.4	20.8	24.0	27.6
16: 6	198	16.9	18.5	20.8	24.0	27.7
16: 7	199	17.0	18.5	20.9	24.1	27.7
16: 8	200	17.0	18.5	20.9	24.2	27.8
16: 9	201	17.0	18.6	21.0	24.2	27.8
16: 10	202	17.1	18.6	21.0	24.3	27.9
16: 11	203	17.1	18.7	21.1	24.3	28.0
17: 0	204	17.1	18.7	21.1	24.4	28.0
17: 1	205	17.2	18.7	21.2	24.5	28.1
17: 2	206	17.2	18.8	21.2	24.5	28.1
17: 3	207	17.2	18.8	21.3	24.6	28.2
17: 4	208	17.3	18.9	21.3	24.6	28.2
17: 5	209	17.3	18.9	21.4	24.7	28.3
17: 6	210	17.3	18.9	21.4	24.7	28.4

BMI-for-age GIRLS
5 to 19 years (percentiles)

World Health Organization

Year: Month	Months	3rd	15th	Median	85th	97th
10: 1	121	13.6	14.8	16.7	19.2	22.2
10: 2	122	13.7	14.9	16.7	19.3	22.2
10: 3	123	13.7	14.9	16.8	19.3	22.3
10: 4	124	13.7	14.9	16.8	19.4	22.4
10: 5	125	13.8	15.0	16.9	19.5	22.5
10: 6	126	13.8	15.0	16.9	19.5	22.6
10: 7	127	13.9	15.1	17.0	19.6	22.7
10: 8	128	13.9	15.1	17.0	19.7	22.8
10: 9	129	13.9	15.1	17.1	19.8	22.9
10: 10	130	14.0	15.2	17.1	19.8	23.0
10: 11	131	14.0	15.2	17.2	19.9	23.1
11: 0	132	14.0	15.3	17.2	20.0	23.2
11: 1	133	14.1	15.3	17.3	20.0	23.3
11: 2	134	14.1	15.4	17.4	20.1	23.4
11: 3	135	14.2	15.4	17.4	20.2	23.5
11: 4	136	14.2	15.5	17.5	20.3	23.6
11: 5	137	14.2	15.5	17.5	20.4	23.7
11: 6	138	14.3	15.6	17.6	20.4	23.8
11: 7	139	14.3	15.6	17.7	20.5	23.9
11: 8	140	14.4	15.7	17.7	20.6	24.0
11: 9	141	14.4	15.7	17.8	20.7	24.1
11: 10	142	14.5	15.8	17.9	20.8	24.2
11: 11	143	14.5	15.8	17.9	20.8	24.3
12: 0	144	14.6	15.9	18.0	20.9	24.4
12: 1	145	14.6	15.9	18.1	21.0	24.5
12: 2	146	14.7	16.0	18.1	21.1	24.6
12: 3	147	14.7	16.1	18.2	21.2	24.7
12: 4	148	14.7	16.1	18.3	21.3	24.8
12: 5	149	14.8	16.2	18.3	21.3	24.9
12: 6	150	14.8	16.2	18.4	21.4	25.0

BMI-for-age GIRLS
5 to 19 years (percentiles)

