Development and Initial Validation of the *Gay Men's Physical Attractiveness Scale*

by

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ABSTRACT

Young and older gay men from 40 countries rated the importance of 258 body features in judging the physical attractiveness of other men (*N* = 3,600). Exploratory factor analyses using two separate, independent samples suggested four factors underlying male same-sex physical attractiveness: Facial Attractiveness; Muscularity/Body Shape; Body Fat/Overall Appearance; and Intimate Regions. Twenty items representing the four dimensions were selected. Confirmatory factor analytic models using two other separate, independent samples supported the viability of a hierarchical structure with four first-order attractiveness factors mapping onto a higher-order Attractiveness construct. Responses to the scale exhibited good internal consistency and test-retest reliability (*r* = .73 over a median period of 16 weeks). In addition, the hierarchical structure of responses appears to be time- and age-invariant. Results are discussed in the context of evolutionary theory.

Keywords: aging; evolutionary psychology; gay men; homosexuality; physical attractiveness; scale development and validation

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CHAPTER I: INTRODUCTION

Physical Attractiveness: A Potent Social Variable

Physical attractiveness plays a central role in our everyday lives, as evidenced by polls indicating that the majority of men and women take a strong interest in their physical appearance (Mann, 2003). By 2015, the global market for cosmetics and grooming products will reach $333 billion, with growth driven by both developed and developing nations (e.g., Global Industry Analysts, 2012; Li & Fung Research Centre, 2012; RNCOS, 2012). By 2013, the global market for surgical and non-surgical cosmetic procedures will reach $40 billion, up 25% from 2008 (Elder, 2009). Although females comprise the majority of this market, there has been a 120% increase in the number of men undertaking cosmetic procedures over the last 15 years (American Society for Aesthetic Plastic Surgery, 2011; Blanchard & Hope, 2010; Shields, 2008). Lest we think that this preoccupation with beauty is a recent phenomenon, evidence indicates that beauty has been a priority throughout recorded history, even as far back as the Stone Age (Azoulay, 2009; Long, 2010). Yet despite our evident concern with appearance, most of us still lack awareness or feign ignorance of the influence of physical attractiveness on our everyday lives (Patzer, 2006).

Studies demonstrate that physical attractiveness is one of the primary factors affecting our liking of others (Berscheid & Walster, 1974; Brislin & Lewis, 1968; Byrne, Ervin, & Lamberth, 1970; Curran, 1973; Curran & Lippold, 1975; Hagiwara, 1975; Hatfield & Sprecher, 1986; Peretti & Abplanalp, 2004; Riggio & Woll, 1984; Stroebe, Insko, Thompson, & Layton, 1971; Walster, Aronson, Abrahams, & Rottman, 1966). This preference is not exclusive to mating contexts; we like good-looking people of both sexes, including same-sex friends (Aboud & Mendelson, 1996; Byrne, London, and

Reeves; 1968; Fehr, 2000). This preference for beauty begins early in life: Irrespective of the ethnicity of the faces, infants as young as a few days prefer faces that adults rated as attractive over those rated as unattractive (Geldart, Maurer, & Carney, 1999; Kramer et al., 1995; Langlois et al., 1987, 1991; Rubenstein, Kalakanis, & Langlois, 1999; Samuels et al., 1994; Samuels & Ewy, 1985; Slater et al., 1998; van Duuren, Kendell-Scott, & Stark, 2003).

Not only do we like attractive people, but we evaluate them more favourably than less attractive people. Despite the age-old adage that we should "never judge a book by its cover," studies consistently demonstrate that most of us intuitively equate beauty with concepts like *good-better*, *smart-successful*, and *important-valuable*. A seminal study by Dion, Berscheid, and Walster (1972) found that attractive people are more socially desired than their less attractive counterparts and are believed to be more likely to attain a prestigious job, have a satisfying marriage, be a good spouse, and be happy in general. A voluminous literature has since demonstrated that, other things being equal, attractive men and women are routinely judged to be smarter[1], more successful, more sociable, more honest, more dominant, sexually warmer, and as having better mental and physical health and higher self-esteem than their less attractive counterparts, even by those who know them well (Atoum, 2000; Bull & Rumsey, 1988; Cash et al., 1977; Dion, 1972; Eagly, Ashmore et al., 1991; Hatfield & Sprecher, 1986; Feingold, 1992a; Jackson, Hunter, & Hodge, 1995; Jones et al., 1978; Segal-Kaspi et al., 2012; Langlois et al., 2000; LeMay et al., 2010; Miller, 1970; Mobius & Rosenblat, 2006; Patzer, 2006; Porter et al., 2002; Zebrowitz et al., 1998, 2002). As Hatfield and Sprecher (1986) wrote, attractive people are believed to "possess almost all the virtues known to

[1] This runs contrary to the "dumb blonde" stereotype in Western culture. In fact, for every additional point a judge assigns to a person's attractiveness, the perception of that person's intelligence rises, on average, .29 points (Ruffle & Shtudiner, 2011).

mankind" (p. xix). Even physically attractive infants are perceived more positively (Karakker & Stern, 1990; Stephan & Langlois, 1984).

Favourable perceptions of attractive people are often attributed to the *physical attractiveness bias*: the tendency to over-generalize from appearance and assume that those who are attractive on the outside must also be attractive on the inside (Berscheid & Walster, 1974; Dion, 1981, 1986; Warner & Sugarman, 1986). In essence, "what is beautiful is good" (Dion et al., 1972, p. 285). This bias is a prominent example of the *halo effect*, in which a person perceived as having one positive trait is perceived as having many others (Nisbett & Wilson, 1977b; see also LeMay et al., 2010). This bias operates automatically and outside of conscious awareness (Nisbett & Wilson, 1977a; van Leeuwen & Macrae, 2004; Wetzel, Wilson, & Kort, 1981). Moreover, although the content of the positive attributions may differ across cultures, the underlying physical attractiveness bias appears to be universal (Chen et al., 1997; Zebrowitz et al., 1993).

Interestingly, there may be a kernel of truth to the "beautiful is good" stereotype. Although qualities like intelligence[2], emotional stability, talent, character, and virtue are generally unrelated to physical attractiveness (Feingold, 1992b; Hatfield & Sprecher, 1986; Jackson et al., 1995), physically attractive individuals are, in fact, less socially anxious, more socially skilled, and more extraverted than their less attractive counterparts (Erwin & Calev, 1984; Feingold, 1992b; Fink et al., 2005; Goldman & Lewis, 1977; Langlois et al., 2000; Mobius & Rosenblatt, 2006; Penton-Voak et al., 2006; Pound et al., 2007; Zebrowitz, Collins, & Dutta, 1998). They are also happier (Hamermesh, 2012; Umberson & Hughes, 1987; cf. Diener, Wolsic, & Fujita, 1995) and

[2] There is, in fact, a highly significant positive relationship between physical attractiveness and intelligence, but the effect size is fairly small (Jackson et al., 1995; Langlois et al., 2000; Zebrowitz et al., 2002). Kanazawa and Kozar (2004), however, argue that the effect may be stronger in other cultures (e.g., polygynous societies).

may be at decreased risk for mental illness (Archer & Cash, 1985; Farina et al., 1977; Napoleon, Chassin, & Young, 1980). Perhaps attractive people possess genes that lead to both beauty and positive personality traits, and it is the personality traits to which others respond. Perhaps they internalize the beautiful-is-good stereotype and conform to others' positive expectations by way of a self-fulfilling prophecy (Swann, 1984). Or perhaps by the process of *behavioural confirmation* (Darley & Fazio, 1980; Miller & Turnbull, 1986), people reinforce their expectations that attractive individuals are good by treating them better, in turn eliciting more positive behaviour (Anderson & Bem, 1981; Burns & Amerigo, 1992; Langlois, 1986; Lerner & Lerner, 1977; Schofield, 1964; Snyder et al., 1977; Zebrowitz et al., 1998).

Whatever the causal mechanism, it is clear that attractive people enjoy more positive outcomes in nearly every sphere of life that we consider important (Langlois et al., 2000). Mothers develop stronger bonds with their attractive children (Hildebrandt & Fitzgerald, 1983), touch them more often (Harrell, 1979), and monitor their safety more closely (Harrell, 2005). Teachers have higher academic expectations for attractive students (Clifford, 1975) and treat them preferentially (Wang et al., 2008), including giving them more attention (Clifford & Walster, 1973; Hatfield & Sprecher, 1986), higher evaluations for the same work (Landy & Sigall, 1974), and better grades for equivalent achievement (Felson, 1980; Salvia, Algozinne, & Sheare, 1977). They are also less likely to view attractive students' transgressions as reflecting an enduring disposition toward antisocial behaviour, and are therefore more lenient (Dion, 1972).

As adults, attractive people are more likely to attain higher education (Jokela, 2009; Umberson & Hughes, 1987) and are judged more positively in occupational contexts (Hosoda, Stone-Romero, & Coats, 2003; Princeton Survey Research Associates, 2010a, 2010b; Watkins & Johnston, 2000). They receive more job offers

(Cash & Kilcullen, 1985; Chiu & Babcock, 2002; Heilman & Saruwatari, 1979; Marlowe et al., 1996), better positions (Senior, Thomson, Badger, & Butler, 2007), higher performance ratings (Cash et al., 1975; Hamermesh & Parker, 2005; Riniolo et al., 2006), and larger salaries, even in fields where looks have no relationship with performance, such as law (Biddle & Hamermesh, 1998; Hamermesh & Biddle, 1994; Hamermesh, 2011; Harper, 2000; French, 2002). Attractive people are also more likely to be approved for loans and to receive favourable interest rates, irrespective of credit history (Pope & Syndor, 2011; Ravina, 2008). They elicit more trust from others (Mulford et al., 1998), are more persuasive (Chaiken, 1979; Pallak, 1983; DeBono & Harnish, 1988; Parekh & Kanekar, 1994, van Leeuwen et al., 2009), win more arguments (Patzer, 1985), and receive higher ratings from voters (King & Leigh, 2009). They are less likely to be found guilty of crimes and they receive more lenient sentences (Castellow, Wuensch, & Moore, 1990; Downs & Lyons, 1991; Mazella & Feingold, 1994; Patry, 2008; Stewart, 1980). They get more help from strangers (Benson, Karabenick, & Lerner, 1976; Harrell, 1978) and are even treated preferentially in medical settings: Sudnow (1969) found that doctors were less likely to pronounce a casualty “dead on arrival” if the patient was “of pleasing appearance” (p. 114).

Perhaps the most important context in which attractive people are advantaged is intimate relationships. Although people do not consciously recognize or acknowledge the role that physical attractiveness plays in romantic relationships (Hadjistavropoulos & Genest, 1994), attractive people are more popular (Langlois et al., 2000), have more dates (Berscheid et al., 1971; Bogaert & Fisher, 1995; Krebs & Adinolfi, 1975; Riggio & Woll, 1984; Walster et al., 1966), report a more active sex life (Bogaert & Fisher, 1995; Curran & Lippold, 1975; Langlois et al., 2000; Rhodes, Simmons, & Peters, 2005; Weeden & Sabini, 2007), have a greater number of long-term relationships (Rhodes et

al., 2005), are more likely to marry (Udry & Eckland, 1984; cf. Hamermesh, 2012), have longer marriages (Jokela, 2009), and sire more children (Hill & Hurtando, 1996; Jokela, 2009; Mueller and Mazur, 2001; Nettle, 2001; Pawlowski, Dunbar, & Lipowicz, 2000). Attractiveness also seems to be associated with satisfaction in the early stages of relationships (Critelli & Waid, 1980; McNulty, Neff, & Karney, 2008) and perhaps over the longer term as well (Blumstein & Schwartz, 1983; Harrell, 1979; Margolin & White, 1987; Murstein & Christy, 1976; Peterson & Miller, 1980; Sangrador & Yela, 2000).

It should be noted that although physically attractive people enjoy more positive outcomes compared to their less attractive counterparts, there are exceptions. Unusually attractive people tend to evoke negative emotional reactions in members of the same sex and elicit derogatory personal attributions, especially among those who are less attractive (Agthe, Spörrle, & Försterling, 2008; Buunk, Massar, & Dijkstra, 2007; Gutierres, Kenrick, & Partch, 1999; Maner, Gailliot, Rouby, & Miller, 2007; Maner, Miller, Rouby, & Gailliot, 2009). It seems that attractive individuals are perceived to be rivals in intrasexual competition for mates. This rivalry may express itself in a variety of contexts. For example, although job applications from very good-looking individuals are judged more positively than those from average-looking applicants, the opposite occurs when evaluators are of the same sex, and especially when they are less attractive than the applicants (Agthe, Spörrle, & Maner, 2010; Ruffle & Shtudiner, 2011). Not surprisingly, 10% of those in a recent nationally representative survey indicated that they know someone who was held back professionally because of their good looks (Princeton Survey Research Associates, 2010a) and one-third of hiring managers say that very good-looking (female) employees are penalized at work (Princeton Survey Research Associates, 2010b).

Exceptionally good-looking people are, however, in the minority; for those who are above-average in attractiveness but not exceptionally so, attractiveness confers many benefits across a variety of domains. More importantly, those below average in attractiveness incur a penalty for their looks (e.g., lower pay; Hamermesh, 2011) and are often stigmatized (Bergling, 2007; Brownell, 2005; Greenberg et al., 2003). Formerly obese individuals, for example, are so stigmatized that they would rather be blind or have a leg amputated than be overweight again (Rand & Macgregor, 1991).

Regardless of context, beauty is clearly more than skin deep, so much so that it may have an equal or greater impact on our lives (either positive or negative) than qualities like emotional intelligence, personality, or even morality (Swami & Furnham, 2008). For these reasons, it remains an important construct in psychology research.

Why Do We Pay Attention to Physical Attractiveness in the First Place?

Some theorists suggest that beauty is aesthetically appealing and thus has positive reinforcement value. Like viewing a beautiful painting, it feels good to look at, and be in the presence of, a good-looking person (Byrne, 1971; Byrne & Clore, 1970; Byrne et al., 1968; Centers, 1975). As Rhodes (2006) writes, "There are few more pleasurable sights than a beautiful face" (p. 200). Indeed, exposure to physically attractive people of either sex increases positive affect (Byrne & Clore, 1970; Byrne et al., 1968) and activates brain reward regions, including the orbitofrontal cortex and the nucleus accumbens (Aharon et al., 2001; Kampe et al., 2001; O'Doherty et al., 2003). This may be why attractive people are so difficult to ignore (Sui & Liu, 2009).

Cognitive theorists argue that this aesthetic pleasure is a function of how the mind visually processes faces and bodies (Reber, Schwarz, & Winkielman, 2004). For example, one feature of an attractive face is prototypicality, or the degree to which it

matches the population average (Langlois & Roggman, 1990; Rhodes & Tremewan, 1996; Rhodes et al., 1999, 2002). According to the *perceptual bias* view, we like prototypical faces because they most closely match the mind's cognitive representation of the face category (Rubenstein et al., 1999); they are, in other words, "easy on the mind" (Winkielman et al., 2006). Our attraction to symmetrical faces (Rhodes, 2006) has also been attributed to the fluency with which the mind processes them (Enquist & Arak 1994; Enquist & Ghirlanda, 1998; Enquist & Johnstone 1997).

Another explanation for our attention to beauty derives from evolutionary psychology (Buss, 2011). According to this perspective, evolution by natural selection over thousands of years has predisposed us to subliminally attend and be attracted to morphological traits advertising health (e.g., clear skin, facial and body symmetry); current fertility and future reproductive value (e.g., hourglass-shaped female waist, youthfulness); strength (muscular, "v-shaped" male torso); and other attributes beneficial for survival, mating, and rearing offspring (Barber, 1995; Dixson et al., 2010; Gangestad & Scheyd, 2005; Grammer et al., 2003; Little, Jones, & DeBruine, 2011; Møller & Thornhill, 1998; Rhodes, 2006; Rhodes et al., 2005; Singh et al., 2010; Sugiyama, 2005; Thornhill & Gangestad, 1993, 1999, 2006). In other words, certain physical traits are attractive because they are perceived to be honest signals of mate quality (Symons, 1979, 1995). To the extent that these traits connote other positive traits (i.e., the halo effect), evolutionary psychology can explain the physical attractiveness bias, too.

Although typically invoked to explain attractiveness in mating contexts, evolutionary theory has also been used to explain attractiveness in non-mating contexts. For example, Sugiyama (2005) suggests that men may find facial and body symmetry attractive in other men because symmetry is a marker of health and developmental stability (e.g., ability to withstand disease, absence of congenital conditions) and is

associated with large body size, muscularity, and high testosterone, all of which are ideal attributes in coalitional partners. Similarly, Krupp and colleagues (2011) have found that we are more likely to reciprocate trust and co-operate with healthy- rather than unhealthy-looking social partners, presumably because those in good health tend to live longer and accrue more resources and may thus be of benefit to us in future. Moreover, by positing the adaptive value of associating with attractive people, including enhancement of one's own attractiveness in the eyes of others (e.g., Geiselman et al.,1984; Kernis & Wheeler, 1981; Strane & Watts, 1977), evolutionary psychology can explain the physical attractiveness bias in non-sexual contexts as well. Evolutionary and cognitive mechanisms are not necessarily mutually exclusive, of course, and both may have shaped attraction preferences (Franklin & Adams, 2009; Rhodes, 2006).

Men's Valuation of Physical Attractiveness

Although both men and women prefer physically attractive individuals of either sex, physical attractiveness generally matters more to men than to women, especially in mating contexts. Across time and culture, men have been more interested in, and readily aroused by, visual sexual stimuli (Bailey et al., 1994; Blumstein & Schwartz, 1983; Ellis & Symons, 1990; Hamann, Herman, Nolan, & Wallen, 2004; Kinsey et al., 1953; Meston & Buss, 2007; Symons, 1979) and have placed greater importance on the physical attractiveness of prospective mates (Buss, 1989; Buss et al., 1990; Buss et al., 2001; Buunk, Dijkstra, Fetchenhauer, & Kenrick, 2002; Feingold, 1990, 1992a; Goode, 1996; Gottschall et al., 2005; Gottschall, 2008; Hatfield & Sprecher, 1995; Howard et al., 1987; Legenbauer et al., 2009; Lippa, 2007; South, 1991; Symons, 1979; Townsend & Levy, 1990a, 1990b; Weiderman & Allgeier, 1992; cf. Eastwick & Finkel, 2008). According to evolutionary theory, this tendency reflects men's optimal reproductive strategy of mating with multiple fertile partners (Buss, 2003). As will be discussed in Chapter II, this focus on physical attractiveness persists even in later life.

Gay Men's Valuation of Physical Attractiveness

Because the tendency to focus on physical appearance likely evolved independently of sexual orientation (see Kenrick et al., 1995a; Quinsey & Lalumière, 1995; Silverthorne & Quinsey, 2000), gay men place as much, if not more, importance on the physical attractiveness of other men as straight men place on women, even though sexual activity between men produces no offspring (Atkins, 1998; Bergling, 2004, 2007; Child et al., 1996; Deaux & Hanna, 1984; Epel et al., 1996; Gettleman & Thompson, 1993; Gonzales & Myers, 1993; Lippa, 2007; Morrison, Morrison, & Sager, 2004; Peplau & Spalding, 2000; Pope, Phillips, & Olivardia, 2000; Sergios & Cody, 1985; Siever, 1994, 1996; Signorile, 1997).

Because gay men seek attractiveness in others and others seek it in them, they are focused not only on their partners' appearance, but their own as well (Bailey et al., 1994; Mann, 1998; Siever, 1994). This means that in any relationship with two or more men, the emphasis on appearance is amplified. Furthermore, because gay men tend to have more sexual partners than heterosexual men (Blumstein & Schwartz, 1990; Foulkes, 1994; Van de Ven et al., 1997), their emphasis on their own and their partners' physical appearance is reinforced over time. Gay men's emphasis on attractiveness has also been attributed to the effects of societal stigma, discrimination, and victimization. For example, to overcome internalized homophobia, some gay men may overcompensate by striving for a perfect physical appearance (Bergling, 2004; Downs, 2005) or a physique that counters perceptions that they are effeminate (Kurtz, 1999; Pope et al., 2000; Signorile, 1997). These men may subsequently hold others to the same unreasonable standards of physical attractiveness to which they hold themselves.