World Health Organization

Year: Month	Months	3rd	15th	Median	85th	97th
12: 7	151	14.9	16.3	18.5	21.5	25.1
12: 8	152	14.9	16.3	18.5	21.6	25.2
12: 9	153	15.0	16.4	18.6	21.7	25.3
12: 10	154	15.0	16.4	18.7	21.8	25.4
12: 11	155	15.1	16.5	18.7	21.8	25.5
13: 0	156	15.1	16.5	18.8	21.9	25.6
13: 1	157	15.2	16.6	18.9	22.0	25.7
13: 2	158	15.2	16.7	18.9	22.1	25.8
13: 3	159	15.3	16.7	19.0	22.2	25.9
13: 4	160	15.3	16.8	19.1	22.3	26.0
13: 5	161	15.3	16.8	19.1	22.3	26.1
13: 6	162	15.4	16.9	19.2	22.4	26.1
13: 7	163	15.4	16.9	19.3	22.5	26.2
13: 8	164	15.5	17.0	19.3	22.6	26.3
13: 9	165	15.5	17.0	19.4	22.6	26.4
13: 10	166	15.6	17.1	19.4	22.7	26.5
13: 11	167	15.6	17.1	19.5	22.8	26.6
14: 0	168	15.6	17.2	19.6	22.9	26.7
14: 1	169	15.7	17.2	19.6	22.9	26.8
14: 2	170	15.7	17.3	19.7	23.0	26.8
14: 3	171	15.8	17.3	19.7	23.1	26.9
14: 4	172	15.8	17.4	19.8	23.2	27.0
14: 5	173	15.8	17.4	19.9	23.2	27.1
14: 6	174	15.9	17.4	19.9	23.3	27.1
14: 7	175	15.9	17.5	20.0	23.4	27.2
14: 8	176	15.9	17.5	20.0	23.4	27.3
14: 9	177	16.0	17.6	20.1	23.5	27.4
14: 10	178	16.0	17.6	20.1	23.5	27.4
14: 11	179	16.0	17.6	20.2	23.6	27.5
15: 0	180	16.1	17.7	20.2	23.7	27.6

BMI-for-age GIRLS
5 to 19 years (percentiles)

World Health Organization

Year: Month	Months	3rd	15th	Median	85th	97th
15: 1	181	16.1	17.7	20.3	23.7	27.6
15: 2	182	16.1	17.8	20.3	23.8	27.7
15: 3	183	16.2	17.8	20.4	23.8	27.7
15: 4	184	16.2	17.8	20.4	23.9	27.8
15: 5	185	16.2	17.9	20.4	23.9	27.9
15: 6	186	16.2	17.9	20.5	24.0	27.9
15: 7	187	16.3	17.9	20.5	24.0	28.0
15: 8	188	16.3	18.0	20.6	24.1	28.0
15: 9	189	16.3	18.0	20.6	24.1	28.1
15: 10	190	16.3	18.0	20.6	24.2	28.1
15: 11	191	16.4	18.0	20.7	24.2	28.2
16: 0	192	16.4	18.1	20.7	24.2	28.2
16: 1	193	16.4	18.1	20.7	24.3	28.2
16: 2	194	16.4	18.1	20.8	24.3	28.3
16: 3	195	16.4	18.1	20.8	24.4	28.3
16: 4	196	16.5	18.2	20.8	24.4	28.4
16: 5	197	16.5	18.2	20.9	24.4	28.4
16: 6	198	16.5	18.2	20.9	24.5	28.4
16: 7	199	16.5	18.2	20.9	24.5	28.5
16: 8	200	16.5	18.3	20.9	24.5	28.5
16: 9	201	16.5	18.3	21.0	24.6	28.5
16: 10	202	16.6	18.3	21.0	24.6	28.6
16: 11	203	16.6	18.3	21.0	24.6	28.6
17: 0	204	16.6	18.3	21.0	24.7	28.6
17: 1	205	16.6	18.3	21.1	24.7	28.6
17: 2	206	16.6	18.4	21.1	24.7	28.7
17: 3	207	16.6	18.4	21.1	24.7	28.7
17: 4	208	16.6	18.4	21.1	24.8	28.7
17: 5	209	16.6	18.4	21.1	24.8	28.7
17: 6	210	16.6	18.4	21.2	24.8	28.8

Appendix B: Body-Esteem Scale for Adolescents and Adults

Respondents indicate their degree of agreement on a 5-point Likert scale ranging from 0 (never) to 4 (always), and negative items are reverse scored.

1	I like what I look like in pictures
2	Other people consider me good looking
3	I'm proud of my body
4	I am preoccupied with trying to change my body weight
5	I think my appearance would help me get a job
6	I like what I see when I look in the mirror
7	There are lots of things I'd change about my looks if I could
8	I am satisfied with my weight
9	I wish I looked better
10	I really like what I weigh
11	I wish I looked like someone else
12	People my own age like my looks
13	My looks upset me
14	I'm as nice looking as most people
15	I'm pretty happy about the way I look
16	I feel I weigh the right amount for my height
17	I feel ashamed of how I look

18	Weighing myself depresses me
19	My weight makes me unhappy
20	My looks help me to get dates
21	I worry about the way I look
22	I think I have a good body
23	I look as nice as I'd like to

Appendix C: Stage 1 information sheet and consent form for participants

INFORMATION SHEET FOR PARTICIPANTS

THE UNIVERSITY OF WARWICK

RELATIONSHIPS, HEALTH AND EMOTIONS STUDY

You have been invited to take part in this research study. Before you decide, it is important for you to understand why the research is being done and what you would have to do. Please read the following information carefully and discuss it with your parents and with others if you wish. Take your time to decide whether or not you wish to take part.

What is the purpose of the study?

The purpose of this study is to understand how young people like you get on with others, how you view yourselves and others, and understand more about your health and emotions. This will help us to develop interventions in the future for other young people who may have difficulties with their relationships, health and emotions.

Why have I been invited to take part?

You have been invited because you are between 11 and 16 years old and go to school in Coventry, Warwickshire, Birmingham or Staffordshire. We are asking everyone in this age group in your school to take part.

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part, you will be asked to sign a consent form. We will also contact your parents and ask

them if they are happy for you to take part. If they have no concern, you can participate in the study.

Who are "we"?

We work at the University of Warwick. Kirsty Lee and Alexa Guy are the researchers who will be in charge of the study and Professor Dieter Wolke is their supervisor.

What will happen if I start taking part in the study but then change my mind?

You can stop taking part at any time without giving a reason and this will not affect you in any way.

What will taking part involve?

In the spring of 2015, *all* participants will be asked to complete task 1. For task 1 you will answer questions online in your school's computer lab. Task 1 should take about 30-40 minutes to complete. Your answers will be completely confidential. They will not be shared with anyone at your school, or used for anything other than this research.

Task 1	Answer questions about: • Yourself and your positive (e.g. liking to hang around with someone) and negative (e.g. spreading rumours) experiences with others in your school • How people in your form/tutor group get on with others • Your strengths and difficulties and how you feel about yourself

In the summer of 2015 *some* participants who completed task 1 will be asked to complete tasks 2 and 3. Tasks 2 and 3 will take about an hour to do. Both tasks will again be online on the computer in the computer lab at your school. Remember, all information will be confidential and not shared with anyone.

Task 2	Answer questions about: • Your appearance • Your physical development • Your activity and behaviours • The type of person you think you are • How important some things are to you • Your thoughts and emotions about four scenarios you will read You will also be asked if: • We can take some measurements, such as your height (this will be done in private)

Participants might be asked to repeat some the tasks above in May or June 2015. This will help us to see if there have been any changes. However, this will depend on your school. Some participants may also be asked if they would be happy to be interviewed. Participants will be given information about the interview in May or June. The decision to be interviewed will be separate from the decision to take part in the study described above.

What are the possible benefits/disadvantages to taking part?

We do not expect this study to disadvantage you in any way. Participants who complete task 1 and those who are selected to do tasks 2 and 3 and complete all

activities will be given a “Certificate of Participation” from the University of Warwick.

Will my participation in this study be kept confidential?

All the information collected for this study will be kept private. The answers you give will not be shared with anyone else, including your parents or teachers. When you complete the tasks you will never be asked for your name or personal details. We will not use your name in any report or publication we write. The only time you will give us your name is on the consent form and this will be kept separate from all other information you provide.

Researchers have a legal responsibility to make sure that young people involved in research are kept safe, so the only time we would pass on information about you to someone outside the study is if we were concerned for your safety.

What happens to the results of the research study?

The data collected will be analysed and the results will be used to write a research report. We will also give your school a report on the key findings. However, there will be no details that could identify you in any report we write.

Contact for further information:

If you have any questions or you would like any more information then please contact the researchers below. If we are not able to take your call, please leave a message and we will call you back. You can also visit our webpage www.warwick.ac.uk/fac/sci/psych/research/lifespan/project, which has more information about the researchers and this study.

Kirsty Lee MSc, BSc (Hons)
Department of Psychology
University of Warwick
Coventry CV4 7AL
Kirsty.Lee@warwick.ac.uk
024 7657 3469

Alexa Guy MRes BSc (Hons)
Department of Psychology
University of Warwick
Coventry CV4 7AL
A.L.Guy@warwick.ac.uk
024 7652 3158

What if I have any concerns?