As is the case with heterosexual men, physical attractiveness appears to be important to gay men even as they age (Bergling, 2004; Pope et al., 2007). It is interesting to ask whether the nature of male-to-male physical attractiveness is the same for both age groups. If it is, this would suggest that evolutionary forces, rather than simply cultural or psychological factors, shape gay men's physical attractiveness perceptions. This, in turn, would suggest that gay and heterosexual men share, to a certain extent, a universal mating psychology.

Unfortunately, this issue cannot be adequately examined in the absence of valid and reliable measures of male-to-male physical attractiveness. Although certain methods have long been used to measure attractiveness among heterosexuals (e.g., global ratings of the body or, more frequently, the face), they are suboptimal for many research purposes. In particular, these methods often oversimplify attractiveness by assuming that it comprises only one or two dimensions; in so doing, they prevent examination of finer-grained dimensions of attractiveness, particularly of the body (e.g., muscularity, weight). These methods also focus on a relatively small number of individual features (e.g., eyes, arms, legs), while ignoring many other features that surely contribute to ratings of physical attractiveness. They also overlook the myriad attributes of each feature (e.g., arm size, shape, muscularity, and fatness/leanness).

Although some efforts have been made to assess physical attractiveness in a more comprehensive and valid manner (e.g., Swami, Furnham, Georgiades, & Pang, 2007), this work is in its infancy. There are currently no instruments that measure physical attractiveness among gay men, who value different physical features than their heterosexual male and female counterparts (e.g., Glassenberg, Feinberg, Jones, Little, & DeBruine, 2010; Kaminski et al., 2005; Levesque & Vichesky, 2006; Swami & Tovée, 2008; Tiggemann et al., 2007; Yelland & Tiggemann, 2003). The purpose of this thesis,

therefore, was to examine a comprehensive range of physical features that may be important in men's same-sex attractiveness judgments; to determine the latent dimensions underlying these judgements; to develop a valid and reliable scale to measure these dimensions; and to determine whether young and older gay men assess physical attractiveness in the same way. It was envisioned that such an instrument could be used as both a comprehensive yet efficient self-report measure of the physical attractiveness of gay men (i.e., a rating scale) as well as an instrument to gauge the relative importance that gay men in general, and specific subgroups of gay men in particular (e.g., young and older gay men) place on specific dimensions of male physical attractiveness.

Research Questions

This thesis was guided by the following three questions:

1. Is male same-sex physical attractiveness a unidimensional or multidimensional construct? In other words, does it have an underlying latent structure?

2. Which items can be chosen to represent the construct as a whole and, if multi-dimensional, its subcomponents?

3. Is the structure of male same-sex attractiveness (namely, its underlying dimensions as well as the relative contribution of each dimension to judgment of overall attractiveness) similar for both young and older gay men, thus suggesting that it may have an innate, evolutionary basis?

CHAPTER II:
LITERATURE REVIEW AND THEORETICAL FRAMEWORK

As evident in the previous chapter, perhaps the most robust and replicable finding in all of social psychology is that looks matter. Another finding is that looks matter more for men than women, irrespective of sexual orientation. This chapter will attempt to explain why this is so and will subsequently examine the nature of physical attractiveness judgments among both heterosexual and homosexual men.

Men's Valuation of Physical Attractiveness

Although both men and women indicate that qualities like kindness and intelligence are those they value most in a partner, they also rank physical attractiveness fairly highly (Buss & Barnes, 1986; Buss, 1989; Buss et al., 1990; Li et al., 2002; Lippa, 2007; Sangrador & Yela, 2000). Men, however, are more likely to prioritize physical attractiveness whereas women are more likely to prioritize status and resources[3] (Buss, 1987, 1989; Buss & Barnes, 1986; Buunk et al., 2002a; Deaux & Hanna, 1984; Feingold, 1990, 1992a; Goode, 1996; Gottschall et al., 2005; Gottschall, 2008; Greenlees & McGrew, 1994; Hatfield & Sprecher, 1995; Howard et al., 1987; Koestner & Wheeler, 1988; Legenbauer et al., 2009; Li et al., 2002; Lippa, 2007; Sprecher, Sullivan, & Hatfield, 1994; Stroebe et al., 1971; Symons, 1979; Townsend & Levy, 1990b; Wiederman, 1993; Waynforth & Dunbar, 1995; cf. Bereczkei et al., 1997; Eastwick & Finkel, 2008). Furthermore, although the importance that both sexes place on the

[3] The exception is short-term mating, when both sexes prioritize physical attractiveness (Buss & Schmitt, 1993; Buunk et al., 2002a; Greiling & Buss, 2000; Kenrick Trost, & Sadalla, Groth, 1993; Li & Kenrick, 2006; Regan, 1998; Regan & Berscheid, 1997; Regan, Levin, Sprecher, Christopher, & Cate, 2003).

physical attractiveness of potential mates has increased over the last 70 years (perhaps due to the proliferation of media images of highly attractive people), men still prioritize appearance more than women (Buss, Shackelford, Kirkpatrick, & Larsen, 2001).

Not surprisingly, laboratory studies reveal that men are willing to wait longer, work harder, and spend more money for the chance to look at attractive opposite-sex faces (Hayden, Parikh, Deaner, & Platt, 2008). Men, but not women, are also motivated by attractive faces to forfeit larger future monetary rewards in favour of smaller, immediate rewards (Wilson & Daly, 2004). A recent neuroimaging study underscores this disparity, revealing that reward centres are activated more often in men than in women in response to attractive faces (Cloutier, Heatherton, Whalen, & Kelley, 2008). Given men's high valuation of physical attractiveness, perhaps it is not surprising that there is strong agreement in their attractiveness ratings of women (Thornhill & Grammer, 1999; Wood & Brumbaugh, 2009); because women perceive physical attractiveness within the context of the non-physical factors they value more highly (i.e., personality and status), their attractiveness ratings of men are more subjective and thus demonstrate less consensus (Jankowiak, Hill, & Donovan, 1992; Wood & Brumbaugh, 2009).

Many scholars attribute these between-sex disparities to sociocultural influences. Perhaps women are more likely to emphasize resources because they have historically been denied political and economic power and have therefore been forced to obtain resources from men (Buss & Barnes, 1986; Eagly, 1987; Eagly & Wood, 1999; Howard et al., 1987; Wood & Eagly, 2002). Socialization practices and pornography may reinforce this power imbalance, especially by encouraging men to view women as sex objects and making them feel inadequate or unacceptable if they do not conform to idealized images of beauty (Dworkin, 1974, 1981; Litewka, 1977; Wolf, 1990). However, a study of mate preferences of over 9,000 individuals across 33 countries and 37

cultures suggests that the sex disparity in focus on physical attractiveness is universal (Buss, 1989; Buss et al., 1990). Furthermore, Eagly and Wood (1999) re-analyzed Buss and colleagues' (1990) data and found that although United Nations indices of gender equality were negatively correlated with sex differences for preferred qualities like earning capacity, they were unrelated to sex differences in the preference for physical attractiveness. Lippa (2007) corroborated these findings using an Internet-based survey of over 200,000 men and women across 53 nations, concluding that this sex disparity is relatively unaffected by structural features within societies and may therefore be due, in part, to biological factors. Evolutionary psychology strives to explain this sex disparity.

Evolutionary Perspective on Men's Focus on Attractiveness

Evolutionary psychology is the application of Darwinian evolutionary theory to understanding contemporary human behaviour (Barrett, Dunbar, & Lycett, 2002; Buss, 2005; Confer et al., 2010a; Palmer & Palmer, 2002). According to Darwin's (1859) theory of *evolution by natural selection*, all organisms exhibit variation in morphological, physiological, and behavioural traits. This variation is genetic and partly heritable. Those who have a competitive advantage in avoiding predators and finding food and mates leave more offspring than those who do not. Those offspring inherit the genes that afforded their parents an advantage, in turn leaving more offspring themselves and thus ensuring the continuation of their genetic lineage. In this way, genes and traits that enhance survival and reproduction become more common in the population over successive generations; those that do not gradually disappear (Darwin, 1859).

Psychological traits have evolved as adaptations, or nonadaptive byproducts of adaptations, selected to ensure survival and reproductive success in the *environment of evolutionary adaptedness* 10,000-1.8 million years ago (Pinker, 1997; Tooby &

Cosmides, 1990a). Because changes in the human genome occur much more slowly than changes in the environment, these ancient adaptations remain the legacy of contemporary humans, even if some (e.g., reliance on males for resource acquisition) are no longer necessary or are at times even maladaptive (Symons, 1990). To the extent that these ancient adaptations are cross-cultural, human psychology is universal (Tooby & Cosmides, 1990b, 1992) and not easily changed (Buss, 1995; Jones, 1999).

Although many psychological traits have evolved by natural selection, several, including sexual preferences and behaviour, have evolved by a specific form of natural selection called *sexual selection* (Andersson, 1994; Symons, 1979). According to Darwin (1871),

> sexual selection depends on the success of certain individuals over others of the same sex, in relation to the propagation of the species; whilst natural selection depends on the success of both sexes, at all ages, in relation to the general conditions of life. It is a struggle between individuals of one sex, generally the males, for the possession of the other sex. The result is not death to the unsuccessful competitor, but few or no offspring (p. 398).

This struggle results from the different levels of parental investment each sex must make to maximize reproduction and ensure survival and reproductive success of offspring (*parental investment theory;* Trivers, 1972). Because women produce a finite number of eggs in a lifetime, and because giving birth to a single child requires assuming the risks and burdens of a nine-month gestation period (e.g., heightened vulnerability, pregnancy complications, loss of additional mating opportunities, many years of child-rearing), their minimum required investment in each offspring is considerable. Men's investment is smaller: their minimum reproductive obligation is a single sex act. Because they suffer a large reproductive loss if their offspring fail, women must protect their investment. To do so, they have been endowed by evolution to exercise a particular set of *sexual*

strategies[4] (Buss & Schmitt, 1993; Buss, 1994, 2003), primarily the tendency to place less emphasis on attractiveness and short-term mating, and more on finding a high-quality, committed, long-term partner who possesses the traits and material resources required to support her and her offspring (e.g., social status, material resources, commitment, relational support; Buss & Barnes, 1986; Sadalla, Kenrick, & Vershure, 1987; Townsend, 1995). This cautiousness and selectivity make women a reproductively valuable resource over which most men compete.

In contrast, because men produce an unlimited number of sperm in a lifetime (they do not experience a precipitous reproductive termination like menopause) and have fewer costs in producing offspring with minimal investment, it is argued they have been selected to maximize reproductive success by tending towards a strategy of short-term mating with multiple fertile partners (Buss & Schmitt, 2003). Of course, they can also enhance survival of offspring by forming long-term relationships and providing resources and parental care, and most do (Daly & Wilson, 1983). However, due to the large number of other men competing for, and mating with, multiple fertile partners, men continually experience *paternity uncertainty* (Buss & Schmitt, 1993). To avoid unwittingly investing resources in another man's child (i.e., *cuckoldry*), they have been selected to provide a lower degree of parental investment and to put greater emphasis on short-term mating. A recent study of men and women in 48 cultures underscores the

[4] It is important to clarify a common misconception about the idea of sexual strategies, namely that they are conscious. As Buss and Schmitt (1993) write, "the use of the term *strategies* is meant to connote the goal-directed and problem-solving nature of human mating behavior and carries no implication that the strategies are consciously planned or articulated" (p. 205). It is simply the case that, by virtue of their genetic endowment, some people are predisposed to use reproductively advantageous strategies and thus leave more offspring than those who are not similarly endowed. When their offspring, in turn, reproduce, they transmit these genes to the next generation.

universality of this strategy: Even in more egalitarian cultures with greater gender equality, men are more likely to follow a less constrained mating style (Schmitt, 2005).

Sex differences in mating strategies, including the emphasis placed on physical attractiveness, are not "a set of restrictions foisted upon defenseless individuals or written upon a *tabula rasa*" (Mealey, 1997, p. 227), which is what the *standard social science model* posits (Barkow, Cosmides, Tooby, 1992). Rather, these differences appear to have been sculpted over millennia by natural selection and inherited by contemporary humans (and, in fact, by a variety of other sexually-reproducing species, too; Daly & Wilson, 1983; Trivers, 1985). Today's social environment is, of course, very different from that faced by our primitive hunter-gatherer ancestors, but because natural selection tends to proceed more slowly than changes in the environment, these adaptations remain our legacy, even if they are not as useful as they once were.

In the next sections, I will discuss the various features and qualities that heterosexual men and women find physically attractive in prospective mates and explain why, from an evolutionary perspective, they are considered attractive. I have chosen to discuss these preferences in some detail because, as we will see later, gay men possess an amalgam of heterosexual male and female preferences, which means that these preferences are important to consider when constructing any scale to measure male same-sex attractiveness.

Men's attractiveness preferences. Due to their emphasis on short-term mating, it has been argued that men have evolved to be aware of and attracted to physical cues as indices of current fertility and future reproductive potential (Buss, 1989; Symons, 1979). Because current fertility is associated with estrogen and sexual maturity, men across cultures are attracted to feminine, estrogen-dependent sex

characteristics like light skin tone; a narrow forehead; a small nose; high cheekbones and narrow cheeks; large, red lips; a gracile jaw; a small, tapered chin; medium to large breasts; voluptuous buttocks; and a low, “hourglass” waist-to-hip ratio of between .60:1 - .80:1 (Barber, 1995; Buss, 2003; Coetzee, 2012; Dixson et al. 2007a, 2007b, 2008, 2010, 2011; Dixson & Dixson, 2010; Gangestad & Scheyd, 2005; Jones & Hill, 1993; Little, Jones, & DeBruine, 2011; Marlowe et al., 2005; Perrett et al., 1998; Rhodes, 2006; Singh, 1993, 2006; Singh et al., 2010; Symons, 1979). Because future reproductive potential is strongly correlated with youth, men across cultures also prefer young partners (Bereczkei et al., 1997; Buss, 1989; Jones, 1995; Kenrick & Keefe, 1992) with youthful features like large, widely-spaced eyes; firm breasts; and taut, smooth, evenly coloured skin (Cunningham, 1986; Cunningham, Roberts, Barbee, Druen, & Wu, 1995; Fink, Grammer, & Thornhill, 2001; Jones & Hill, 1993; Matts, Fink, Grammer, & Burquest, 2007; Fink & Matts, 2008; Marlowe, 1998; Symons, 1979).

Men are also attracted to traits advertising good genes, overall health, and absence of acquired illness (Barber, 1995; Buss, 2003; Gangestad & Scheyd, 2005; Grammer & Thornhill, 1994; Grammer et al., 2003; Hamilton & Zuk, 1982; Jones et al., 2001; Little et al., 2011; Rhodes, 2006; Shackelford & Larsen, 1997; cf. Gangestad & Kaplan, 2005). Not only are healthy-looking women more fertile and of higher future reproductive value, but they are also more likely to produce healthier, disease-resistant offspring and are better able to invest in those offspring and ensure their survival. Examples of traits that function as so-called *health certificates* (Symons, 1979) are clear skin with slightly red colouration (Fink, Grammer, & Matts, 2006; Jones et al., 2004; Matts et al., 2007; Re et al., 2011), lustrous hair (Hinz, Matz, & Patience, 2001), and slightly longer than average legs (Sorokowski & Pawlowski, 2008).

Bilateral facial and body symmetry are also attractive (Manning et al., 1997; Møller & Thornhill, 1998; Perrett et al., 1999; Rhodes et al., 2001a, 2001b; Rhodes, 2006), perhaps because they signal developmental stability: lack of exposure to developmental perturbations due to mutations, infections, or other environmental stressors, or the ability to resist these stressors (i.e., a healthy immune system; Hamilton & Zuk, 1982; Hope et al., 2012; Møller, 1999; Møller et al., 1999; Penke et al., 2009; Shackelford & Larsen, 1997; Thornhill & Gangestad, 1993, 1999, 2006; cf. Rhodes et al., 2001b; Weeden & Sabini, 2005). Men are also drawn to faces resembling their own (DeBruine, 2004) and "average" faces and bodies that do not deviate markedly from the population norm (Langlois & Roggman, 1990; Rhodes & Tremewan, 1996; Rhodes et al., 1999, 2002; see also Pallett, Link, & Lee, 2009; Schmid et al., 2008). Attraction to these features may be adaptive because it discourages mating with unhealthy partners of poor genetic quality (e.g., those with mutations, chromosomal abnormalities, or nongenetic congenital deformations; Thornhill & Gangestad 1993, 1999, 2006; Zebrowitz & Rhodes, 2004) and increases chances of mating with those optimally adapted to local conditions (Rhodes et al., 2003).

In sum, men are strongly attracted to healthy-looking women with "youthful maturity" (Kenrick & Keefe, 1997, p. 143), so much so that these women trigger the same neural circuitry as in cocaine and gambling addiction (Aharon et al., 2001; Kranz & Ishai, 2006).

Women's attractiveness preferences. To the extent that women care about men's physical attractiveness, they too are attracted to traits advertising good genes, overall health, and absence of acquired illness (e.g., good skin tone, symmetry, and averageness; Gangestad & Scheyd, 2005; Jones, Little, Burt, & Perrett, 2004; Langlois

& Roggman, 1990; Little, Jones, & DeBruine, 2011; Rhodes, 2006; Rhodes & Tremewan, 1996; Rhodes et al., 1999, 2002; Scott et al., 2010; Steven et al., 2012). They also prefer masculine characteristics such as above-average height and a lean, moderately muscular, "v-shaped" physique with wide shoulders, a broad chest, a narrow waist, and a waist-to-hip ratio of about 0.8-0.9 (Dixson et al., 2003, 2010; Fan, Dai, Liu, & Wu, 2005; Frederick & Haselton, 2007; Furnham & Baguma, 1994; Hensley, 1994; Horvath, 1981; Hughes & Gallup, 2003; Lavrakas, 1975; Lynch & Zellner, 1999; Maisey, Vale, Cornelissen, & Tovée, 1999; Mealey, 1997).

These qualities are considered attractive because they advertise physical strength, prowess, and dominance, which in ancestral environments would have had a direct bearing on men's ability to hunt, acquire resources, and defend territory and mates, thus enhancing survival and reproductive success of offspring (Barber, 1995; Bramble & Lieberman, 2004; Buss, 2004; Buss & Schmitt, 1993; Marlowe, 2004; Mueller & Mazur, 1996). These qualities may also advertise other fitness-enhancing qualities like superior cardiac function and metabolic health (Dixson et al., 2003). Preferences for many of these traits are evident across Western and non-Western cultures alike (Dixson et al., 2003, 2007b; Fan et al., 2005; Swami and Tovée, 2005b). They also contribute to mate selection among non-human primates (Wrangham & Peterson, 1996). As we will see later, these traits are attractive to gay men, too.

Unlike their strong preference for masculine bodies, women's preference for masculine faces tends to be less consistent, which may explain why they demonstrate less consensus in their ratings of the physical attractiveness of men (Wood & Brumbaugh, 2009). Although some studies have suggested that women prefer masculine faces (Grammer & Thornhill, 1994; Keating, 1985; Koehler, Simmons, Rhodes, & Peters, 2004; Rhodes, Chan, Zebrowitz, & Simmons 2003), others have

suggested that they prefer less masculine, slightly “feminized” faces (Perrett et al., 1998; Little, Burt, Penton-Voak, & Perrett, 2001; Little & Hancock, 2002; Little, Jones, Penton-Voak, Burt, & Perrett, 2002; Rhodes, Hickford, & Jeffery, 2000). Some research has even suggested that for many women, the most attractive male faces are simultaneously “rugged,” “cute,” and “expressive.” An example would be a face with a large chin, prominent cheekbones, and slight stubble, as well as large eyes and a wide smile (Cunningham et al., 1990; Neave & Shields, 2008). Cunningham and colleagues (1990) speculated that these preferences reflect *multiple motives*: attracting masculine, moderately dominant partners who are also warm and responsive.