If you have any concerns about this study or the way it is being carried out, you, your parents or your teachers should contact the person below:

Professor Dieter Wolke
Department of Psychology
University of Warwick
Coventry CV4 7AL
D.Wolke@warwick.ac.uk
024 7615 0513

What happens next?

You have two weeks to read and understand this information and decide if you want to take part. If you would like to take part in this study, please complete the consent form below and return it to your tutor as soon as possible. Once we receive your consent form and your parents have no concerns that you can take part, we will come to your school and start the study during one of your classes.

Thank you for taking the time to read this information and deciding whether or not to take part in this study. Please keep this information sheet.

Consent form

	Please tick all boxes that apply
I confirm I have read the information sheet and I have been able to think about the information, ask questions and get answers in a way that makes sense to me.	☐
I understand that I do not have to take part and that I can leave the study at any time without giving a reason.	☐
I would like to take part in this study.	☐

Please write your name here (in capitals):

_____

Please sign your name here:

_____

Please write the date here:

_____/_____/_____

Appendix D: Stage 1 standardised instructions for participants

As pupils enter the room.

- Each computer has a piece of paper next to it. Please find the piece of paper where you can see your name. The papers are arranged in alphabetical order by surname.

Once everybody is seated.

- Hello, my name is Kirsty and I am from the University of Warwick.
- Today you are going to complete a questionnaire about peer relationships, as well as some questions about your strengths and difficulties.
- Next I am going to give you the instructions so please listen carefully
- On the computer you will find a word document that contains a web link. Once I have finished reading these instructions, please copy and paste the web link into your internet browser.
- Once you have done this you will need to type in password that is next to your name on the piece of paper you have been given.
- You need to enter the password twice so make sure you read and type it carefully.
- Once you have logged on you can begin to answer the questions
- The questions will be shown to you in a random order. This means that you will not always be answering the same questions at the same time as the people sat next to you.
- You will also see a piece of paper next to you that has the names of the peers in your tutor group. Please use this to answer the questions about peers in your tutor group. Detailed instructions will be on the questionnaire.
- Please do not talk to any other pupil during the study. This is very important.

- If you have any questions or problems at any time, please raise your hand and one of the study team will come and assist you.
- After 40 minutes the study will end. You will be told when there is five minutes left.
- At the end of the session we will collect the piece of paper from you.
- You should remain quiet until you leave the computer room.
- Remember:
    - There are no right or wrong answers
    - All of your answers will be kept private and not shared with anyone
    - Please answer honestly, this is very important
- You can now begin

Appendix E: Stage 2 standardised instructions for participants

INFORMATION SHEET

THE UNIVERSITY OF WARWICK

RELATIONSHIPS, HEALTH AND EMOTIONS STUDY - PART 2

Why am I here?

A little while ago you completed an online questionnaire. You have now been selected to take part in the second part of this study.

What do I have to do?

We are asking you to complete two more tasks (see task 1 and 2 below). It will take you about an hour to complete all of the tasks. Remember, all of the information you give us will be confidential and not shared with anyone.

To say thank you for completing all of the tasks today, you will be entered into a prize draw to win a £50 amazon voucher!

Task 1	Answer questions about: • Your appearance • Your physical development • Your activity and behaviours • How important some things are to you • Your thoughts and emotions about some scenarios you will read about

	You will also be asked if: • We can take some measurements, such as your height (this will be done in private)

Remember – all of the information you give us will be kept private and will not be shared with anyone, including your parents or teachers. You will not be asked for your name during any of the tasks.

Remember - you can stop taking part at any time, without giving any reason. If you decide to stop taking part this will not affect you in any way. If you do not want to take part you can tell the researchers directly or you can ask your teacher or parent to let us know.

Contact for further information:

If you have any questions or you would like any more information then please contact the researchers below. If we are not able to take your call, please leave a message and we will call you back. You can also visit our webpage www.warwick.ac.uk/fac/sci/psych/research/lifespan/project, which has more information about the researchers and this study.

What if I have any concerns?

Kirsty Lee MSc, BSc (Hons)
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If you have any concerns about this study or the way it is being carried out, you, your parents or your teachers should contact the person below:

Professor Dieter Wolke
Department of Psychology
University of Warwick
Coventry CV4 7AL
D.Wolke@warwick.ac.uk
024 7615 0513

Any complaints can also be sent to the Registrar at the University's Ethical Committee at: Registrar's Office, University House, University of Warwick, Coventry, CV4 8UW.

Thank you for taking the time to read this information. Please keep this information sheet.

Appendix F: Post-study debriefing sheet

DEBRIEF SHEET FOR PARTICIPANTS

THE UNIVERSITY OF WARWICK

RELATIONSHIPS, HEALTH AND EMOTIONS STUDY

What was the purpose of the study?

The purpose of this study was to understand how young people like you interact with others and how these social experiences and relationships affect your emotions, thoughts and behaviours. We also wanted to find out how you view yourself and others to help us understand how this might influence or change your health, emotions and behaviour.

Why is this important to study?

As we grow older, our health, emotions and social skills play an important role in our development. It is important that we know the affect that emotions, health and social skills have on our interactions and relationships with others. By increasing our understanding and knowledge of this, we can learn how to prevent some of the problems that young people experience. We can also learn better ways to help young people who are already having difficulties.

Contacts for further information:

If you have any questions or you would like any more information then please contact the researchers below.

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If you have any concerns about this study you, your parents or your teachers should contact the person below:

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024 7657 3217

Sources of Support

We know there are many different issues and troubles young people go through in their lives. If you are experiencing any problems and would like to speak to someone for help, there a number of groups you can contact. Some are listed below:

Childline
Website: http://www.childline.org.uk
Tel: 0800 1111
Email and 1-2-1 chat: available through links on the website

Kidscape
Website: http://www.kidscape.org.uk
Tel: 020 7730 3300
Email: info@kidscape.org.uk

Beat Bullying
Website: http://www.beatbullying.org
Tel: 0208 771 3377
Email: hello@beatbullying.org

Samaritans
Website: http://www.samaritans.org
Tel: 08457 90 90 90
Email: jo@samaritans.org

Victim Support
Website: https://www.victimsupport.org.uk
Tel: 0845 30 30 900
Email: supportline@victimsupport.org.uk

Thank you for taking part in our project

Appendix G: Path estimates of covariates on the relationship between bullying role and weight loss preoccupation

Bullies

There were significant direct paths between BMI percentile (β=.221, SE=.095, p=.006) and parent education (β=.156, SE=.113, p=.004) on weight loss preoccupation; there were significant indirect paths of sex (β=-.154, SE=.097, p=.002) and BMI percentile (β=.087, SE=.040, p=.010) on weight loss preoccupation via reduced psychological functioning.

The direct path between parent education and weight loss preoccupation was significant in girls (β=.190, SE=.159, p=.011) and insignificant in boys (β=.077, SE=.148, p=.300). The indirect path of BMI percentile on weight loss preoccupation via reduced psychological functioning was significant in girls (β=.084, SE=.051, p=.030) and insignificant in boys (β=.099, SE=.063, p=.095).

Bully-victims

There were significant direct paths between BMI percentile (β=.142, SE=.085, p=.043), parent education (β=.093, SE=.101, p=.045) and age (β=-.137, SE=.045, p=.023) on weight loss preoccupation; there were significant indirect paths of sex (β=-.137, SE=.079, p<.001), BMI percentile (β=.058, SE=.027, p=.010) and pubertal

stage (β=-.034, SE=.023, p=.046) on weight loss preoccupation via reduced psychological functioning.

The direct effect of BMI percentile on weight loss preoccupation was significant in bully-victims who were boys (β=.243, SE=.102, p=.010) and insignificant in girls (β=.070, SE=.163, p=.577); similarly, the direct effect of age on weight loss preoccupation was significant in bully-victims who were boys (β=-.178, SE=.065, p=.038) and insignificant in girls (β=-.117, SE=.068, p=.211). Similar to bullies, the indirect path of BMI percentile on weight loss preoccupation via reduced psychological functioning was significant in girls (β=.068, SE=.044, p=.046) and insignificant in boys (β=.046, SE=.029, p=.091). The indirect path of pubertal stage on weight loss preoccupation via reduced psychological functioning was significant in boys (β=-.061, SE=.037, p=.043) and insignificant in girls (β=-.022, SE=.032, p=.291).