More recent research has demonstrated that women’s preferences are actually influenced by their current fertility and mating strategies (Gangestad & Thornhill, 2008; Jones, DeBruine, & Little, 2008). Women looking for short-term partners and who have entered the fertile phase of their menstrual cycles tend to prefer men with more masculine, testosterone-dependent facial characteristics such as a broader forehead and more pronounced brow ridge; smaller, narrower eyes; a larger, more prominent nose; broader, more prominent cheekbones and thinner cheeks; smaller, thinner lips; a larger jawbone; a longer, broader chin; and a darker complexion (Frost, 1994; Johnston, Hagel, Franklin, Fink, & Grammer, 2001; Little, Jones, & DeBruine, 2008; Penton-Voak & Perrett, 2000; Penton-Voak et al., 1999; Penton-Voak & Perrett, 2001; Peters, Simmons, & Rhodes, 2009; Roney & Simmons, 2008; Welling, Jones, & DeBruine, 2008). Their preferences will also tend to shift towards taller, more muscular men (Buss & Schmitt, 1993; Gangestad, Garver-Apgar, Simpson, & Cousins, 2007; Little, Jones, & Burriss, 2007; Pawlowski & Jasienska, 2005; Peters et al., 2009).

Many of these masculine traits are especially attractive during ovulation because they are thought to be indices of indirect, genetic benefits that can be conferred to

offspring. Because testosterone is an immunosuppressant (Kanda et al., 1996; Rantala et al., 2000; Yesilova, 2000), men who possess testosterone-dependent traits like a pronounced jaw and muscularity (Bhasin et al., 2001; Johnston, 2006; Penton-Voak & Chen, 2004; Round et al., 1999) have a sufficiently robust immune system that they can afford to generate these costly traits (*immunocompetence handicap theory*; Folstad & Karter, 1992; Møller et al., 1999; cf. Scott et al., 2010; Stephen et al., 2012). Women who mate with these men bestow healthy genes to their offspring, in turn enhancing their offspring's survival and reproductive success (*sexy son hypothesis*; Dawkins, 1990). In contrast, when looking for long-term partners and when not ovulating, women tend to prefer slightly feminized men, such as those with softer facial features (e.g., smaller chin, less pronounced jaw). Men with these features are perceived to be less dominant and more responsive, agreeable, empathetic, co-operative, and honest compared to men with more masculine features (Carré et al., 2009; Fink & Penton-Voak, 2002; Penton-Voak & Perrett, 2001). These men are also more interested in long-term rather than short-term mating (Boothroyd, Jones, Burt, DeBruine, & Perrett, 2008). In combination, these traits are all ideal in a partner who will be a good parent and provider.

Cross-cultural agreement. Across both Western and non-Western cultures, including hunter-gatherer societies (e.g., Ache Indians in Paraguay, the Hazda in Tanzania), there is remarkable agreement about attractiveness as described above (Apicella, Little, & Marlowe; 2007; Jones & Hill, 1993; Little et al., 2007; Perrett et al., 1994, 1998; Rhodes et al., 2001a, 2002; cf. Swami & Furnham, 2008). Many of these features (e.g., symmetry) are also preferred by other animals, including birds and rhesus monkeys (Møller, 1992, 1999; Møller & Hoglund, 1991; Møller & Thornhill, 1998; Parsons, 1992; Swaddle, 1996; Swaddle & Cuthill, 1994; Waitt & Little, 2006).

Moreover, there is very high agreement on overall ratings of attractiveness, particularly of the face (Cunningham et al., 1995; Langlois et al., 2000; Maret & Harling, 1985; Perrett et al., 1994): Irrespective of sex, age, race, geographic location, type of society (hunter-gatherer, modern, etc.), or socioeconomic status, people tend to agree on who and what is physically attractive (cf. Hönekopp, 2006). These consistencies are not accounted for by increasingly widespread exposure to Western media (Cunningham et al., 1995); indeed, they are apparent even in infancy, well before cultural standards of beauty are likely to be internalized (Geldart, Maurer, & Carney, 1999; Kramer et al., 1995; Langlois et al., 1987; Langlois, Ritter, Roggman, & Vaughn., 1991; Rubenstein et al., 1999; Samuels & Ewy, 1985; Samuels et al., 1994; Slater et al., 1998; van Duuren et al., 2003). These findings support the contention that certain morphological features are indices of health and fecundity (or at least were in the ancestral environment); that these features account for overall physical attractiveness; and that the perception of what is physically attractive is, to some extent, universal and therefore innate. In other words, rather than being "in the eye of the beholder," it may be that beauty is "in the *adaptations* of the beholder" (Symons, 1995; cf. Hönekopp, 2006).

None of this is to say, however, that these features are the only ones that determine physical attractiveness. These preferences may be modified by individual-level factors (Little & Perrett, 2002; Wood & Brumbaugh, 2009). For example, the appearance of people most frequently encountered in childhood, including our parents, may affect who we find physically attractive as adults (*imprinting*; Bereczkei et al., 2002; Little et al., 2003; Perrett et al., 2002; ten Cate, Verzijden, & Etman, 2006; Wilson & Barrett, 1987). Our own self-rated attractiveness also plays a role: We are attracted primarily to those who are at least as attractive as we perceive ourselves to be (Lee, Lowenstein, Ariely, Hong, & Young, 2008; Montoya, 2008). Even personality traits like

narcissism influence attractiveness judgements (Moskowitz et al., 2009). Although such factors may account for some variance in attractiveness ratings (e.g., Hönekopp, 2006; Varangis et al., 2012), they do not override those determined by evolutionary forces[5]. Indeed, few of us are attracted to unhealthy-looking people with disproportionate, asymmetrical faces and blotchy, pock-marked skin. Culture plays a role, too, though this can be understood as functioning within a broader evolutionary context.

Evolutionary Psychology's Explanation for Cultural Preferences

Although there is remarkable agreement about who is physically attractive and which physical features contribute to attractiveness, cultural variation in attractiveness preferences have also been documented (see Swami & Furnham, 2008, for a review). Some have taken this to mean that physical attractiveness preferences are arbitrary and acquired gradually through exposure to cultural standards of beauty (Wolf, 1990). It is important to note, however, that the existence of cultural variation in physical attractiveness preferences is not by itself a sufficient explanation for those preferences. As Nettle (2009) writes, "Merely to assert that attractiveness ideals are socially constructed and therefore different across different societies is non-explanatory, for it does not say anything about *why* the pattern…should be as it is" (p. 227). Evolutionary psychology, however, explains the reasons for various culture-bound preferences.

According to the *evoked culture* hypothesis (Gangestad, Haselton, & Buss, 2006; Nettle, 2009; Symons, 1995; Tooby & Cosmides, 1992), cultural variation in physical attractiveness preferences is a product of local ecological and social cues acting upon a universal set of evolved mechanisms. For example, it is theorized that all men possess

[5] For models that attempt to integrate evolutionary and person-specific influences on beauty perception, see Osborne (2006) and Singh (1993).

an evolved tendency to attend to the body weight of prospective mates because this is a reliable index of health (Manson et al., 1995; Willet et al., 1995) and fertility (Frisch, 1987; Lake, Power, & Cole, 1997; Reid & Van Vugt, 1987; Wang et al., 2000). However, the optimal, and thus most attractive, weight for women in one geographic region may be very different for women in another. Because body fat represents surplus calories, it is considered a safeguard during times of scarcity because it provides a sustained supply of energy and prevents disruptions to ovulation, pregnancy, and lactation (Ellison, 1990; Frisch, 1987; Wood, 2006). Thus, in resource-poor areas where extended periods of food scarcity are common (e.g., rural South Africa, Tanzania), men find heavier women more attractive (Brown & Konner 1987; Marlowe & Wetsman, 2001; Swami & Tovée, 2005a, 2007; Tovée; Swami, Furnham, & Mangalparsad 2006; Wetsman & Marlowe, 1999; cf. Ember, Ember, Korotyaev, & de Munck, 2005). In affluent, industrialized regions where food supplies are more consistent, excess calories stored as fat are a reproductive cost because they divert metabolic resources from other important tasks, hinder mobility, and increase morbidity and mortality (Calle et al., 2003; Garfinkel, 1985; Malina et al., 1997; Manson et al., 1995; Willet et al., 1995); thus in these regions, men find thinner women more attractive (Swami & Tovée, 2005a, 2007; Tovée, Reinhardt, Emery, & Cornelissen 1998; Tovée et al., 2006). Similar variations have been found for female waist-to-hip ratio (Dixson et al., 2007a, 2007b; Marlowe et al., 2005; Singh & Lewis, 1995; Singh, 2006; Sugiyama, 2004; Yu & Shepard, 1998), although there still appears to be a universal preference for a WHR within the low range (Dixson & Dixson, 2010; Singh et al., 2010).

Differences in physical attractiveness preferences are evident *within* cultures, too. For example, compared to their Caucasian counterparts, African-American men prefer heavier women (Jackson & McGill, 1996; Rosenfeld, Stewart, Stinnett, & Jackson,

1999), a disparity that may be accounted for by their lower socioeconomic status (Rodgers, 2008) may explain this disparity. Similarly, Little, Apicella, and Marlowe (2007) found that the Hazda, a hunter-gatherer society with high pathogen prevalence and mortality rates, more strongly prefer symmetry, an immunocompetence cue (Thornhill & Gangestad, 1993, 1999, 2006), compared to citizens of the United Kingdom, where pathogen prevalence and mortality rates are much lower (cf. Dixson et al., 2011).

This type of evolved, environmentally-responsive psychology can be seen at work directly in the laboratory. For example, several studies have found that men who are hungry (i.e., sensitized to resource scarcity) prefer heavier women, whereas those who have just eaten prefer lighter women (Pettijohn, Sacco, & Tesser, 2009; Nelson & Morrison, 2005; Swami & Tovée, 2006). Men who have been primed to feel financially inadequate also prefer heavier women, a finding that converges with previous research demonstrating the same preference among men of lower socioeconomic status (Cunningham et al., 1995; Swami and Tovée, 2005a). More recently, Swami and Tovée (2012) found that men who were experimentally induced to feel acute psychological stress found heavier women more attractive than control subjects.

According to the *environmental security hypothesis* (Pettijohn & Tesser, 1999), conditions of environmental stress and insecurity are likely to evoke a preference for all types of mature features, including heavier body weight and masculine facial features, because mature features connote strength, control, and the ability to adapt successfully to threatening situations; in contrast, conditions of environmental security are likely to evoke a preference for more neotenous characteristics, like lower weight and softer facial features. In support, studies have shown that both men and women prefer facial masculinity (e.g., closely spaced eyes, longer chins) and body masculinity (e.g.,

mesomorphism) during periods of socioeconomic hardship (e.g., recessions); in contrast, more neotenous and facial and body features are preferred when socioeconomic conditions in the same society are relatively more stable (e.g., economic booms; Pettijohn & Jungeberg, 2004; Pettijohn & Tesser, 1999). Similar context-dependent (female) preferences for masculine features have been noted in regions with income inequality, poor health, and high mortality due to disease and homicide (Brooks et al., 2011; DeBruine et al., 2010, 2011; Penton-Voak, Jacobson, & Trivers, 2004). Similar patterns have been noted in non-Western cultures (Pettijohn & Yerkes, 2005).

In summary, humans have evolved to evaluate the quality of prospective mates and coalitional partners by assessing their physical attractiveness along a variety of dimensions, or through various "lenses." As environments change (or temporal changes occur within environments), a different set of preferences along each of these dimensions is "evoked." As Patzer (2006) writes,

> The structure of…physical attractiveness rests on dimensions of permanency and impermanency. This structure is a stable fundamental of physical attractiveness…constructed overwhelmingly with permanent components supplemented by comparably minute, impermanent fashions. [The permanent components] do not vary by culture, time, or geography, [unlike] the standards that accompany the permanent components (p. 380).

It is important to remember that preferences can differ between or within cultures even though the *dimensions* along which people assess attractiveness remain the same. This thesis attempted to test whether there are relatively stable dimensions along which gay men assess physical attractiveness, too.

Dimensions Underlying Men's Physical Attractiveness Preferences

Facial and body attractiveness are the two dimensions of physical attractiveness that have been examined most frequently by researchers. Of the studies that have examined the relative contribution of each dimension to overall attractiveness, most have suggested that facial attractiveness is more important than body attractiveness, at least among heterosexual adults (Brown, Cash, & Nobles, 1986; Confer, Perilloux, & Buss, 2010; Currie & Little, 2009; Furnham, Lavancy, & McClelland, 2001; Furnham & Reeves, 2006; Mehrabian & Blum, 1997; Mueser, Grau, Sussman, & Rosen, 1984; Peters, Simmons, and Rhodes, 2007; Riggio, Widaman, & Tucker, 1991; cf. Alicke, Smith, & Klotz, 1986). This finding is likely attributable to the plethora of information the face provides about both the overall health and reproductive value of mates and coalitional partners (Currie et al., 2009).

Some of these studies have also shown that the relative importance of the face and body to overall attractiveness ratings is partly dependent upon mating context. For example, Confer and colleagues (2010b) found that in short-term mating contexts, when a woman's health and current fertility are more important than her future reproductive value (Buss & Schmitt, 1993), men prioritize the attractiveness of the body over the face because the body contains more cues to current fertility (i.e., estrogen-dependent secondary sexual characteristics like an hourglass waist-to-hip). In longer-term contexts where *future* reproductive value is more important, men prioritize facial attractiveness, which contains more information about youthfulness (see Currie & Little, 2009).

Unlike research with heterosexual men, very little research has examined the dimensions underlying gay men's physical attractiveness preferences. The primary aim of this thesis was to uncover these dimensions. Before turning to a discussion of gay men's physical attractiveness preferences and the dimensions underlying them, it is instructive to first review evolutionary psychology's explanation for the persistence of homosexuality over time and across populations.

Evolution and Homosexuality

Homosexuality is a paradox for evolutionary psychology. Across cultures, about 2% of men are homosexual (Gates, 2011; Gates & Newport, 2012; Laumann, Gagnon, Michael, & Michaels, 1994) yet this population has historically had a rate of reproduction about 10-20% the rate of heterosexual men (Bailey et al., 2000; Barash, 2012; Bell & Weinberg, 1978; Curran & Parr, 1957; Parr, 1957; Hamer & Copeland, 1994; Iemmola & Camperio-Ciani, 2009; King et al. 2005; Saghir & Robins, 1973; Van de Ven et al., 1997). In addition, twin studies indicate that up to 50% of the variability in sexual orientation is genetic (Bailey et al., 2000; Bailey & Pillard, 1991, 1995; Kendler et al., 2000; Kirk et al., 2000; Långström, Rahman, Carlström, & Lichtenstein, 2010; Pillard & Weinrich, 1986; see LeVay, 2011, for review). How does a genetic trait with such problematic consequences for reproduction persist across populations?

Various theories have been proposed to explain this paradox (Barash, 2012; McKnight, 1997; Rahman & Wilson, 2003), with most suggesting that gay men minimize their costs for non-reproduction by conferring some type of reproductive advantage upon their relatives, thereby indirectly transmitting their genes to the next generation. In support, studies have found that relatives of homosexual men are, in fact, more fecund than those of heterosexuals (e.g., Camperio-Ciani et al., 2004; King et al., 2005).

Kin selection. The theory most frequently cited to explain *why* relatives of homosexual men have a reproductive advantage is *kin selection*. Wilson (1975, 1978) suggested that because homosexual men in the ancestral environment did not expend time and energy on direct reproduction (e.g., competing for fertile partners), they could instead help their *relatives* reproduce by providing protection and assistance with hunting, chores, and childcare. Ruse (1982) and Weinrich (1976) suggested that because homosexual men in some primitive societies held high-status positions (e.g., diplomats, shamans, priests), they could also share their wealth with relatives. Moreover, Bobrow and Bailey (2001) suggested that because homosexual men tend to be later in birth order and have a greater number of older brothers[6], their costs for non-reproduction would be offset because much of their families' resources would likely already have been invested in older brothers. Other versions of kin selection theory have suggested that homosexual men aided relatives by promoting greater sociality and co-operation (for a review, see McKnight, 1997). In each case, genes for homosexuality would persist in the population because families with homosexual relatives whould be able to produce more offspring than families without.

Kin selection has been criticized as an evolved adaptation because, as Bobrow and Bailey (2001) point out, it exhibits little evidence of *special design* by natural selection: the specificity, efficiency, and economy an evolved trait should possess if it is

[6] This consistent statistical finding is called the *older brother effect* and is observed cross-nationally (Blanchard, 1997, 200; Blanchard & Lippa, 2007; Bogaert, 2003; Camperio-Ciani et al., 2004; Iemmola & Camperio-Ciani et al., 2009). Social factors (e.g., child-rearing) do not seem to be the cause (Bogaert, 2006). Blanchard and Bogaert (1996) speculated that pregnant women are exposed to antigens from male (but not female) fetuses. The mother's body may develop antibodies against those antigens and, with each successive pregnancy with a male fetus, mount a stronger immune response against it. If one of the effects of these antigens is to masculinize the brain of the male fetus, each successive pregnancy may reduce this masculinizing effect and thus increase the probability of homosexuality in later-born sons. It is not yet known whether this effect is adaptive or merely a nonadaptive by-product of immune function. See LeVay (2011) for further discussion.

to produce a beneficial effect over successive generations (Williams, 1966). First, the anthropological evidence that homosexual men in primitive societies enjoyed high status is inconclusive (Bobrow & Bailey, 2001) and one wonders why special status would be given to these men rather than to their reproductively successful counterparts (Kirkpatrick, 2000). Second, it is not clear how gay men profit by directing resources to kin when they spend a large amount of time and effort on nonreproductive sex. As LeVay (1993) writes, "To put it crudely, why do gay men waste so much time cruising each other, time that according to this theory would be better spent baby-sitting their nephews and nieces?'' (p. 129). Most importantly, homosexual men in Western countries are no more likely than heterosexual men to channel resources to kin (in fact, *heterosexual* men provide more resources) and they are more likely to be estranged from family (US: Bobrow & Bailey, 2001; UK: Rahman & Hull, 2005). Vasey and VanderLaan (2012) argued that perhaps kin altruism is more apparent in collectivistic cultures, as is the case in the Polynesian nation of Samoa, yet they found no evidence of kin altruism in another collectivistic country, Japan.

The absence of substantial kin altruism could, of course, reflect alienation due to contemporary societal stigma against homosexuals, but if kin altruism were an adaptation that evolved over thousands of years to offset costs of non-reproduction, it would be expected to be at least *somewhat* higher among contemporary homosexual men. For these reasons, many have discarded kin selection as a viable evolutionary theory of homosexuality (Buss, 1994, 2003; Bobrow & Bailey, 2001; Kirkpatrick, 2000; McKnight, 1997; Muscarella, 2000; Rahman & Hull, 2005; Rahman & Wilson, 2003; Small, 1995).

Fertile female hypothesis. Some evolutionary theories of homosexuality suggest that certain genes confer a *direct* reproductive benefit upon some of the female relatives of gay men. One theory, the *fertile female hypothesis* (Trivers, 1974; Hamer & Copeland, 1994), suggests that certain genes (carried on the x-chromosome) predispose to *androphilia*, an attraction to males. Female relatives of gay men who inherit these genes might be "hyper-heterosexual," with a greater attraction to men and thus a greater frequency of intercourse and conception. In support, studies have shown that gay men are more likely to come from larger extended families and that this is, indeed, partly[7] due to the increased fecundity of their female relatives (Camperio-Ciani et al., 2004, 2008; Iemmola & Camperio-Ciani et al., 2009). A more recent study, however, has suggested that rather than making women (and gay men) more *attracted* to men, the genes might actually make women (and gay men) more *attractive* to men, in part because they promote greater extraversion (Camperio-Ciani et al., 2012).

Miller's equilibrium theory. According to Miller (2000), homosexuality persists because it arises from the effects of numerous *pleiotropic* genes (i.e., genes that have more than one effect). These genes promote homosexuality yet simultaneously contribute to the reproductive success of heterosexual men. In particular, the genes code for personality traits more often found in females, such as lower impulse control, enhanced communication skills, sensitivity, empathy, and kindness. Women find men with moderate degrees of these traits more attractive than men who are overly dominant, aggressive, or competitive (Penton-Voak & Perrett, 2001), thus giving these men easier sexual access to women and a greater chance of leaving offspring.

[7] One of the other reasons may be the birth-order effect described previously.

Since most traits are normally distributed in a population, Miller argues that there will always be a small subset of men who happen to inherit more feminizing genes than other men. If the number of these genes reaches a critical "tipping point," these men will develop not only more feminine personality traits, but also homosexual attraction. Because this number of men is small, however, the genes will persist in the population, with benefits to most men outweighing the reproductive costs to a few.

One of the factors that likely mediates the relationship between these genes and the feminine traits they code for is resistance to *androgens*—prenatal (and sometimes postnatal) hormones like testosterone that are responsible for sexual differentiation (Ellis & Ames, 1987; Pillard & Weinrich, 1987; LeVay, 2011). Lower levels of fetal testosterone production and/or impairment in testosterone absorption may reduce the masculinization of the body and brain, leading to various sex-atypical (i.e., feminine) traits, including attraction to men. In support, studies show that the brains of homosexual men resemble, in certain respects, those of heterosexual women more than those of heterosexual men (Allen & Gorski, 1992; LeVay, 1993, 2011; Reite et al., 1995; Swaab & Hoffman, 1990). These resemblances tend to be apparent in neurological structures thought to develop in utero, prior to learning or sociocultural influences (e.g., Savic & Lindström, 2008).

Studies show similar cross-sex resemblances for childhood behaviour (Bailey, 2003; Bailey & Zucker, 1995; Green, 1987), speech/voice patterns (Guadio, 1994; Linville, 1998; Pierrehumbert et al., 2004; cf. Smyth et al., 2003; Smyth & Rogers, 2008), gait (Johnson & Tassinary, 2005; Johnson et al., 2007), personality (e.g., empathy, altruism, expressiveness, instrumentality, aggressiveness; Bernard, 1982; Gladue & Bailey, 1995; Lippa, 2005a, 2008; Nettle, 2007; Pillard, 1991; Salais & Fischer, 1995, Sergeant et al., 2006), vocational and hobby preferences (Bailey & Oberschneider,

1997; Chung & Harmon, 1994; Lippa, 2000; 2002, 2005b, 2008; Weinrich, 1987), aesthetic interest (Bernard, 1982; Harris, 1997; Nettle, 2007), verbal fluency (Wegesin, 1998; Rahman et al., 2003; Willmott & Brierley, 1984), spatial ability (McCormick & Witelson, 1991; Peters et al., 2007a; Rahman & Koerting, 2008), navigational strategies (Rahman et at al., 2005), and motor functioning (e.g., throwing accuracy; Hall & Kimura, 1995). Cross-sex resemblances in morphology (e.g., facial appearance, height, arm length, hand shape, handedness, finger size ratios, fingerprint patterns) have also been documented (Blanchard & Bogaert, 1996; Bogaert, 1998, 2010; Bogaert & Blanchard, 1996a, 1996b; Bogaert & Frisen, 2002; Freeman, Johnson, Ambady, & Rule, 2010; Hall & Kimura,1994; Hughes & Bremme, 2011; Lalumière, Blanchard & Zucker, 2000; Lippa, 2003; Manning et al., 2007; Martin & Nguyen, 2004; Mustanski, Bailey, & Kaspar, 2002).

Linking these findings to Miller's (2000) theory, men who inherit only a few genes coding for prenatal androgen resistance will develop an optimal level of feminine traits, while those few who inherit many of these genes will develop extreme androgen resistance as well as the feminine characteristic of attraction to males. A recent twin study provides support for Miller's theory. Using a community-based sample of 4,904 Australian twins reared together, Zietsch and colleagues (2008) found that psychologically feminine men were more likely to be homosexual, but psychologically feminine *heterosexual* men had more opposite-sex sexual partners than psychologically masculine heterosexual men (cf. Santtila et al., 2009). This suggests that feminized men may, indeed, be more attractive to women. Statistical analyses indicated that these results were due partly to the pleiotropic effects of genes on personality traits and sexual orientation. It is also true, of course, that because only 50% of variance in homosexuality is genetic, prenatal environmental factors (e.g., immunity reactions and variations in androgen levels not controlled by genes; Ellis & Ames, 1987; Ellis et al., 1988; LeVay, 2011) as well as *epigenetic* mechanisms that

activate or suppress specific genes (Bocklandt, Horvath, Vilain, & Hamer, 2006) may also influence the development of homosexuality.

Having reviewed an evolutionary explanation for the persistence of homosexuality, I will now discuss an evolutionary explanation for gay men's focus on physical attractiveness.

Gay Men's Focus on Physical Attractiveness

Research suggests that physical attractiveness is very important to gay men—as equally important, if not more so, than for straight men (Atkins, 1998; Bergling, 2004, 2007; Child et al., 1996; Epel et al., 1996; Gettleman & Thompson, 1993; Lippa, 2007; Morrison et al., 2004b; Peplau & Spalding, 2000; Pope et al., 2000; Signorile, 1997). Like their heterosexual counterparts, gay men place a premium on physical attractiveness in short-term mating contexts (Howard et al., 1987; Regan, Medina, & Joshi, 2001). Gay men also consider attractiveness to be one of the main (if not the primary) criteria for choosing dating partners (Bartholome et al., 2000; Deaux & Hanna, 1984; Gonzales & Meyers, 1993; Hatala & Predhodka, 1996; Regan et al., 2001; Sergios & Cody, 1985). Indeed, gay men are often quick to reject prospective partners based on appearance alone (Bergling, 2007).

With respect to long-term mates, although gay men are similar to their heterosexual counterparts in valuing qualities like intelligence, kindness, expressiveness, and honesty (Boyden et al., 1984; Blumstein et al., 1987), they also rank physical attractiveness very highly (Clark, 1997). In fact, the 6,000 gay men in Lippa's (2007) cross-national survey of mate preferences indicated that physical attractiveness is the third most important quality in a long-term mate, after intelligence and humour. Attractiveness is also important in the progress of gay men's long-term relationships, at least to the extent that it affects sexual activity, which gay men generally

consider integral to their relationships (Symons, 1979). Comments like the following, from a 39-year-old man, represent a common sentiment among many gay men:

> If I'm not physically attracted to someone, I've tried to make it work and it just doesn't. It all comes down to the sex in the end. If you're not having great sex, you're not going to stay faithful, and it's not going to work, no matter how hard you work at it…I've tried everything and it just keeps coming back to that (Bergling, 2007, p. 15).

It is curious that although gay men resemble heterosexual women in their preference for male partners, they resemble heterosexual men in their greater emphasis on partner attractiveness. This divergence makes sense, however, if we consider that although gay men prefer same-sex partners, they have evolved under the same selection pressures as all men (Hayes, 1995; Symons, 1979). Although some criticize the "evident absurdity of applying claims of reproductive fitness to attractions between men" (Adam, 2000, p. 416), it is important to remember, as Howard and colleagues (1987) remind us, that "although homosexual [men] may not be *consciously* concerned with reproductive outcomes, evolutionary mechanisms concerning partner preferences should operate similarly for all humans" (p. 195; italics added). Consistent with these explanations is that gay men also tend to resemble their heterosexual male counterparts in their relative disinterest in a partner's status; in their high interest in youthfulness, physical attractiveness, visual sexual stimuli, and uncommitted sex[8]; and in their mate retention

[8] Although gay and heterosexual men do not differ in their interest in uncommitted sex, gay men are more likely to *pursue* it (Bailey et al., 1994; Bell & Weinberg, 1978; Blumstein & Schwartz, 1990; Bringle, 1995; Hoff et al., 2010). Symons (1979) argued that because gay men's sexual partners are other men, their desire for uncommitted sex is unconstrained by women's greater preference for monogamy; if women were as interested in uncommitted sex as men are, then heterosexual men would indulge in it as frequently as gay men. The greater frequency of uncommitted sex among gay men also explains why they, unlike heterosexual men, are more likely to become upset over emotional as opposed to sexual infidelity (Bailey et al., 1994; De la Garza et al., 2006; Dijkstra et al., 2001). Gay men seem to adapt to sexual infidelity and commonly have "open" relationships in which uncommitted sex with outside partners is permitted (De la Garza et al., 2006; Dijkstra et al., 2001; Hoff et al., 2010).

behaviours (Bailey et al., 1994; Jankowiak et al., 1992; Kenrick et al. 1995a; Legenbauer et al., 1999; Lippa, 2007; Teuscher & Teuscher, 2007; VanderLaan & Vasey, 2008).

The concept of *modularity* further explains why gay may are preoccupied with attractiveness. A widely-held view in evolutionary psychology is that rather than comprising a few general cognitive, emotional, and behavioural mechanisms, the mind is actually a collection of hundreds, if not thousands, of specialized mechanisms that were useful in solving a variety of problems related to survival and reproduction in the ancestral environment (*massive modularity;* Buss, 1995; Kenrick et al., 1995b; Tooby & Cosmides, 1995). The different components of sexuality—orientation, age preferences, desired physical qualities, and behaviour—can all be considered specific adaptive modules (Kenrick et al., 1995a; Quinsey & Lalumière, 1995). If there are critical periods for the differentiation of these modules, then modules that differentiate earlier or later may not be subject to the same developmental influences (e.g., anomalies in the sensitivity to prenatal and postnatal hormones known to cause sexual differentiation; Ellis & Ames, 1987; Pillard & Weinrich, 1987). This is consistent with the conceptualizations of the homosexual brain as being simultaneously masculinized (e.g., directed toward partners' appearance and youth) and feminized (e.g., directed towards partners' masculinity; Feierman, 1990; Muscarella, 2002). Thus, it is possible for men to be similar to women in their attraction to other men yet different than women (and similar to straight men) in their emphasis on attractiveness.

Finally, the particular configuration of gay relationships is also important in understanding gay men's emphasis on appearance. Homosexual relationships comprise not one, but two (or more) men. Both partners are focused not only on the other's appearance but, because they desire to capture and maintain each other's interest, their own appearance as well (Siever, 1994; Mann, 1998). Thus, in an additive,

or perhaps even synergistic fashion, the desires and behaviour of both partners in a gay relationship are amplified.

Evidence for gay men's amplified focus on appearance is abundant. They men place as much, if not more, importance on their partners' physical appearance as straight men do (Bergling, 2004, 2007; Deaux & Hanna, 1984; Epel et al., 1996; Gettleman & Thompson, 1993; Gonzales & Myers, 1993; Morrison et al., 2004b; Pope et al., 2000; Sergios & Cody, 1985; Siever, 1994, 1996; Signorile, 1997). They consider physical appearance very important to their sense of self (Silberstein et al., 1989; Siever, 1994; Tiggeman et al., 2007; Williamson & Hartley, 1998) and feel that it is important to others (Yelland & Tiggemann, 2003).

Compared to heterosexual men, gay men also report greater body image dissatisfaction and shame, even when they are not much further from their physical ideal (Beren et al., 1996; Berscheid et al., 1973; Brown & Graham, 2008; Conner, Johnson, & Grogan, 2004; Fallon & Rozin, 1985; Gettleman & Thompson, 1993; Hospers & Jansen, 2005; Morrison et al., 2004b; Peplau et al., 2009; Siever, 1994; Strong et al., 2000; Tiggemann et al., 2007; Wagenbach, 1997; Williamson & Hartley, 1998). They are more likely to feel or fear becoming overweight (Kaminski et al., 2005; Schneider, O'Leary, & Jenkins, 1995; Yager et al., 1988) and are more likely to engage in restrictive dieting (Brand et al., 1992; Kaminski et al., 2005; Martins et al., 2007), consume medications to lose weight (Schneider et al., 1995; Yager et al., 1988), and develop eating disorders (Boisvert & Harrell, 2009; Carlat, Carmargo, & Herzog, 1997; Feldman & Meyer, 2007; French et al., 1996; Lakkis et al., 1999; Schneider & Agras, 1987; Silberstein et al., 1989; Strong et al., 2000; Russell & Keel, 2002). They are dissatisfied with their muscularity (Kaminski et al., 2005; Levesque & Vichesky, 2006; Martins, Tiggemann, & Churchett, 2007; Tiggemann et al., 2007), spend more time lifting weights (Duggan &

McCreary, 2004), and are more likely to exercise to improve attractiveness rather than health (Bridel & Rail, 2007; Brown & Graham, 2008; Siever, 1994; Silberstein et al., 1989; Yelland & Tiggemann, 2003). They also seem to be over-represented among cosmetic surgery patients (e.g., Blanchard & Hope, 2010; Shields, 2008).

Although gay men are more likely to look after their appearance and are less likely to be overweight compared to heterosexual men, they rate themselves lower on attractiveness, feel more uncomfortable showing their bodies in public, and are twice as likely to report hiding one or more parts of their bodies during sex (Peplau et al., 2009). In general, gay men's body image dissatisfaction is at least as high as heterosexual women's, if not higher (Peplau et al., 2009, Siever, 1994). Indeed, half of gay men in a recent body image survey said they would sacrifice one year of their lives for the perfect body, compared to only one-third of heterosexual men (Campbell, 2012). More startling, 10% of gay men in the survey said they would be willing to die more than 11 years earlier if they could have their ideal body right now.

Competing Explanations for Gay Men's Focus on Physical Attractiveness

Various sociocultural accounts of gay men's focus on appearance compete with evolutionary accounts. Some have implicated gay culture's excessive focus on physical attractiveness and the expectation that gay men aspire to narrow and unrealistic standards of attractiveness, youthfulness, slenderness, and muscularity (Atkins, 1998; Benzie, 2000; Harris, 1997; Drummond, 2005; Kleinberg, 1980; Saucier & Caron, 2008; Siever, 1994; Wright, 1997). According to Rotello (1997), gay culture "has developed a powerful, even merciless, system of rewards and penalties based on body image" (p. 254). Signorile (1997) has even accused gay culture of "body fascism," which "not only

deems those who don't or can't conform [to rigid standards of beauty] to be sexually less desirable, but…also deems an individual completely worthless *as a person*, based solely on his appearance" (p. 28).

Others have suggested that gay men not only live in a culture that has increasingly stringent expectations for the physical appearance of *all* men (Coad, 2008; Leit et al., 2001; Petrie et al., 1996; Pope et al., 2000, 2001), but they experience the added burden of cultural stereotypes that gay men are inherently attractive and look after their bodies (Grogan, 1999). It is no surprise, then, that gay men, including older gay men, feel pressure to look good (Hospers & Jansen, 2005; Strong, 2005) and that involvement in the gay community is associated with greater body image dissatisfaction (Beren et al., 1996; Siever, 1994), drive for muscularity (Levesque & Vichesky, 2006), and risk for disordered eating (Feldman & Meyer, 2007). It is also no surprise that gay men come to expect their partners to conform to these same standards. However, is culture itself the cause of gay men's focus on youth and beauty?

Given the tendency for both gay and straight men to place a premium on attractiveness, it is more plausible to suggest that gay culture's focus on appearance is a reflection or extrapolation of men's evolved tendency to focus on appearance. Some may argue that there are subgroups of gay men, such as "bears," who do not care as much about appearance. Yet these men judge one another based on appearance just as much as other gay men do (Bergling, 2007), the only difference being that they have different attractiveness preferences (e.g., hirsuteness, higher body fat; Wright, 1997). Culture, it seems, reflects our inherent human nature, not the other way around, and many gay men seem to recognize this. As one writes, "Looks are important. I always get mad when I hear people say we live in shallowness. It's no more true of us than the Greeks or Romans, or Renaissance Italians" (Cassels, 2012, p. 5).

Some argue that all men's bodies are becoming increasingly objectified within both mainstream and gay culture (Harvey & Robinson, 2003; Pope et al., 2001; Rohlinger, 2002), leading gay men to see others, and eventually themselves, as little more than objects for "visual inspection and consumption" (*objectification theory;* Davis, Dionne, & Shuster, 2001, p. 22; Fredrickson & Roberts, 1997; Harris, 1997; Kozak, Frankenhauser, & Roberts, 2009; Martins et al., 2007; Morrison, Morrison, & Sager, 2004; Siever, 1994). As Signorile (1997) writes,

> It is not difficult to see that many, if not most of us become both the rigidly objectified as well as the rigid objectifier, holding ourselves and each other to rigid standards of physical beauty. These standards become a significant, if not the most important, characteristic in choosing a mate or sexual partner. For many of us, the preoccupation with physical appearance and the cult of masculinity become the mechanisms that drive most aspects of our lives (p. 7).

Some have extended this argument to fault ever-abundant pornography or the advent of dating sites like Manhunt, Gaydar, and Grindr (a mobile application that uses GPS technology to allow gay men[9] to find and "hook up" with other men in close proximity). It is argued that the highly visual nature of these media may be driving gay men's focus on physical attractiveness to the exclusion of other personal qualities that may be desired in a mate. For example, in describing Manhunt, Andrew Holleran writes about

> the nightmare that gay people always have just underneath the surface, the fear that, *I'm just my dick. I'm just my body. I'm just my age.* It reduces everybody to statistics. You're presuming that nobody will love you for yourself, if you're offering yourself as just a bunch of statistics (cited in Gross, 2008).

[9] The makers of Grindr recently launched Blendr, a GPS app aimed at heterosexuals. Recognizing, however, that men and women differ in their mating strategies, the developers designed Blendr to be more of a tool for social networking rather than facilitating sexual encounters. Despite this shift in focus, it is not surprising that male users still appear to outnumber female users (Clark-Flory, 2011).

The problem with objectification theory is that it is mainly descriptive and does not explain the underlying reasons *why* gay men report greater body image dissatisfaction than heterosexual men; *why* they are so concerned about their own and their partners' appearance; and *why* they come to objectify themselves and other men. It also does not explain why sites like Manhunt and Grindr are wildly popular among gay men around the world. Finally, speculations about the influence of gay culture are somewhat tenuous because the historical stigmatization of homosexuality has meant that gay culture is actually a relatively recent phenomenon.

Some have suggested that gay men's focus on physical appearance, and sexuality more generally, is an affirmation of gay men's sexuality—a liberating response to hundreds of years of heterosexual hegemony and stigmatization of same-sex attraction (Tucker, 1991). This argument, however, does not explain why gay men would choose physical appearance as a tool in their quest for liberation, rather than some non-physical aspect of their identity.

Other writers have speculated that, in an effort to overcome internalized homophobia, some gay men overcompensate by striving for a perfect physical appearance (e.g., Bergling, 2004; Downs, 2005). They may subsequently come to hold others to the same high standards of physical attractiveness to which they hold themselves. Relatedly, Moskowitz and colleagues (2009) have found that gay men with higher levels of narcissism tend to have higher standards for physical attractiveness. If narcissism reflects deep-seated feelings of inferiority (Myers & Zeigler-Hill, 2012), it may be that some gay men strive to overcome this inferiority by being attracted to men of higher social status (i.e., more attractive men) who can enhance their own social value. This begs the question, however, why gay men focus so heavily on appearance rather than other personal qualities in an effort to overcome perceived inferiority.

Gay men's particular focus on muscularity has been interpreted as a psychological reaction against the perceived inferiority of a homosexual orientation (Williamson & Hartley, 1998). One of the reasons for this perceived inferiority is the association between homosexuality and femininity, which many gay men find highly unattractive in both themselves and their partners (Bailey et al., 1997; Bergling, 2001; Pope et al., 2000; Signorile, 1997). Because muscularity is associated with masculinity, physical strength, power, dominance, mastery, and even emotional control and strength of character (Drummond, 2005; Halkitis et al., 2004; Harris, 1997; Mishkind et al., 1986; Pope et al., 2000, 2001), gay men may revere a muscular ideal in an effort to distance themselves from femininity—something they may dislike because of challenges to their masculinity in childhood, the perceived association of femininity with weakness, a desire for acceptance by mainstream society, or internalized homophobia (Higgins, 2006; Kimmel & Mahalik, 2005; Kurtz, 1999; Signorile, 2007; Wood, 2004).

In sum, although socialization and cultural factors may play some role in gay men's focus on physical appearance, they seem to explain the *proximate* rather than *ultimate* reasons for this focus. The consistent emphasis on appearance among gay men in 17 nations (Lippa, 2007) suggests the existence of an underlying, biological, and universal mechanism predisposing to men's focus on attractiveness; sociocultural and psychological factors may simply increase the likelihood that this fundamental focus on attractiveness expresses itself.

Impact of Age on Focus on Physical Attractiveness

Because there is no age limit to men's reproductive capacity, it is believed that their emphasis on attractiveness, and thus their preference for features advertising health and fertility, persists over time. Studies have shown that as men age, the gap between their own age and the preferred age of partners expands (Kenrick & Keefe, 1992; Townsend, 1992). Indeed, 25% of eHarmony's male clients over the age of 50 request to be matched only with women in their 20s and 30s (eHarmony, 2004).