Victims

There were significant direct paths between BMI percentile (β=.232, SE=.093, p=.002) and sex (β=-.164, SE=.150, p=.033) on weight loss preoccupation; there was a significant indirect path of sex on weight loss preoccupation via reduced psychological functioning (β=-.070, SE=.066, p=.039).

There was no evidence of moderation in victims.

Appendix H: Path diagrams including covariates for bullies, victims and bully-victims on desire for cosmetic surgery

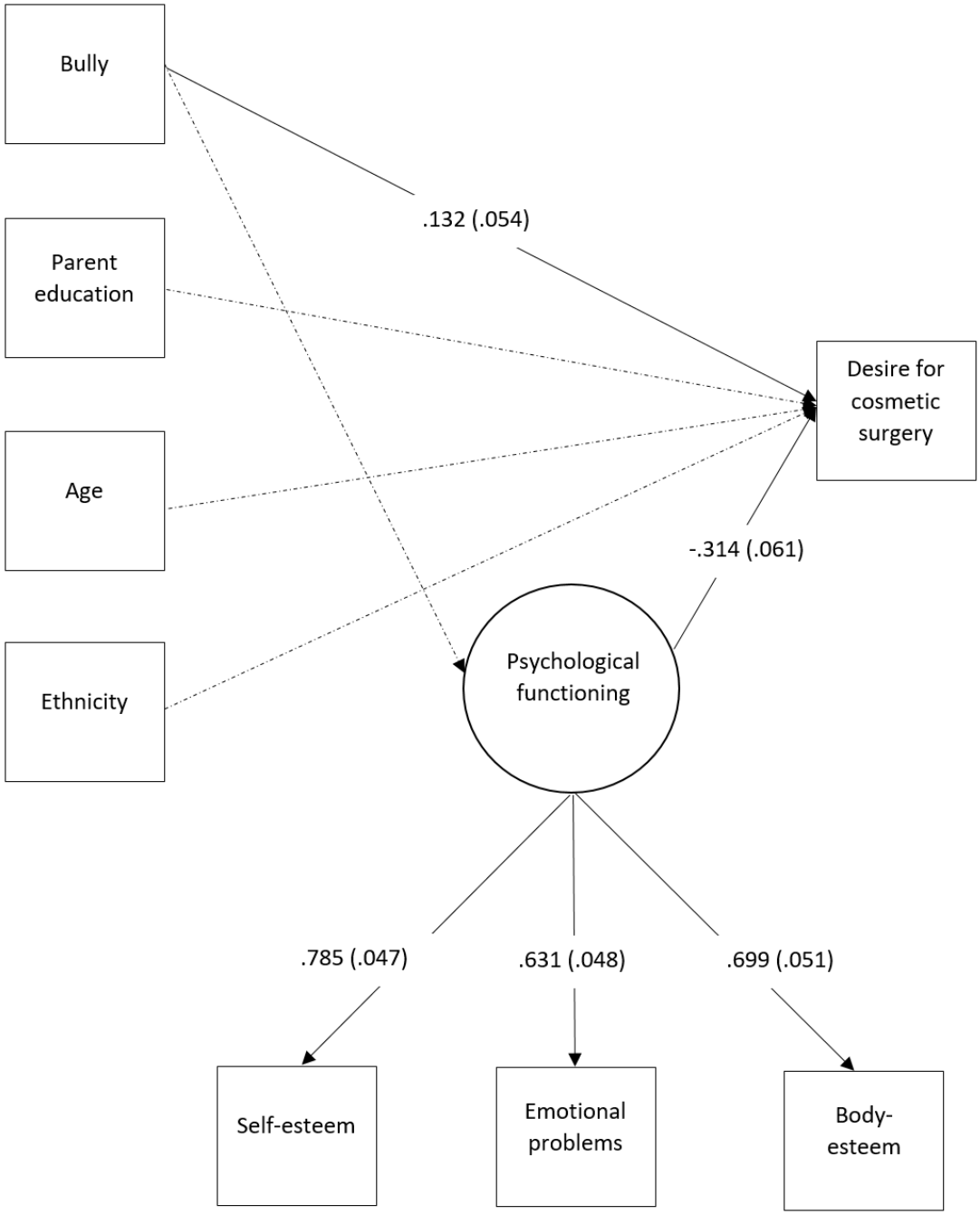

Figure H1 Path diagram for bullies *Note* Solid lines represent significant effects, dashed lines represent non-significant effects. Values are standardized beta coefficients with standard errors in parentheses. Residual errors have been omitted for simplicity