Within established relationships, the importance that husbands place on physical attractiveness does not appear to decrease over time (in fact, it may *increase*; Buss, Schmitt, & Shackelford, 2005). Their partners' physical appearance remains important even to older men's relationship satisfaction (Blumstein & Schwartz, 1983; Margolin & White, 1987; Murstein & Christy, 1976; Peterson & Miller, 1980). This is supported by the observation that as couples age, men are more likely than women to lose sexual interest in their partners (Pfeiffer & Davis, 1972; Pfeiffer, Verwoerdt, & Davis, 1972; Pfeiffer, Verwoerdt, & Wang, 1968). In addition, older women remain more concerned about their appearance than older men (Pliner, Chaiken, & Flett, 1990). In fact, while aging husbands may become quite dissatisfied with their looks, this dissatisfaction does not lead to the same discomfort and concern as expressed by aging wives (Bailey & Price, 1978; Rozin & Fallon, 1988). As Blumstein and Schwartz (1983) note, "Most wives…are keenly aware of the importance to their husbands of their looks" (p. 247).

To the extent that gay men share heterosexual men's mating strategies, it is expected that their emphasis on physical attractiveness will persist with age as well. Given declines in physical attractiveness with age (Deutsch, Clark, & Zelenski, 1986; Korthase & Trenholme, 1982; McLellan & McKelvie, 1993; Teuscher & Teuscher, 2007),

it is not surprising that many gay men report greater body image dissatisfaction over time and consider aging "an essential dread" (Murray & Adam, 2001, p. 80; Bergling, 2004; Tiggemann et al., 2007). As Kooden and Flowers (2000) write,

> The majority of negatives around aging involve the body…Gay men are deeply invested in their bodies, and many feel that their body is their best asset—not only for sex, but for feelings of attractiveness, power, and success (p. 28).

According to Pope and colleagues (2007),

> When they enter their middle to late adult years, gay men can be confronted by a loss of social valuation as the appearance of physical and sexual changes affect what has been a source of self-esteem. Assigning so much value to physical attractiveness, an important aspect of their lives that is negatively affected by aging, sets up gay men for a sometimes devastating experience as their bodies begin to change (pp. 73-74).

Indeed, some gay men engage in unprotected, high-risk sexual behaviour because they would rather die young from AIDS than grow old (Shernoff, 2006; Symons, 1998). As one older gay man writes, "I never thought I'd live to be fifty. I used to think 'who wants an old man?' I really believed it would be better to be dead than grow old, fat, and wrinkled" (cited in Downs, 2005, p. 99; see also Cassels, 2012).

Gay Men's Physical Attractiveness Preferences

The limited research available suggests that gay men's physical attractiveness preferences are an amalgam of heterosexual male and female preferences. Gay men share heterosexual men's preference for youthful features, but also heterosexual women's preference for masculine features. Development of any instrument measuring gay men's attractiveness and its underlying dimensions should consider these facial and body features.

Youthfulness. Youthfulness is often cited as a key aspect of the gay ideal (e.g., Atkins, 1998; Kiley, 1998; Mann, 1998). Irrespective of their own age, gay men generally consider younger men to be more sexually appealing than older men, and those aged 18-24 are considered the most attractive (Freund et al., 1973; Silverthorne & Quinsey, 2000; Teuscher & Teusher, 2007). Harry and DeVall (1978a) noted a more qualified pattern of preferences: While most men aged 18-24 in their study preferred older sexual partners, most of those aged 25-34 preferred someone of the same age. At about age 35, however, there was a sharp increase in preference for younger partners: Half of men aged 35+ preferred younger partners, whereas 40% preferred someone of the same age.

For dating and long-term relationships, some studies suggest that gay men prefer partners of similar age (Boyden et al., 1984), but most suggest that gay men, like heterosexual men, prefer younger partners (women generally prefer slightly older partners, at least for long-term relationships; Kenrick & Keefe, 1992, 1994). Studies of personal advertisements have revealed that gay men younger than 30 years prefer somewhat older partners, while older men progressively prefer younger partners (Harry & DeVall, 1978b, as cited in Waller, 1994; Hayes, 1995; Kaufman & Phua, 2003; Kenrick & Keefe, 1994; Over & Phillips, 1997). In fact, for men in their mid-30s and even their 50s, the youngest preferred partner is up to 20 years their junior (Kenrick et al., 1995a; Over & Phillips, 1997), a discrepancy greater than that observed among straight men. One study of personal advertisements revealed that gay men were seven times more likely to advertise for a younger rather than older partner (Bartholome et al., 2000).

The strong preference for youth in both short-term (i.e., sexual) and long-term partners is reflected in the gay media's glorification of lean, muscular men with shaved bodies and full heads of hair (Bergling, 2007; Benzie, 2000; Duncan, 2007; Saucier &

Caron, 2008; Tiggemann et al., 2007). It is also echoed by gay men's perceptions that the gay community is highly youth-oriented (Berger, 1984, 1996; Bergling, 2004; David, 2007; Friend, 1987; Kelly, 1977; Kimmel, 1978; Lee, 1991; Signorile, 1997). In a summary of their research, Kenrick and colleagues (1995a) echoed the reflections of earlier writers who focused on the diminished attractiveness of older men (Ackerley, 1968, Hoffman, 1968; Symons, 1979): In general, "homosexual men express an attraction toward youth, and do not find older men desirable" (p. 1170). This likely explains the phenomenon of *accelerated aging* within the gay male community (Barón & Cramer, 2000; Bennett & Thompson, 1991; Berger, 1996). As Bennett and Thomspon (1991) write,

> [B]ecause of the gay community's emphasis on youth, homosexual men are considered middle-aged and elderly by other homosexual men at an earlier age than heterosexual men in the general community. Since these age-status norms occur earlier in the gay sub-culture, the homosexual man thinks of himself as middle-aged and old before his heterosexual counterparts do (p. 66).

Masculinity. Various studies, including those examining the content of personal advertisements, have revealed that gay men generally prefer masculine partners, although this preference is less pronounced among those who describe themselves as feminine (Bailey et al., 1997; Laner & Kamel, 1977; Sánchez & Vilain, 2012; Yee, 2002). This is evident in the large number of men describing themselves and their preferred partners as "masculine" and "straight-acting" (Bailey et al., 1997; Boyden et al.,1984; Clarkson, 2006; Lumby, 1978; Martino, 2006) and the finding that gay men often wish to be more masculine than they currently perceive themselves to be (Sánchez et al., 2010). Those with feminine traits are not held in high esteem by other gay men (Skidmore, Linsenmeier, & Bailey, 2006); they are often disparaged as "sissies" or "nellies" and are frequently rejected in dating contexts (e.g., "no femmes;" Bergling, 2001; Martino, 2006).

The preference for masculine over feminine men is even evident in male sex work: Logan (2010) found that male sex workers who advertise masculine characteristics charge more for their services than those who advertise feminine characteristics.

Facial masculinity. Much as their heterosexual counterparts strongly prefer feminine facial characteristics, gay men strongly prefer masculine facial characteristics such as a broad forehead, wide brow, narrow eyes, prominent cheekbones, thin lips, and a broad, square jaw (Glassenberg et al., 2010). In their strong preference for sexually dimorphic characteristics, gay and heterosexual men are similar. Yet even though they prefer masculine faces the most, gay men also find slightly *feminized* faces attractive, a preference shared by women, at least for long-term partners (Little et al., 2001; Penton-Voak et al., 1999; Perrett et al., 1998; Rhodes et al., 2000). Indeed, 40% of the faces that the men in Glassenberg and colleagues' study preferred were slightly feminized. Generally, gay men also find a full head of hair to be very attractive; in fact, after weight and muscularity, they indicate that this is the personal feature about which they worry most (Martins et al., 2008).

Body masculinity. Masculinity, particularly in the form of upper body muscularity, appears to be a primary focus for gay men (Duncan, 2007; Kaminski et al., 2005; Levesque & Vichesky, 2006; Swami & Tovée, 2008; Tiggemann et al., 2007; Yelland & Tiggemann, 2003). In general, gay men strongly prefer an athletic, mesomorphic, "v-shaped" physique: a lean but muscular frame with broad shoulders; well-developed arms and pectoral muscles; a flat but well-defined stomach; and a slim waist, hips, and buttocks (Bartholeme et al., 2000; Bridel & Rail, 2007; Halkitis et al., 2004; Hatala & Predhodka, 1996; Howard et al., 1987; Higgins, 2006; Swami & Tovée, 2008; Tiggemann et al., 2007; Varangis, Lanzieri, Hildebrandt, & Feldman, 2012;

Yelland & Tiggemann, 2003; Wagenbach, 1997). The v-shape seems to be a defining feature of gay men's attractiveness; compared to heterosexual men's ratings of other men, gay men consider a lower waist-to-chest ratio (WCR) to be more attractive (Swami & Tovée, 2008).

Regarding weight, some studies have suggested that gay men, like heterosexual women, desire a low body weight (Herzog, Newman, & Warshaw, 1991; Williamson & Hartley, 1998), but more recent research suggests that their preferred weight is within the normal range (body mass index of about 21kg/m^2; Swami & Tovée, 2008). Rather than weight *per se*, gay men seem to be more concerned about *leanness* (i.e., less body fat and more muscle; Levesque & Vichesky, 2006; Tiggemann et al., 2007).

Finally, like those of heterosexual men and women, gay men's attractiveness preferences are also influenced by context. For example, gay men seem to place greater value on muscular bodies in short-term compared to long-term mating contexts (Varangis et al., 2012), much as heterosexual women do (Buss & Schmitt, 1993; Frederick & Haselton, 2007; Gangestad, 2004; Gangestad, Garver-Apgar, Simpson, & Cousins, 2007; Little et al., 2007; Peters et al., 2009). As mentioned previously, muscularity is an immunocompetence cue and is thus an especially important feature in short-term mating contexts when acquiring good genes is a priority. Although men in same-sex relationships do not produce offspring, they have inherited many of the same mating strategies as heterosexual men have, including the prioritization of body attractiveness in assessing the suitability of short-term partners (though, in this case, gay men resemble women in the specific body dimension being assessed; i.e., muscularity versus body fat).

Preferences among subgroups. The foregoing preferences are modified by gender identity and genitoerotic role preference. For example, it has been noted that feminine gay men tend to prefer relatively older partners (Boyden et al., 1984; Freund, Langevin, Laws, & Serber, 1974; Haist & Hewitt, 1974). Exclusive "bottoms" (i.e., those preferring the receptive role in anal intercourse), tend to prefer taller, heavier, and hairier men compared to exclusive "tops" (i.e., those preferring the insertive role), who tend to prefer shorter, thinner, and "smoother" men (Yee, 2002).

Reasons for Gay Men's Physical Attractiveness Preferences

Youthfulness. Although gay men consider younger partners the most appealing in short-term (i.e., sexual) contexts, some research suggests that this preference shifts in longer-term mating contexts. Gobrogge and colleagues (2007) found that gay men seeking short-term sexual partners preferred a significantly wider age range than those seeking long-term partners. In a study of middle-aged gay couples in civil unions, Todosijevic and colleagues (2005) found that the mean age difference between partners was only six years and that age similarity was associated with greater relationship satisfaction. These findings have suggested that, in selecting long-term mates, gay men may consider non-sexual factors like being at similar life stages (e.g., in established careers, desiring to have children), which may enhance relationship satisfaction and longevity. However, Todosijevic and colleagues (2005) also speculated that "because gay men…value appearance in their partners, it is possible that being near the same age minimizes the possibility that one of the partners would look significantly older, and thus less desirable, than the other partner" (p. 164). It appears, therefore, that the preference for youth is omnipresent, in keeping with evolutionary hypotheses that men generally value youth, irrespective of sexual orientation or mating context.

Muscularity. The preference for mesomorphic bodies has commonly been explained from a sociohistorical perspective. According to historians, homosexual beauty in Western society at the end of the 19th century was epitomized by the "dandy"—a young, aristocratic, effeminate man who placed particular value on physical appearance and grooming and had a refined fashion sense (Chauncey, 1994; D'Emilio, 1983). After the Oscar Wilde trials, however, effeminacy became associated with the new social category of "the homosexual" (D'Emilio, 1983) and thus both became increasingly stigmatized (Signorile, 1997).

In the ensuing decades, gay men tried to avoid association with the stereotype of the effeminate homosexual by suppressing feminine characteristics and emphasizing masculine ones. This gave birth to the hypermasculine gay "Clone" culture of the late 1960s and 1970s (Levine & Kimmel, 1998; Signorile, 1997). As epitomized by Tom of Finland's stylized illustrations, the gay Clone imitated the style and dress of working-class men and was characterized by a heavily muscled torso, limbs, and buttocks, as well as a moustache and sideburns. This masculine trend has been variously termed the "Butch shift" (Fernbach, cited in Humphries, 1985), the "Gay Machismo" (Humphries, 1985), and "[the cult of gay] masculinists" (Edwards, 1994, p. 46; Nichols, 1979).

The mesomorphic ideal became especially prominent in the 1980s, as the AIDS epidemic swept through the gay community. Many gay tried to attain an increasingly muscular physique in an effort to avoid infection, appear healthy, and distance themselves from the "feminine" (i.e., receptive) position in gay sex, which now connoted death and disease (Halkitis et al., 2004; A. Klein, 1993; Shernoff, 2002; Signorile, 1997; Wood, 2004). Yet as many Clone men died from AIDS, mesomorphism itself became associated with disease and death, as did older gay men more generally. As a result, new generations of gay men came to revere a more innocent-looking, pubescent

appearance characterized by a sleeker, athletic build and little or no hair on the chest, abdominal area, back, or buttocks (Bergling, 2007; Drummond, 2005; Levesque & Vichesky, 2006; Mann, 1998; Signorile, 1997; Yelland & Tiggemann, 2003).

Wood (2004) has suggested that this emphasis on masculinity and muscularity has had less to do with stigmatization of homosexuality *per se* and more to do with wider-spread societal stigmatization of femininity more generally (see also Taywaditep, 2001). Others have simply suggested that the gay media has increasingly glorified the muscular body type, which gay men have internalized as the ideal for both themselves and their partners (Saucier & Caron, 2008).

The foregoing explanations for gay men's preference for masculine bodies are problematic for several reasons. First, just because there is a cultural ideal for the male body does not mean that men find it physically attractive. Second, even if factors like HIV/AIDS did lead some men to prefer hypermesomorphic bodies, the evolutionary theory of evoked culture would suggest that any shifts in muscularity preferences were evoked by the environment. For example, because muscularity is perceived to be an immunocompetence cue, gay men may subconsciously find hypermesomorphic men particularly attractive in regions or historical periods where HIV is epidemic. In support, research with heterosexual samples reveals that physical attractiveness becomes increasingly important in judging partner suitability in environments with high pathogen prevalence (DeBruine et al., 2011; Gangestad & Buss, 1993; Gangestad, Haselton, & Buss, 2006; Little et al., 2010). Finally, muscularity (whether defined or mesomorphic) appears to have been important to gay men throughout history, as evidenced in everything from Greek, Roman, and Renaissance art to the gay men's physique magazines from the early 1900s to present (Harris, 1997; Hooven, 1995; Mullins, 1992; Saucier & Caron, 2008). Rather than reflecting passing cultural fads, a preference for

muscularity more likely reflects an evolved, female-typical preference for physical prowess, strength, and dominance (Barber, 1995; Bramble & Lieberman, 2004; Buss, 2004; Buss & Schmitt, 1993; Marlowe, 2004; Mueller & Mazur, 1996).

Facial masculinity. Similar to preferences for mesomorphic bodies, the preference for masculine faces may reflect an adaptive preference for dominance (Mueller & Mazur, 1996). It may also reflect an adaptive preference for overall good health and good genes (Rhodes, Chan, Zebrowitz, & Simmons, 2003; Møller et al., 1999; Thornhill & Gangestad, 1993, 1999, 2006). Because facial masculinity is associated with higher levels of testosterone (Johnston, 2006; Penton-Voak & Chen, 2004), and because testosterone is an immunocompetence cue, the attraction to masculine faces may also be a specific adaptive response to HIV/AIDS. In support, Debruine and colleagues (2010) found that facial masculinity is especially valued in countries with higher rates of mortality, including mortality due to communicable diseases, and Little and colleagues (2011a) found that exposure to visual cues of pathogen contagion increased preferences for symmetry and masculinity in male faces.

As noted earlier, however, gay men may also find slightly feminized (i.e., rounder, softer) faces attractive, although not as much as masculine faces (Glassenberg et al., 2010). Since this preference is shared by women, especially in long-term mating contexts (e.g., Little, Jones, & DeBruine, 2008), it may reflect the feminization of gay men's brains as discussed earlier.

Aside from the specific preferences described above, it is also important to understand how they cluster into broader dimensions so that male same-sex attractiveness can be more accurately measured in studies in which it is a variable of primary interest. This is discussed in the following section.

Dimensions Underlying Gay Men's Physical Attractiveness Preferences

Some studies have suggested that both heterosexual women and homosexual men consider muscularity, body weight, and body structure (e.g., waist-to-hip ratio) in much the same way when assessing the attractiveness of other men (gay men: Lippa, 2007; Swami & Tovée, 2008; heterosexual women: Furnham, Tan, & McManus, 1997; Henss, 1995; Maisey et al., 1999; Singh, 1995). Other research, however, suggests that gay men place greater emphasis on muscularity than body weight (e.g., Tiggemann et al., 2007). More study is warranted to determine the number and nature of dimensions underlying gay men's physical attractiveness judgements and how each dimension contributes to assessment of overall physical attractiveness. The purpose of this thesis was to gain a clearer understanding of these dimensions, as well as to ascertain whether the relative importance assigned to these dimensions differs by age group. Evidence for age invariance would provide additional support for an evolutionary explanation for male same-sex physical attractiveness because it would suggest that biological rather than just cultural or historical factors determine the nature of same-sex physical attraction.

Measuring the Dimensions of Gay Men's Physical Attractiveness Preferences

Is beauty just in the "eye of the beholder"? Can it be measured? Before discussing measurement of dimensions underlying male same-sex physical attractiveness, it is important to ask whether attractiveness in general is a quality that can be measured. An age-old adage is that "beauty is in the eye of the beholder"—that it is simply too subjective to measure objectively. As David Hume (1757/1963) wrote,

beauty “is no quality in things themselves; it exists merely in the mind which contemplates them, and each mind contemplates a different beauty” (p. 234). As discussed earlier, however, there is remarkable agreement between judges about the attractiveness of specific physical features, as well as overall ratings of attractiveness: Irrespective of sex, age, race, geographic location, or socioeconomic status, people tend to agree on who and what is physically attractive (Cunningham et al., 1995; Langlois et al., 2000; cf. Hönekopp, 2006). There clearly exists some kind of universal quality to which people respond consistently, which makes it amenable to measurement. As Edward Thorndike wrote in 1918, “Whatever exists at all, exists in some amount” (p. 16) and as McCall wrote in 1939, “Anything that exists in amount can measured” (p. 18). Echoing Thorndike and McCall, Patzer (2006) writes,

> It is true that physical attractiveness is not as readily or as commonly described and precisely measured as, say, car speed at which we travel or air temperature around us. However…it is not accurate to say that people cannot describe and measure it, as well as manipulate it, control it, lose it, gain it, decrease it, and increase it (p. 87).

Is attractiveness more than the sum of its parts? Another common view is that physical attractiveness is assessed as a *gestalt*: “The sum is greater than the parts” (Armstrong, 2004; Patzer, 2006; Swami, 2007). By this account, features are assessed simultaneously as a single, unified entity. Surprisingly little research has examined this claim. One study provided support for the holistic processing of facial attractiveness (Abbas & Duchaine, 2008), in line with other research demonstrating holistic processing for facial identity recognition (Hancock et al., 2000; Young et al., 1987), expression recognition (Calder et al., 2000), gender categorization (Baudouin & Humphreys, 2006), and race categorization (Michel et al., 2007). To my knowledge, no studies have examined holistic processing of body attractiveness.

In contrast to holistic processing, it can be argued that attractiveness is assessed in an additive fashion, with individual features assessed independently and then added together to form a composite judgment of attractiveness. This position finds some support in qualitative evaluations of gay men's perceptions of other gay men. As Bergling (2007) observed, gay men often "find themselves not only separating faces and bodies from personalities at times, but sometimes even the disparate body parts from each other, giving some more weight than others when it comes to attraction" (p. 24). Kagian and colleagues (2008) were able to train a computer to "recognize" facial attractiveness based on an analysis of several individual facial features; the attractiveness ratings provided by the computer were remarkably similar to those provided by real people. Moreover, findings from a recent study have challenged the dominant holistic processing view of facial recognition by demonstrating that people are no more efficient at integrating facial features holistically than they are at assessing each individual feature in isolation (Gold, Mundy, & Tjan, 2012). This leaves open the possibility that the attractiveness of individual facial and body features may also be processed in an additive fashion.

With respect to the processing of broader dimensions of attractiveness, researchers have found that both facial and body attractiveness contribute independently to overall attractiveness, with only partial or even minimal interaction between the two (Currie & Little, 2009; Peters, Rhodes, & Simmons, 2007). Thus, even though our preferences evolved based on viewing faces and bodies together (Peters et al., 2007), both dimensions are processed separately.

Even if attractiveness *is* assessed holistically, this does not mean that the specific features and broader dimensions contributing to the whole cannot be measured (Patzer, 2006). As discussed earlier, features like symmetry, averageness, and sexual

dimorphism all likely convey information about the quality, and thus attractiveness, of mating and coalitional partners. The same can be said about broad dimensions like the face and body (Gangestad & Scheyd, 2005; Peters et al., 2007; Rhodes, 2006).

Multiple dimensions of physical attractiveness. Facial and body attractiveness are the two overall dimensions of attractiveness that have been examined most frequently. For example, Riggio and colleagues (1991) proposed a model of attractiveness comprising four major dimensions: Facial Attractiveness; Body Attractiveness; Dynamic Expressive Style (e.g., smiling, movement); and Attractiveness of Dress. Brown and colleagues (1986) suggested a fifth dimension, Grooming. Of these dimensions, the first two are considered *static* dimensions of attractiveness because they do not usually change much from situation to situation, and only gradually over time). The remaining three dimensions of physical attractiveness are considered *dynamic* because they may fluctuate quite markedly in different situations and across time and culture[10] (Brown et al., 1986).

In addition, it has been recognized that perceptions of physical attractiveness can also be influenced by various non-physical qualities like attitudinal and demographic similarity (Klentz, Beaman, Mapelli, & Ullrich, 1987; Park & Lennon, 2008; Fisman, Iyengar, Kamenica, & Simonson, 2008), reputation (Rucas et al., 2006), personality (Gross & Crofton, 1977; Jensen-Campbell, Graziano, & West, 1995; Kniffin & Wilson, 2004; Lewandowski, Aron, & Gee, 2007; Little et al., 2006; Paunonen, 2006; Townsend & Levy, 1990a), and mate-choice copying (Waynforth, 2007).

[10] Riggio and colleagues (1991) consider attractiveness of dress to be a static element of physical attractiveness. However, given that one may dress attractively in one situation and unattractively in another, this can be logically deemed a dynamic element of physical attractiveness.

Although dynamic and non-physical variables are important is assessing attractiveness, static features are more informative from an evolutionary perspective and can also be measured more reliably because they are comparatively more stable than non-static features (i.e., not confounded by fleeting sociocultural factors). Considering that static features are a rich source of information about the quality of prospective mating and coalitional partners, it is remarkable that few studies have examined whether face and body attractiveness are, indeed, the *only* two static dimensions underlying physical attractiveness judgements.

Franzoi and Herzog (1987) attempted to determine which physical features young adults use in judging physical attractiveness by administering the 35-item *Body Esteem Scale* (BES; Franzoi & Shields, 1984) to college students. The BES measures three dimensions underlying men's body esteem assessments: Overall Physical Attractiveness (e.g., face, buttocks, sex organs); Upper Body Strength (e.g., arms, chest, width of shoulders); and Physical Condition (e.g., physical stamina, reflexes, agility). For women, the three dimensions are Sexual Attractiveness (e.g., lips, breasts, sex organs), Weight Concern (e.g., waist, thighs, weight), and Physical Condition (e.g., muscular strength, energy level, physical coordination). In this study, participants rated how important they consider each BES item when assessing the physical attractiveness of other men and women. A principal components analysis (PCA) suggested one dimension underlying men's physical attractiveness assessments of women (accounting for 38% of total variance), one dimension underlying women's physical attractiveness assessments of men (accounting for 33% of total variance), and one dimension underlying men's physical attractiveness assessments of other men (accounting for 31% of total variance).

There were, however, several problems with this study. First, although a large number of body features were included in the development of the BES, it was not an exhaustive list of all features that might figure into assessments of static physical attractiveness. Second, the items tended to be generic in scope (e.g., “arms”), without reference to specific attributes of items (e.g., muscularity, shape, size, and fatness/leanness of arms). Third, several items were conceptually inappropriate as indicators of physical attractiveness (e.g., reflexes, appetite, energy level). Finally, the use of principal components analysis itself is not considered an appropriate methodology for identifying latent factors because it assumes no error variance and therefore overstates factor loadings (Costello & Osborne, 2005; O’Rourke, Hatcher, & Stepanski, in press).

Mehrabian and Blum (1997) had participants rate the attractiveness of 76 men and women using 37 items. Principal components analysis suggested five dimensions underlying these 37 criteria: Masculinity (e.g., shoulder width, body build, chin size); Self-Care (e.g., stomach, obesity, posture); Femininity (e.g., hair length, eye size, eye shape); Pleasantness (e.g., friendliness, babyish face); and Ethnicity (e.g., lightness of skin; fullness of lips). Masculinity and Self-Care each accounted for 10% of total variance; Femininity and Ethnicity each accounted for 7%; and Pleasantness accounted for 6%. As with Franzoi and Herzog’s (1987) study, the 37 criteria were not exhaustive (e.g., there were no references to genitalia), although some of the items were more specific (e.g., chin size, eye shape, eyebrow thickness). In addition, nine of the items were dynamic rather than static features of attractiveness. Principal components analysis, which is problematic in itself, was conducted using a sample of only 117; as will be discussed in Chapter III, this was likely too small. Finally,

responses from men and women combined. These methodological issues limit confidence in these results.

More recently, Swami and colleagues (2007) developed a brief 22-item measure of physical attractiveness among relationship partners. Factor analysis with orthogonal (varimax) rotation suggested four factors underlying responses to the scale: Lower Torso (e.g., waist, stomach, hips, arms); Lower Body and Extremities (e.g., legs, thighs, feet); Facial Attributes (e.g., mouth, teeth, nose); and Upper Body Features (e.g., hair, chest/breasts, eyes). The four factors accounted for 19.62%, 18.33%, 14.82%, and 13.47% of total variance, respectively. As with the other two scales, however, this one did not include an exhaustive list of items (again, no reference to genitalia) and most of the items were general. Although the use of true factor analysis was a methodological improvement over previous studies, the authors excluded from the analysis the broader items in the scale, namely overall body weight, overall body shape, and overall height. Moreover, the factor analysis was conducted using responses from males and females combined.

In addition to the shortcomings listed above, these measures are not appropriate for use with gay men because, as noted earlier, gay men value different physical features than heterosexual men and women. The purpose of this thesis, therefore, was to redress these shortcomings by examining an exhaustive range of physical features that may be important in perceptions of static physical attractiveness among gay men; by determining the latent dimensions underlying these perceptions; by developing a valid and reliable instrument to measure these dimensions; and by ascertaining whether the latent dimensions are the same for both young and older gay

men. It was envisioned that such an instrument would provide a convenient way to gauge the relative importance that gay men place on particular dimensions of male physical attractiveness, dimensions which, individually or in combination, could then be used as reliable predictor or outcome variables in a variety of studies pertinent to gay men and physical attractiveness. It was also envisioned that the scale could be used in studies requiring valid and reliable ratings of the physical attractiveness of gay men (e.g., in couples studies). Finally, and most relevant to this thesis, it was anticipated than an examination of the latent structure underlying scale responses would help reveal whether gay men of all ages assess attractiveness along the same dimensions, thus providing support for an evolutionary basis of male-to-male physical attractiveness perception.

Development of Hypotheses

Although this thesis was exploratory in nature, it was guided by three specific hypotheses based on the literature reviewed above:

1. (Static) male-to-male physical attractiveness is a multidimensional construct comprising two or more latent factors (e.g., facial attractiveness, muscularity).

2. Because these dimensions are theorized to be part of an evolved psychological mechanism to assess physical attractiveness in light of current environmental conditions, the latent multidimensional structure should be invariant across cohorts (i.e., young versus older gay men) even though these cohorts may hold different preferences for the attributes within each factor (e.g., moderate versus extreme muscularity).

3. The relative emphasis placed upon each dimension in assessing overall physical attractiveness should be invariant across cohorts (i.e., young and older gay men should equally value these dimensions when assessing men's attractiveness).

CHAPTER III: METHODOLOGY

A Two-Studies Approach

This thesis comprised two separate studies. Study 1 entailed the development of an instrument to assess the dimensions underlying physical attractiveness judgments among gay men aged 18-49 years (*n* = 2,773). Study 2 assessed the viability of this dimensional structure with gay men aged 50-88 years of age (*n* = 827).

Internet Data Collection

Data were obtained via a website constructed specifically for this study. The Internet has been used previously in studies of gay men's partner preferences (Gobrogge, 2007; Lippa, 2007; Sánchez et al., 2010; Sánchez & Vilain, 2012), including physical attractiveness preferences (Glassenberg et al., 2010; Legenbauer et al., 2009; Moskowitz et al., 2009; Teuscher & Teuscher, 2007; Varangis et al., 2012; Yee, 2002), and body image (Duggan & McCreary, 2004; Halkitis et al., 2004; Reilly & Rudd, 2006). It has also been used in studies with older adults (e.g., Chou & O'Rourke, 2012; O'Rourke & Cappeliez, 2001, 2002), including older gay men and lesbians (Fredriksen-Goldsen et al., 2011).

The Internet is advantageous in research with sexual minorities because it permits quick, efficient, and inexpensive data collection, with anonymity, from a relatively small population that tends to be concentrated in geographically-dispersed pockets (i.e., major metropolitan areas). Indeed, researchers were able to recruit nearly 6,000 gay men for an online study of mate preferences in 53 nations—one of the largest studies of gay men yet (Lippa, 2007). The Internet has also facilitated collection of open-ended qualitative data from large samples of gay men (e.g., Sánchez, Greenberg, Liu, & Vilain, 2009; *N* = 547). Since gay men tend to be more computer-literate than their

heterosexual counterparts, and since most have Internet access (Brown, Maycock, & Sharn, 2005), the Internet remains a promising avenue for participant recruitment and data collection.

In contrast to the preconception that Internet-derived participants are demographically distinct, research has found that such samples are comparable to those recruited via more traditional self-selection methodologies (Gosling, Vazire, Srivastava, & John, 2004; O'Rourke & Chou, 2008). In addition to demographic similarity, several studies have determined that substantive variables of interest do not differ markedly between Internet-derived versus self-selected samples recruited by more traditional means (Epstein, Klinkenberg, Wiley, & McKinley, 2001; O'Rourke & Chou, 2008; Roster, Rogers, Albaum, & Klein, 2004). Results of Internet-based attractiveness research also tend to be similar to those of laboratory studies (Feinberg et al., 2005, 2008; Welling, Jones, & DeBruine, 2008; Wilson & Daly, 2004).

Internet-based methods make respondents feel more comfortable in disclosing sensitive information (Cooper et al., 1999; Ross, 2005; Tourangeau & Smith, 1996) and encourage thoughtful responses to questions with reduced impression management demands (Gosling et al., 2004; Richman et al., 1999). They also help minimize incomplete responding by flagging questions that participants may have inadvertently missed; as will be discussed later, this feature contributed to the remarkable completeness of the dataset in the current study.

In sum, Internet-based methods facilitate efficient, reliable data collection across an array of populations and topic areas (Chuah, Drasgow, & Roberts, 2006; Gosling et al., 2004) and were therefore considered opportune for this thesis.

Study Participants (Studies 1 & 2)

Recruitment. A convenience sample of 3,681 gay and bisexual men aged 18-88 were recruited over a 10-day period in August 2010. Advertisements for this study were initially posted to LGBT discussion boards (e.g., LGBT section of About.com; 4Chan), listservs of LGBT-serving organizations (e.g., university student groups), the LGBT section of Reddit.com, and the "Men Seeking Men" section of Craigslist. Because respondents recruited from gay-specific media and organizations may differ from the general population in being more socially involved or invested in the gay community (Harry, 1986; Meyer & Wilson, 2009), this study was also advertised using Google "click ads." In addition, given the growing popularity of social networking sites, even among older adults (Pew Internet & American Life Project, 2012), advertisements were placed on Facebook, the world's largest social networking site.

The Google and Facebook advertisements comprised a small black-and-white silhouette of men's bodies with the following text: "What Makes That Guy Hot? SFU in Vancouver, Canada is looking for gay/bi men for a 20-minute anonymous survey about men's bodies. All ages and races welcome" (see Appendix "A"). The ads were demographically targeted to gay/bi men 18+ years of age in all countries except those in which homosexuality remains illegal (as per SFU ethics requirements). Interested participants were able to click on a link that directed them to the study website.

Computer logs indicated that about 85% of participants accessed the study website from Facebook, either by clicking on the study advertisement or following a link to the study posted on a friend's Facebook "wall." The advertisements were shown a total of 9,275,965 times; of these ad impressions, 261,078 were *social impressions*—ads shown with the names of viewers' friends (e.g., those who had "liked" the ad). Of the

11,155 men who clicked on the ads, 3,681 completed the study questionnaire. It was not possible to determine if those who completed the questuionnaire were demographically distinct from those who did not.

In addition to attracting a large sample, Facebook recruitment contributed to the geographic diversity of the sample, as participants hailed from 40 countries on five continents. It allowed access to subgroups that have traditionally been overlooked in LGBT research, such as those in rural areas, towns, and villages with small numbers of LGBT residents (in the current study, about one-third of respondents were from suburban areas and 10% were from rural areas). Facebook recruitment also permitted access to older gay men, a population long considered invisible and thus less likely to participate in LGBT research; indeed, targeted Facebook advertising (i.e., temporarily restricting advertisements to specific demographic subgroups) facilitated recruitment of 827 men between the ages of 50-88. Most importantly, use of Facebook likely minimized over-sampling of gay and bisexual men who are heavily involved in the gay community and who are thus not representative of the broader population of gay and bisexual men. These are some of the reasons why LGBT researchers are increasingly using Facebook participant recruitment (e.g., Vrangalova & Savin-Williams, 2012).

Participants who were interested in the study were greeted with a splash page explaining the general purpose of the study (Appendix “B”). Those who agreed to participate were presented with the study questionnaire; those who choose not to participate were shown a list of links to generic websites (e.g., LGBT news sites). Participants were informed that their responses would be collected and encrypted via Simon Fraser University’s secure https:// server to help ensure privacy and security of information.

Participant screening. Using IP addresses, dates, and submission times, three cases were flagged as duplicate and excluded from further analyses. Only 1% of all respondents (*n* = 42) submitted questionnaires with responses missing for more than 50% of the physical attractiveness items; these respondents were not included in the study. Less than 1% of all respondents (*n* = 36) self-identified as mostly or exclusively heterosexual and were thus excluded further analyses (details on the assessment of sexual orientation are discussed later). A final working sample of 3,600 respondents remained after exclusion of duplicate cases, incomplete questionnaires, and predominantly heterosexual respondents.

Participant characteristics. The final sample of 3,600 participants hailed from 40 countries in 10 regions:

(1) Canada

(2) United States

(3) Central & South America: Argentina, Brazil, Mexico, Nicaragua, Panama

(4) United Kingdom and Ireland: England, Ireland, Northern Ireland, Scotland, Wales

(5) Continental Europe: Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Italy, the Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland

(6) Middle East: Israel, Turkey, United Arab Emirates

(7) Africa: Namibia, South Africa

(8) Asia: China, Hong Kong, India, Japan, Korea, Philippines, Singapore, Taiwan

(9) Australasia: Australia, New Zealand

Figure 3.1 illustrates the geographic locations of Study 1 participants (men aged 18-49); Figure 3.2 illustrates the locations of Study 2 participants (men aged 50-88). The distribution of Study 1 respondents generally mirrored the population distribution of the English-speaking world; the Study 2 sample was skewed towards North American respondents. Table 3.1 lists other key characteristics of Study 1and 2 participants.

Figure 3.1: Geographic distribution of Study 1 participants (*n* = 2,773)

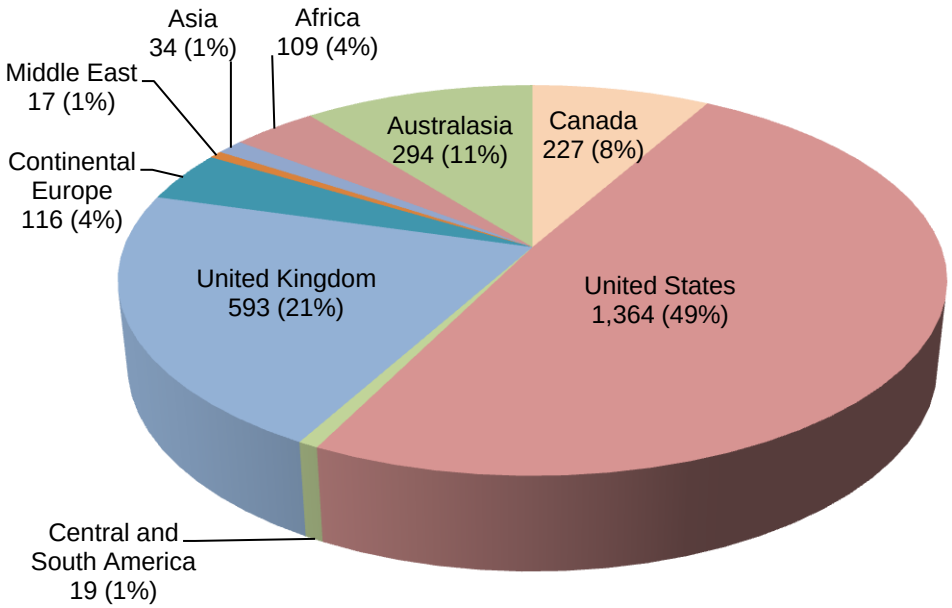


Figure 3.2: Geographic distribution of Study 2 participants (older men, *n* = 827)

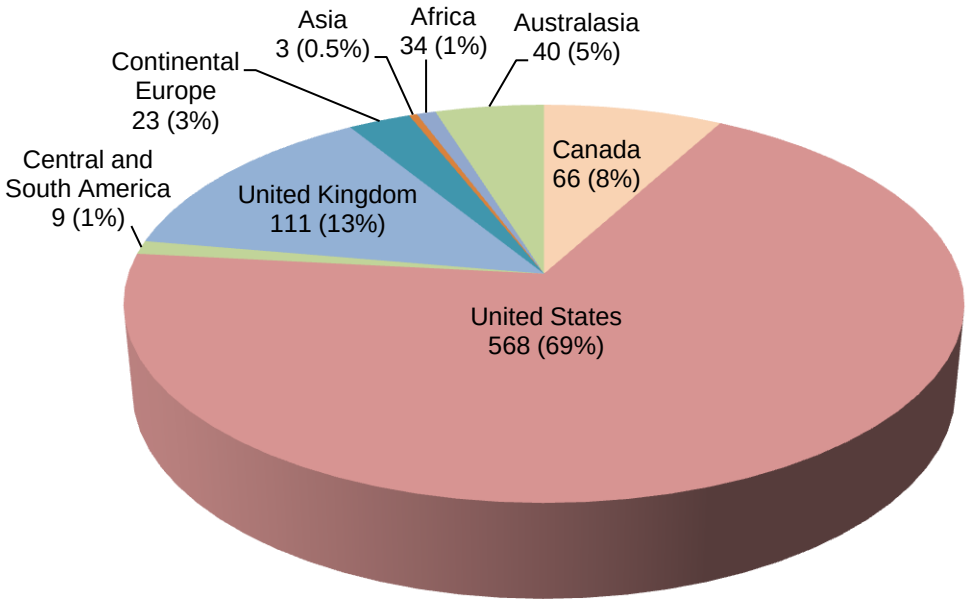


Table 3.1: Key socio-demographic characteristics of Study 1 and Study 2 participants