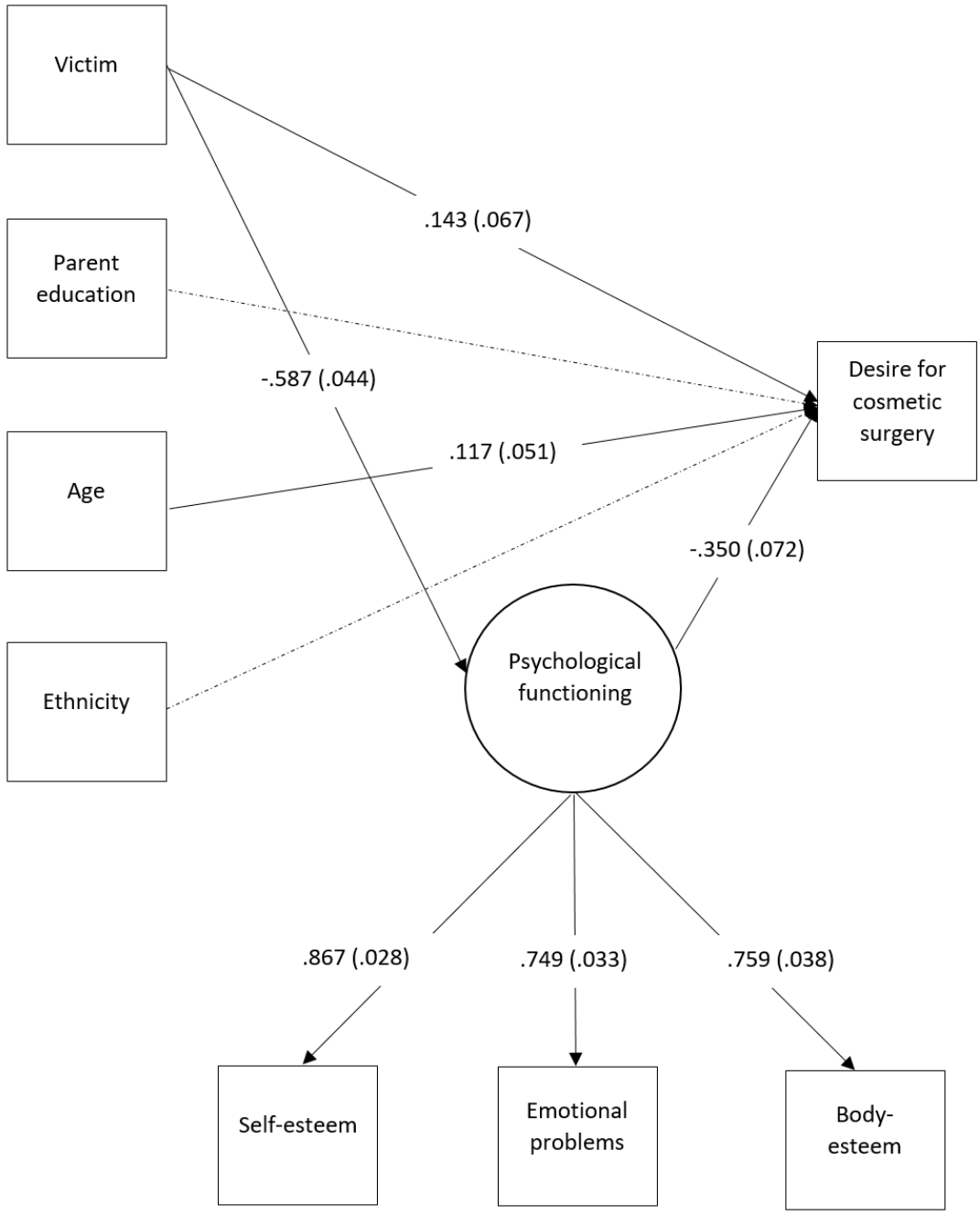

Figure H2 Path diagram for victims. *Note* Solid lines represent significant effects, dashed lines represent non-significant effects. Values are standardized beta coefficients with standard errors in parentheses. Residual errors have been omitted for simplicity

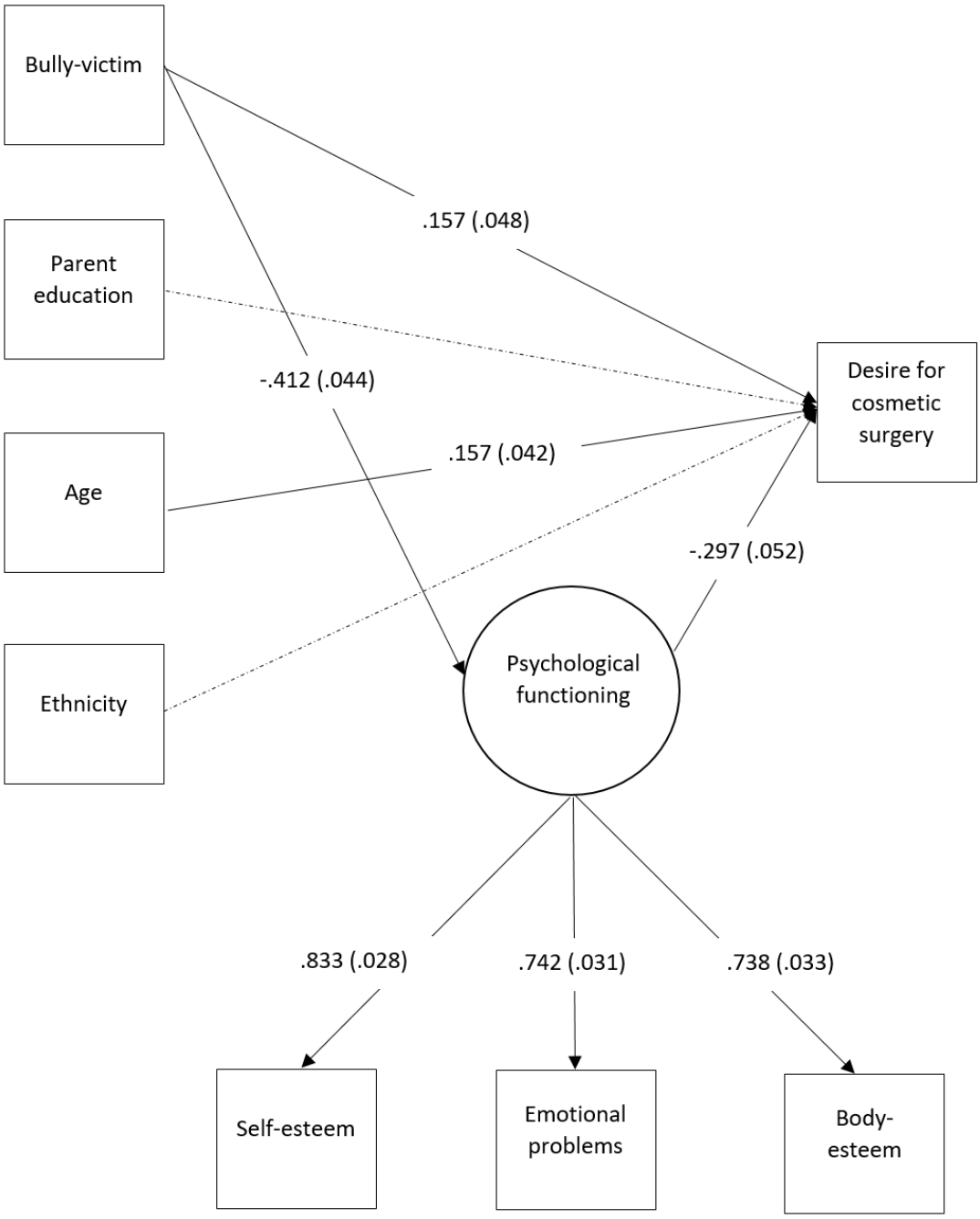

Figure H3 Path diagram for bully-victims. *Note* Solid lines represent significant effects, dashed lines represent non-significant effects. Values are standardized beta coefficients with standard errors in parentheses. Residual errors have been omitted for simplicity