Socio-demographic Variable	Young (*n* = 2,773)	Older (*n* = 827)
Age	*n* = 2,495 *Mdn* = 29.11 Range = 17.55 - 49.99 IQR = 23.44 - 38.27	*n* = 827 *Mdn* = 54.53 Range = 50 - 87.7 IQR = 52 - 58.49
Biological Sex	*n* = 2,515	*n* = 827
- Male	2,506 (99.6%)	826 (99.9%)
- Other (Intersex, Transsexual)	9 (0.4%)	1 (0.1%)
Ethnicity	*n* = 2,514	*n* = 827
- Aboriginal/Native/First Nation	17 (0.7%)	6 (0.7%)
- African/African American/Black	46 (1.8%)	18 (2.2%)
- Asian/SE Asian/Pacific Islander	110 (4.4%)	6 (0.7%)
- Latino	122 (4.9%)	17 (2.1%)
- Middle Eastern/North African	10 (0.4%)	1 (0.1%)
- White/Caucasian/European	2,071 (82.4%)	755 (91.3%)
- Mixed/Multi	136 (5.4%)	24 (2.9%)
- Other	2 (0.1%)	0 (%)
Usual Sexual Behaviour	*n* = 2,515	*n* = 827
- With men only	2,293 (91.2%)	759 (91.8%)
- With men mostly	189 (7.5%)	60 (7.3%)
- With men somewhat more	23 (0.9%)	4 (0.5%)
- With both men and women equally	4 (0.2%)	2 (0.2%)
- With women somewhat more	3 (0.1%)	1 (0.1%)
- With women mostly	1 (0%)	1 (0.1%)
- Asexual	2 (.1%)	0 (0%)
Sexual Identity (Categorical)	*n* = 2,514	*n* = 827
- Homosexual/gay	2,413 (96%)	790 (95.5%)
- Bisexual	68 (2.7%)	26 (3.1%)
- Transgender	5 (0.2%)	1 (0.1%)
- Asexual	3 (0.1%)	3 (0.4%)
- Other	25 (1%)	7 (0.8%)
Sexual Identity (Dimensional)	*n* = 2,503	*n* = 823
- Homosexual only	1,981 (79.4%)	676 (82%)
- Homosexual mostly	448 (17.9%)	131 (15.9%)
- Homosexual somewhat more	48 (1.9%)	10 (1.2%)
- Heterosexual/homosexual equally	26 (1%)	7 (0.8%)

Socio-demographic Variable	Young (*n* = 2,773)	Older (*n* = 827)
Preferred Sexual Position*	*n* = 717	*n* = 327
- Top	67 (9.3%)	36 (11%)
- Top/versatile	150 (20.9%)	77 (23.5%)
- Fully versatile	184 (25.7%)	81 (24.8%)
- Bottom/versatile	205 (28.6%)	74 (22.6%)
- Bottom	88 (12.3%)	51 (15.6%)
- Other (e.g., oral only)	23 (3.2%)	8 (2.4%)
Years of Formal Education	*n* = 2,330	*n* = 777
	Mdn = 15.34 Range = 12 - 30 IQR = 14 - 17	*Mdn* = 16 Range = 12 - 30 IQR = 14 - 18
Occupation/Socioeconomic Status	*n* = 2,387	*n* = 745
- Unskilled	6 (0.3%)	1 (0.1%)
- Semi-skilled	204 (8.5%)	75 (10.1%)
- Student/Unemployed	576 (24.1%)	47 (6.3%)
- Skilled trade	378 (15.8%)	124 (16.6%)
- Managerial	863 (36.2%)	292 (39.2%)
- Professional	360 (15.1%)	206 (27.7%)
Relationship Status	*n* = 2,515	*n* = 827
- Single	1,475 (58.6%)	384 (46.4%)
- Dating	20 (0.8%)	10 (1.2%)
- Partnered	743 (29.5%)	236 (28.5%)
- Common law	51 (2%)	9 (1.1%)
- Legal domestic partnership	50 (2%)	37 (4.5%)
- Civil union	54 (2.1%)	22 (2.7%)
- Married	59 (2.3%)	53 (6.4%)
- Separated	16 (0.6%)	11 (1.3%)
- Divorced	14 (0.6%)	26 (3.1%)
- Widowed	11 (0.4%)	33 (4%)
- Other	22 (0.9%)	6 (0.7%)
Duration of Current Relationship (in years)	*n* = 990	*n* = 371
	Mdn = 3.33 Range = 2 days - 34 years IQR = 1.17 - 7.5	*Mdn* = 12.25 Range = 1 - 57 years IQR = 5.67 - 20.08
Involvement with Gay Community (Higher = greater involvement)	*n* = 2,513	*n* = 827
	M = 34.23 ± 11.71 Range = 8 - 63	*M* = 38.52 ± 11.59 Range = 9 - 63

Note: For categorical data, numbers are reported with percentages in parentheses. For continuous, normal data, means + standard deviations are reported. For continuous, non-normal data, median and interquartile range (IQR) are reported. *Smaller number of respondents because question first asked during test-retest phase of study.

As evident from the table above, most participants were Caucasian, exclusively homosexual, sexually versatile, well-educated, in skilled occupations, and moderately involved in the gay community. A majority of Study 1 participants were single, whereas a majority of Study 2 participants were partnered.

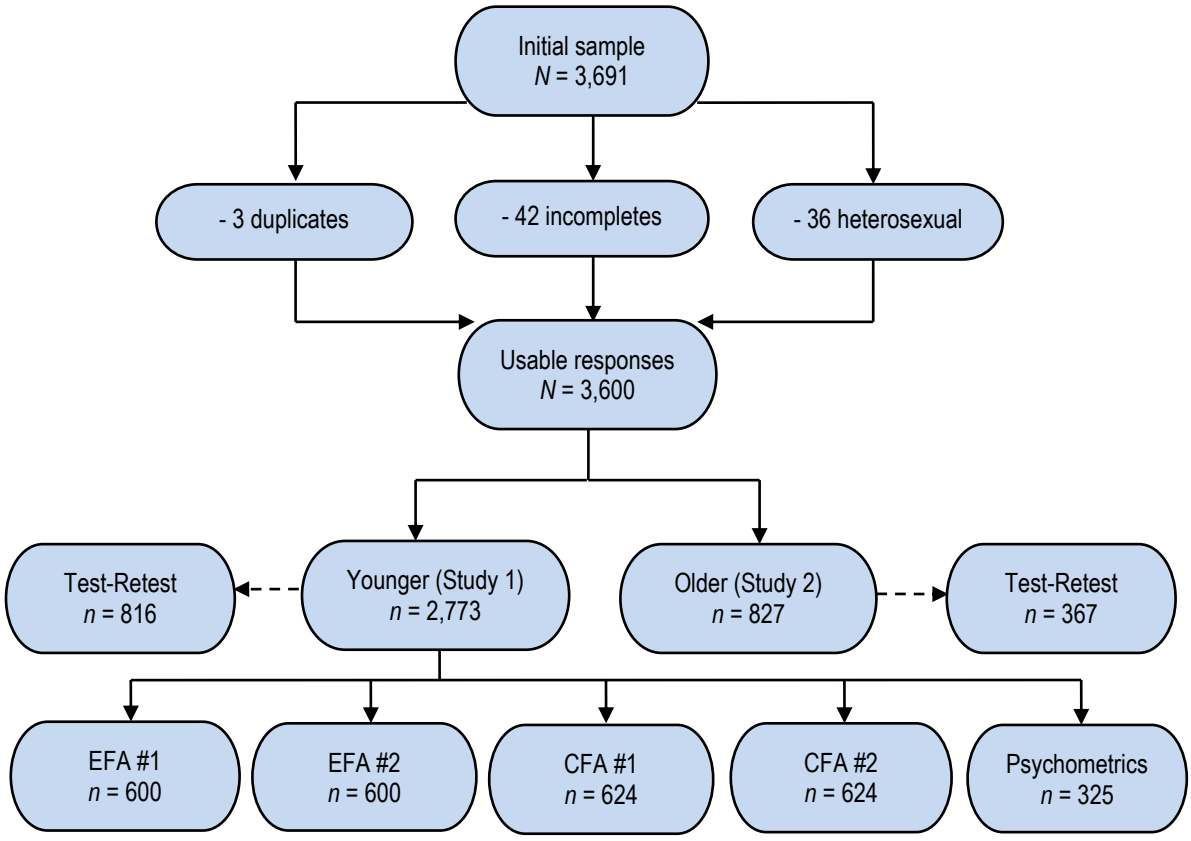
Assignment to Groups

Prior to analyses, the initial sample of 3,600 respondents was divided into two groups, as described earlier: one group comprising men under 50 years of age (n = 2,773) and one group comprising men 50-88 years of age (n = 827)[11]. The first group was used for scale development and validation (Study 1) and the second group was used to examine age-invariance of scale responses (Study 2). Study 1 participants were randomly assigned to one of five sub-samples: one for exploratory factor analysis (EFA #1, n = 600); one for exploratory factor analysis replication (EFA #2, n = 600); one for confirmatory factor analysis (CFA #1, n = 624); one for confirmatory factor analysis replication and as well as the Study 2 age invariance analysis (CFA #2, n = 624); and one for calculation of psychometric properties (n = 325). As discussed later, these sample sizes were sufficiently large for exploratory and confirmatory factor analyses. Figure 3.3 illustrates the allocation of participants into successive samples. Dividing the Study 1 sample in this way provided an opportunity to replicate analyses using multiple independent samples, thus allowing greater confidence in study findings (DeVellis, 2012).

[11] 278 respondents did not report their age. They were placed in the under-50 sample and then randomly assigned to one of the five sub-samples.

There were no significant differences between Study 1 subsamples on attractiveness item total (F[4, 2768] = 1.37, p = .241), self-rated attractiveness (F[4, 2766] = 1.07, p = .372), impression management (F[4, 2625] = 1.45, p = .216), age (F[4, 2490] = 1.58, p = .178), region (χ^2[20, N = 2704] = 29.64, p = .076), ethnicity (χ^2[16, N = 2485] = 7.26, p = .968), SES (χ^2[20, N = 2767] = 20.61, p = .420), education (F[4, 2503] = .725, p = .575), relationship status (χ^2[4, N = 2473] = 6.52, p = .164) or duration (F[4, 985] = .282, p = .890), gender identity (F[4, 2510] = 1.49, p = .204), sexual position (χ^2[16, N = 694] = 14.19, p = .585), or community involvement (F[4, 2508] = 1.51, p = .575)[12]. In other words, random assignment worked as intended.

Figure 3.3: Flowchart of initial sample to final samples for data analyses



[12] For chi-square tests, categories were collapsed or excluded if any cells had expected counts less than 5.

Validity Checks

Prior to analyses, the validity of responses was assessed by examining expected response patterns to specific items. Consistency of socio-demographic information reported during initial data collection and then at test-retest follow-up four to six months later was also examined (i.e., cross-validation). Results of these validity checks are presented at the beginning of Chapter IV.

Study 1: Scale Development and Validation

Item generation. The initial item pool included an exhaustive list of physical features that gay men consider when assessing the static physical attractiveness of other men (Appendix "C"). Items were drawn from several sources, including studies reviewed in Chapter II; existing instruments used in studies of attractiveness and body image among heterosexual adults, including the *Body Esteem Scale* (Franzoi & Herzog, 1986; Franzoi & Shields, 1984) and the *Body Cathexis Scale* (Secord & Jourard, 1953); and other prospective self-generated items germane to physical attractiveness. Effort was made to include as many attributes of each body feature as possible; based on literature reviewed in Chapter II, attributes included the shape, size, muscularity, fatness/leanness, masculinity/femininity, and overall appearance of physical features. Wherever potentially confusing technical terms were used (e.g., *waist-to-hip ratio*), brief definitions were included beside those terms.

It is important to note that the items made reference only to the physical features used in making attractiveness judgments, not the *preferred quality* of these features. Thus, for example, *colour of eyes* was included but not *blue eyes, brown eyes,* or *green eyes*. Similarly, *presence/absence of chest hair* was included but not *chest hair* or *hairy chest*. There were two exceptions, however. To help assess the validity of responses,

the items *visible nose hairs* and *visible hair in ears* were not accompanied by the *presence/absence* qualifier. The intent was to determine whether respondents were attentive to question items or responding more randomly.

To maximize content validity, 20 gay and bisexual colleagues reviewed the preliminary list of physical features for completeness. Based on several comments, including the recommendation to include more items addressing different aspects of genitalia and body hair, a final set of 258 items was selected for inclusion (Appendix "C"). All of the items were listed randomly to prevent biases due to order effects (e.g., responding similarly to different items pertaining to the same general body region) and to discourage participants from thinking too much about any one item (i.e., to choose their "gut reactions" when rating items).

Response options. Participants were asked to rate how important they consider each physical feature when evaluating the physical attractiveness of other men. To ensure sufficient variability of responses, a 5-point Likert-type response format was chosen (1 = *very unimportant*, 5 = *very important*). This is the same response format used in Franzoi and Herzog's (1987) study of the body features heterosexual adults use when judging physical attractiveness. Although scales with seven or more response options can increase response variability and reliability (Comrey, 1988; DeVellis, 2012), a 5-point scale is considered less burdensome for respondents and is in keeping with many of the physical attractiveness and body image studies cited in Chapter II.

Additional measures.

Self-perceived attractiveness. Research has suggested that self-perceived physical attractiveness influences one's attractiveness preferences (e.g., Little et al., 2001). To determine whether self-perceived attractiveness might also affect the

importance ratings assigned to different attractiveness dimensions, participants were asked to rate their self-perceived physical attractiveness on a 10-point Likert-type scale (1 = *unattractive*, 5=*average*, 10 = *very attractive*). Given the ubiquity and familiarity of the 10-point attractiveness scale, it was believed that respondents would find it more intuitive than the 5-point scale used for the previous items. Mean self-rated physical attractiveness was 6.20 (*SD* = 1.64) and 5.75 (*SD* = 1.72) for Study 1 and Study 2 participants, respectively. This difference was statistically significant, $t(3595) = 6.72$, $p < .01$, meaning that the young gay men in this study considered themselves somewhat more attractive than the older gay men did. For neither group were scores associated with impression management (see below).

***Impression management*.** To assess for possible biased responding, participants also completed the Impression Management (IM) subscale of the *Paulhus Deception Scales* (PDS; Paulhus, 1998; Appendix "D"). This subscale measures respondents' conscious attempts to give socially and morally favourable responses, which is not uncommon in physical attractiveness research (Patzer, 2006). Respondents are asked to indicate the extent of their agreement with 20 statements such as "I never cover up my mistakes" and "I never swear." Responses are recorded along a 5-point Likert-type scale (1 = *not true*, 5 = *very true*). One point is assigned for each response of 4 or 5 (subsequent to reversal of negatively-keyed items). Total scores range from 0-20, with higher scores indicating a greater likelihood of socially desirable responding. Scores of 12 or higher suggest that respondents are "faking good." Mean IM scores were 6.97 (*SD* = 3.44) and 7.88 (*SD* = 3.46) for Study 1 and Study 2 participants, respectively. Although both age groups were generally low in IM, older gay men had significantly higher levels, $t(3595) = 6.62$, $p < .01$, although this

difference was not particularly large, Cohen's *d* = 0.25. IM scores were examined relative to responses to the final attractiveness scale (full scale as well as subscales). Correlation coefficients greater than *r* = .30 were considered suggestive of socially desirable responding.

Previous research has demonstrated good internal consistency of responses to the IM subscale (Cronbach's $\alpha \geq .83$ for the general population; Paulhus, 1998). In the present study, internal consistency was within the acceptable range ($\alpha = .75$; 95% CI [.74, .76]). Construct validity of responses to the IM subscale has been established relative to various lie scales (e.g., EPI lie scale, MMPI lie scale; Paulhus 1998). The IM subscale is highly sensitive to demands for impression management, with scores showing theory-consistent increases from private to public response conditions (Paulhus, 1998).

Gender identity. Research has suggested that one's gender identity (i.e., self-perceived masculinity/femininity) influences physical attractiveness preferences (e.g., Bailey et al., 1997; Yee, 2002). To determine whether gender identity also affects the importance assigned to broader attractiveness dimensions, a brief gender identity measure was administered (Appendix "E"). The *Sexual Identity Scale* (SIS; Stern, Barak, & Gould, 1987) is a 5-item composite measure of how masculine or feminine respondents consider themselves along four dimensions: overall self-perception; appearance; behaviour; and interests. Responses are recorded along a 5-point Likert-type scale (1 = *very masculine*, 3 = *neither masculine nor feminine,* 5 = *very feminine*). Total scores are multiplied by 100 and range from 100-500.

The SIS was initially validated with a heterosexual sample, but has since been used in studies with gay men (e.g., Carballo-Diéguez, 2004, 2005; Zheng et al., 2012).

Previous research has demonstrated good internal consistency of responses ($.79 \leq \alpha \leq .85$ for the general population; Palan, Areni, & Kiecker, 1999; Stern et al., 1987). Although there are more widely-used measures of gender identity, such as the *Bem Sex Role Inventory* (BSRI; Bem, 1974) and the *Personal Attributes Questionnaire* (PAQ; Spence, Helmreich, & Stapp, 1975) (both of which conceptualize gender identity as separate constructs coexisting in various degrees in an individual rather than being a single bipolar dimension), the SIS was considered more suitable for two reasons. First, the BSRI and PAQ were developed to measure traits judged to be typical or socially appropriate for heterosexual men and women, not gay men. The SIS avoids the use of these traits by instead relying on respondents' subjective self-perceptions of masculinity/femininity (i.e., gender identity as construed by gay men themselves). Furthermore, a continuous masculinity-femininity construct has been shown to predict sexual orientation in men, thus providing evidence for the validity of this construct (Udry & Chantala, 2005). From a practical standpoint, the brevity of the SIS made it more suitable for inclusion in a lengthy questionnaire (i.e., minimized respondent burden).

In the present study, masculinity/femininity vis-à-vis personality was added to the SIS to ensure that gender identity was assessed across a full spectrum of domains (e.g., Lippa, 2002). Responses to the revised 5-item SIS demonstrated good internal consistency ($\alpha = .82$; 95% CI [.81, .83]). Mean SIS scores were 256.68 ($SD = 55.44$) and 228.00 ($SD = 51.51$) for Study 1 and Study 2 participants, respectively. Although neither young nor older men considered themselves particularly masculine or feminine, young gay men considered themselves significantly more masculine than older gay men, $t(3340) = 13.13$, $p < .01$, Cohen's $d = 0.54$ (medium effect).

***Involvement with gay community/culture*.** Previous research has suggested that greater involvement in the gay community/culture is associated with greater body image dissatisfaction (Beren et al., 1996) and drive for muscularity (Levesque & Vichesky, 2006). It is possible that community involvement also influences gay men's perceptions of other men's physical attractiveness. Thus, the present study included a modified version of the *Involvement with Gay Community Scale* (GCS; Martins, Tiggemann, & Kirkbride, 2007; Appendix "F"). In the original version of the scale, seven items assess gay community involvement across a number of domains, including friendships, visiting gay venues, and membership in gay organizations. Respondents rate each item (e.g., "I have many gay and lesbian friends"; "I generally spend time in venues that are gay/lesbian hangouts") on a 7-point Likert-type scale (1 = *not at all true of me,* 7 = *extremely true of me*). Scores are summed (subsequent to reversal of negatively-keyed items) and can range from 7 to 49, with higher scores indicating greater affiliation with the gay community. In previous research, internal consistency of responses was good (α = .81; Martins et al., 2007).

Because accessing LGBT-specific media can be a form of involvement with gay culture, two items were added to the scale in the present study: "I often read LGBT publications" and "I often visit LGBT websites." Internal consistency reliability of the modified nine-item version of the GCS was good (α = .82; 95% CI [.81, .83]). With the inclusion of these two items, mean community involvement scores were 34.23 (*SD* = 11.71) and 38.52 (*SD* = 11.59) for Study 1 and 2 participants, respectively. These scores indicate that both young and older gay men are moderately involved in the gay community/gay culture, although older gay men are significantly more involved, $t(3338) = 9.18$, $p < .01$, Cohen's $d = 0.37$ (medium effect).

***Socio-demographics*.** Respondents provided a variety of socio-demographic data (Appendix "G"), which was used to determine whether there are any statistically significant demographic differences in attractiveness criteria ratings.

Full date of birth was requested so that age could be calculated in years, months, and days; this is more accurate than self-reported age. Biological sex was classified as *male*, *female*, or *other* (including intersex and transsexual). Ethnicity was categorized into one of eight groups. Due to an oversight, no category was included for Southeast Asians; most of these respondents selected *other.*

Sexual orientation was assessed with three questions (questions 4, 5, and 6 in Appendix "G"). The items were adapted from the *Klein Sexual Orientation Grid* (KSOG; F. Klein, 1993), which conceptualizes sexual orientation along several dimensions. The first question asked respondents to indicate with whom they usually have sexual relations. Responses were recorded along a continuous, 8-point scale (1 = *men only*, 2 = *men mostly*, 3 = *men somewhat more*, 4 = *both men and women equally*, 5 = *women somewhat more*, 6 = *women mostly*, 7 = *women only*, 8 = *I do not like sex/I am asexual*). This question format is based on the Kinsey Scale (Kinsey et al., 1948), the most commonly used measure of sexual orientation. Rather than forcing respondents to indicate an exclusive sexual orientation category, this scale allows them to indicate degrees of homosexual and heterosexual behaviour. Respondents were, nonetheless, also asked to indicate their sexual identification using traditional categories (1 = *homosexual/gay*, 2 = *bisexual*, 3 = *transgender*, 4 = *heterosexual/straight*, 5 = *asexual*, 6 = *other*). Those who self-identified as homosexual were then asked to indicate their self-identification along a continuous, 7-point scale (1 = *homosexual only*, 2 = *homosexual mostly*, 3 = *homosexual somewhat more*, 4 = *heterosexual/homosexual*

equally, 5 = *heterosexual somewhat more*, 6 = *heterosexual mostly*, 7 = *heterosexual only*).

Due to disputed definitions of sexual orientation and the fact that some men with significant same-sex attractions may not identify as homosexual, respondents were included in the final sample if they selected 4 or lower on the first question; any option except 4 on the second question; or 4 or lower on the third question. All other respondents (*n* = 36) were excluded. Similar selection criteria have been used in previous studies with gay and bisexual men (e.g., Bogaert & Hafer, 2009; Strong, Singh, & Randall, 2000; Tiggemann et al., 2007). Although it could be argued that the bisexual men included in the final sample were not as attracted to the same sex as homosexual men are, it was assumed that participants who took the time to fill out a 250+ questionnaire about same-sex attraction were, indeed, significantly attracted to men and should not be excluded.

Preferred sexual position was measured with one question: "What is your general or preferred sexual position?" Response options were based on a classification system commonly used in LGBT research and on gay dating websites (1 = *top*, 2 = *top/versatile*, 3 = *fully versatile*, 4 = *bottom/versatile*, 5 = *bottom*, 6 = *other [please specify]*). This question was asked during the test-retest phase four-six months later.

Current relationship status was measured using a standard classification system used on gay dating websites. Those currently in a relationship were also asked to indicate the total number of months and years they have been in the relationship.

Education was measured by asking respondents to indicate how many years of school they had completed. The question was posed in this way to ensure that those who were educated in different countries (using different benchmarks) could provide accurate information about their formal education. Despite asking respondents include

elementary, secondary, and post-secondary education in the calculation, the distribution of responses suggested that about 7% misunderstood the question and considered only post-secondary education; indeed, many of these respondents specified that they had completed as little as one year of education. The validity of the remaining questionnaire responses (see beginning of Chapter IV) suggests that responses to this question were not nuisance responses but due, in fact, to misinterpretation of the question.

Finally, socioeconomic status was assessed using the Wilson-Barona method (Barona, Reynolds, & Chastain, 1984). Respondents indicated their current primary occupation and work status (i.e., full-time, part-time, disabled, retired). Occupations were then coded into six categories, each corresponding to a different socioeconomic status: 1 = *unskilled worker* (e.g., farm labourer, farm foreman, or general labourer); 2 = *semi-skilled worker* (e.g., service worker, farmer, or farm manager); 3 = *not in the labour force* (e.g., student, permanently disabled, independently wealthy); 4 = *skilled worker* (e.g., craftsman or foreman); 5 = *manager, official, proprietor, clerical or sales worker*; or 6 = *professional* (e.g., doctor, lawyer, accountant, teacher). Retired respondents were classified according to their primary pre-retirement occupation.

Additional comments. Respondents were given space to include any comments they had about the study. About 1,000 respondents took this opportunity to elaborate on their responses to the various questionnaires and to share their thoughts about the nature of male same-sex physical attraction. Many also provided useful feedback about the wording of specific questions (e.g., unclear items) or features of the website that they liked or could be improved (e.g., reducing the number of questions displayed on each screen). Others provided ideas for future avenues for research on LGBT sexuality and physical attractiveness.

Order of questionnaires. The individual questionnaires were presented in three sections (each displayed on a different screen). Part 1 included the attractiveness and self-rated attractiveness items; Part 2 included the IM scale; and Part 3 included the socio-demographic questions, with the SIS and the GCS placed between questions 8 and 9. The space for verbatim comments was provided at the end of the demographics questionnaire. Several LGBT facts (e.g., dates of legal milestones; Appendix "H") were randomly interspersed between questionnaires to maintain participant interest and thus maximize questionnaire completion; participants in previous Internet-based research have commented favourably on this feature (e.g., O'Rourke, Cappeliez, & Claxton, 2011).

Pilot test. Following recommendations by Clark and Watson (1995), the full study questionnaire was pilot-tested on a small number of participants. A paper-and-pencil version was administered to 24 gay and bisexual men aged 25-74 (*M* = 50.43, *SD* = 12.94) during Vancouver's annual Gay Pride parade. Feedback from respondents indicated that the questionnaire instructions and response options were clear and that the questionnaire was not unreasonably long. An initial screening of data indicated that responses to most attractiveness items had sufficiently broad distribution (i.e., all five response options were chosen), thus supporting the appropriateness of the 5-point Likert-type response format. Based on results of this pilot test, the full questionnaire was administered online.

Preliminary item analyses. In keeping with the recommendations of Tabachnick and Fidell (2012), several preliminary analyses were conducted to determine the suitability of the online data for exploratory factor analyses.

1. The means and standard deviations of all items were assessed. Items were required to have mean values greater than their standard deviations.

2. To ensure that each item had sufficient variability for factor analyses, items were assessed for broad distribution of responses (i.e., ensure that all points along the Likert scale were chosen).

3. Although both exploratory and confirmatory factor analysis are usually robust against violations of normality such as skewed item responses (Flora & Curran 2004; Rafaeli & Revelle, 2006; Rigdon & Ferguson 1991), items were nonetheless inspected for excessive skewness (> |2.8|) and kurtosis (> |2.8|).

4. Items were assessed for linearity by doing a spot check of pairs of variables, particularly those pairs in which one variable is positively skewed and the other negatively skewed, which could suggest the presence of non-linear relationships.

5. Items were assessed to determine whether they correlated at least moderately with the total of all attractiveness items (corrected item-total correlation ≥ .30). Items that do not correlate moderately with the total score are poor candidates for exploratory factor analysis (Floyd & Widaman, 1995).

6. Diagonals of the anti-image correlation matrix (a matrix of the negatives of the partial correlation coefficients) were assessed. Variables with diagonal anti-image correlations ≤ .60 are inappropriate for exploratory factor analysis because they lack sufficient correlation with other variables.

7. The squared multiple correlation (SMC) of each variable with the remaining variables was assessed. Items with an SMC ≤ .40 are not ideal for exploratory factor analysis (although this criterion is no longer widely applied).

8. The *Kaiser-Meyer-Olkin* measure of sampling adequacy (KMO; Kaiser, Meyer, & Olkin, 1974) was calculated. The KMO accounts for the relationship of partial

correlations to the sum of squared correlations, thereby indicating the extent to which a correlation matrix actually contains factors rather than simply chance correlations between a small subset of variables. A value of 0.60 indicates that there is minimally sufficient common variance among variables for exploratory factor analysis. Values above .80 are considered good, and values above .90 are considered excellent (Kaiser et al., 1974).

9. Finally, *Bartlett's test of sphericity* (Bartlett, 1950) was computed. A statistically significant value indicates that the correlation matrix is not an identity matrix (i.e., a correlation matrix in which all of the diagonal elements are 1 and all of the off-diagonal elements are 0, thus indicating no correlation between variables).

Exploratory factor analysis. Following preliminary item analyses, two exploratory factor analyses (EFAs) with the first two Study 1 subsamples (EFA #1 and EFA #2) were undertaken using IBM SPSS Statistics, version 20 (2011). The goal was to examine the factor structure of responses to the initial pool of physical attractiveness items. Undertaking two EFAs with separate, independent samples allowed for greater confidence in findings.

Following recommendations by Russell (2002) as well as procedures used by Swami and colleagues (2007) in their study of the factor structure underlying heterosexual men and women's attractiveness ratings, common factor analysis was chosen over principal components analysis (PCA). PCA is often used in attractiveness research but it is not really factor analysis; it is merely a variable reduction procedure that typically results in a small number of components accounting for the greatest amount of variance in a set of observed variables (O'Rourke et al., in press). Unlike PCA, common factor analysis assumes that covariation among observed variables (i.e.,

responses to questionnaire items) is due to the presence of one or more unobserved, latent variables (“dimensions” or “factors”) that exert causal influence on those observed variables. Common factor analysis helps identify the number and nature of these latent factors. Moreover, PCA assumes that all of the variance in a measure is due to the extracted components; in other words, it assumes no measurement error. Common factor analysis, on the other hand, assumes there is always measurement error because instruments are invariably incomplete measures of underlying constructs. It takes this measurement error into account by factoring common variance only (i.e., variance in an item shared with all other items), not common *and* error variance together, as PCA does. As a result, common factor analysis does not overestimate the precision of an instrument by inflating factor loadings, which is sometimes the case with PCA.

For these reasons, common factor analysis was considered the more suitable option for identifying the dimensions underlying gay men’s physical attractiveness judgments and for selecting the best indicators of these dimensions. The estimation method used for the common factor analysis was principal axis factoring (PAF). Although there are other methods, such as maximum likelihood estimation, PAF was preferred because it is generally robust to any violations of multivariate normality (Fabrigar et al., 1999; Russell, 2002).

Sample size. There has been much discussion in the literature about appropriate sample sizes for EFA. Several rules of thumb have been based on the ratio of items to participants, with recommendations ranging from 3:1 to 10:1 (e.g., Cattell, 1978; Costello & Osborne, 2005; Everitt, 1975; Gorsuch, 1983; Tinsley & Tinsley, 1987). Under the assumption that larger samples generally produce more stable factor structures and more closely approximate population parameters, others have

recommended minimum absolute sample sizes irrespective of the number of variables. For example, Comrey and Lee (1992) have suggested that samples of 100 are poor, 200 are fair, 300 are good, 500 are very good, and over 1,000 are excellent. Many have recommended a minimum absolute sample size of 300 (Clark &Watson, 1995; Field, 2009; Floyd & Widaman, 1995; Tabachnick and Fidell (2012).

Others have argued that rules of thumb for sample size are not appropriate because the nature and quality of the data are not considered (Fabrigar et al., 1999). According to MacCallum and colleagues (1999), larger samples become less important when data are strong: when item communalities after extraction are high (i.e., the total amount of variance of an item explained by the extracted factors is > .50); when several variables load strongly on each factor (i.e,. factor saturation); and when there are minimal cross-loading items (i.e., items loading strongly on more than one factor). By these standards, the data in the current study were strong.

Based on the general recommendations above and the quality of the data in the present study, the size of the two EFA subsamples used in this study (n = 600 each) was considered ideal even by the most conservative standards.

Number of extracted factors to retain. After initial factor extraction, several criteria were considered to determine how many factors to retain.

1. Based on the *Kaiser criterion* (Kaiser, 1960; Guttman, 1954), factors should be retained only if their eigenvalues are greater than 1.0. The eigenvalue is the sum of squared loadings on a factor; it represents the total variance in all the items explained by that factor. A factor with an eigenvalue less than 1.0 explains less variance than one item and is thus not useful in explaining the covariation between variables. With a large

set of variables, however, the Kaiser criterion usually leads to the selection of too many factors, many of which account for only trivial amounts of total variance (Fabrigar et al., 1999; Velicer & Jackson, 1990). Moreover, the criterion should technically be used only in principal components analysis (Gorsuch, 1983).

2. According to the *percent of total variance* rule, factors should be retained only if they capture at least 10% of total observed variance (O'Rourke et al., in press).

3. The *scree test* (Cattell, 1966) plots factors against eigenvalues. The plot is visually inspected to find the point at which the eigenvalues drop off substantially. The factors before this precipice should be retained. The scree test has been criticized for its subjectivity because there is sometimes no clear break between eigenvalues (Kaiser, 1970); however, studies suggest that the test provides a reasonably accurate method of identifying the number of factors to retain (Fabrigar et al., 1999).

4. *Parallel analysis* (Horn, 1965; Humphreys & Ilgen, 1969) is considered a more accurate variant of the scree test (Reise, Waller, & Comrey, 2000). In parallel analysis, eigenvalues are derived by factoring a completely random dataset comprising the same number of items and participants as the actual dataset. These eigenvalues are plotted against those derived from the actual dataset. The number of factors to retain is suggested by the point at which the eigenvalues from the actual dataset drop below the eigenvalues from the random dataset. Although parallel analysis can determine the actual eigenvalues that are beyond chance, it sometimes indicates more factors than are warranted (Buja & Eyuboglu, 1992). O'Connor (2000) thus suggests using additional procedures to trim trivial factors. Parallel analysis was attempted in this study using a script written for SPSS (O'Connor, 2000).

5. Finally, the *interpretability criterion* is perhaps the most important. According to this criterion, factors should be retained if the variables loading on them seem to

share a common substantive meaning that “makes sense” in light of what is known about the phenomenon in question (O’Rourke et al., in press). As Worthington and Whittaker (2006) write,

> In the end, researchers should retain a factor only if they can interpret it in a meaningful way no matter how solid the evidence for its retention based on the empirical criteria earlier described. EFA is ultimately a combination of empirical and subjective approaches to data analysis because the job is not complete until the solution makes sense (p. 822).

Factor rotation. The initial loadings provided by factor analysis are usually not interpretable because they do not reflect *simple structure* (Kieffer, 1998). In a simple structure, (1) most of the variables have high loadings on one factor and near-zero loadings on the other factors, and (2) each factor has high loadings for some variables, and near-zero loadings for the others (O’Rourke et al., in press). To help achieve simple structure, factors must be *rotated* along their axes in the three-dimensional variable space to maximize the loading of each variable on one of the extracted factors while minimizing the loading on all other factors. There are two types of factor rotation, orthogonal and oblique.

In *orthogonal rotation*, factors are rotated with the constraint that they be uncorrelated (i.e., axes kept at right handles to one another); the result is factors comprising items that are independent of one another. In *oblique rotation*, by contrast, factors are rotated without this constraint (i.e., axes do not have to be at right angles); the result is factors comprising items that may or may not be independent. Orthogonal rotation is favoured by many because it produces factors that are more clearly delineated from one another, resulting in a more easily interpretable factor solution (e.g., Nunnally, 1978). For this reason, it is the most common rotation method used in psychological research (Fabrigar et al., 1999). When underlying factors are correlated,

however, it is believed that oblique rotation provides a more accurate and realistic representation of the relationship between factors and is also more likely to yield simple structure (Chou & O'Rourke, 2012; Fabrigar et al., 1999).

Although the common recommendation is that orthogonal rotation should be used when theory suggests that resultant factors will be uncorrelated (e.g., $r \leq .15$) and oblique rotation should be used when factors are anticipated to be correlated (DeVellis, 2012; Tabachnick & Fidell, 2012), in practice researchers often do not know which situation to expect before doing an initial factor analysis. Fabrigar and colleagues (1999) thus suggest using oblique rotation first. If the solution indicates that factors are uncorrelated, then it is reasonable to do an orthogonal rotation and use that solution as the basis for the interpretation of underlying factor structure; if the solution indicates that factors are correlated, the oblique solution should be used for interpretation.

Finch (2006) compared the effectiveness of the two rotation methods and concluded that although both are able to uncover underlying factor structures irrespective of the correlation among factors, oblique rotation does, indeed, produce simpler structures with fewer items that have substantial loadings on more than one factor (i.e., *complex items*). The latter is particularly important in scale development because complex items are not considered "pure" exemplars of underlying factors and are thus poor candidates for inclusion in a scale (DeVellis, 2012).

Despite this finding, however, it is still possible that oblique rotations can yield too many complex items and thus an orthogonal solution is preferred. It is recognized that orthogonal rotation can sometimes lead to the selection of items that have somewhat less face validity than would be the case if an oblique rotation were used, but since it was envisioned that the scale resulting from the current study would be used to predict various outcomes (e.g., relationship satisfaction) from ratings of specific attractiveness dimensions, factorial purity was considered more important than face validity.

As will be discussed in Chapter IV, the current study attempted both rotations. Based on recommendations by Fabrigar and colleagues, the varimax method (Kaiser, 1958) was used for orthogonal rotation and the promax method (Hendrickson & White, 1964) was used for oblique rotation. Although both methods identified the same underlying factor structure, the former produced fewer complex items and was ultimately used for selection of preliminary scale items. To aid in identification and interpretation of factors, only those items with minimum loadings of .40 were considered substantively meaningful (Stevens, 1992).

Preliminary selection of scale items. Since the aim of the current study was to arrive at a concise scale that could be easily administered as part of a battery of other instruments, selection of about five items per factor was deemed most appropriate. Although a minimum of three items per factor is recommended to reliably represent an underlying factor, five or more items with strong loadings are considered ideal (Costello & Osborne, 2005; O'Rourke et al., in press).

Selection of items was guided by four criteria. First, items should exhibit fairly strong factor loadings across both EFA solutions (i.e., minimum loading of .45, which corresponds to 20% shared variance between the item and its respective factor). Second, within both EFAs, items should have minimal cross-loadings (≤ .40) on other factors; cross-loading items are influenced by more than one factor and are thus not pure exemplars of any factor (Costello & Osborne, 2005; Shultz & Whitney, 2005; Worthington & Whittaker, 2006). Third, items should reflect broad coverage of each factor[13], with minimal redundancy or exclusive focus on one body feature/region. Finally,

[13] To ensure broad coverage of factors, it was considered acceptable to select some items with relatively moderate loadings rather than only items with the highest loadings (Clark & Watson, 1995). In all cases, however, loadings were required to be above the minimum threshold of .45.

items should be chosen if existing theory or research suggests that they are especially important to gay men.

Confirmatory factor analysis. Once a preliminary scale was selected, the factor structure of responses to that scale was verified using confirmatory factor analysis (CFA). Unlike EFA, which seeks to identify the underlying factor structure of a construct, CFA tests the validity of that factor structure by examining whether observed data fit a hypothesized model. Ideally, CFA is conducted on a separate sample (i.e., not the same sample used to conduct EFA).

Preliminary item analyses. As with EFA, items were examined to ensure their means were greater than their standard deviations; that they exhibited a broad distribution of responses; that they were not substantially skewed or kurtotic (although, like EFA, CFA is robust against non-normal data; Russell, 2002); and that they exhibited sufficient linear relationship with other items.

Sample size. The statistical procedures used in CFA assume that data are drawn from large samples in the population. Generally, CFA requires minimum sample sizes of around 200 (Kline, 2005; O'Rourke et al., in press); smaller samples usually lack sufficient power to identify statistically significant relationships between items and their respective factors, as well as between factors themselves. In this study, the CFA sample sizes (n = 624 each) were sufficient for testing the factor structure of a proposed scale with as few as five items (df = 15; MacCallum, Browne, & Sugawara, 1996).

Computation of* a priori *models. Two *a priori* models were calculated using the two separate CFA samples (*n* = 624 each). The models were hierarchical in nature: Individual attractiveness items were constrained to load on their respective factors as identified previously by EFA (no loadings across factors were permitted), and each of these factors was in turned mapped onto a higher-order latent Attractiveness factor. Because latent factors are unobserved, they have no definite metric scale (Byrne, 2009). Therefore, one observed variable within each factor was constrained to 1.0. This was typically the item that was considered the least conceptually important for the factor or that was quite similar to another item in the factor. One first-order factor was also scaled to 1.0. To provide evidence for replicability and thus increased confidence in study findings, two CFA models were computed using two separate, independent samples. IBM SPSS Amos, version 19.0 (Arbuckle, 2010), was used to calculate CFA models.

Model fit. The CFA models were first examined to ensure that all items loaded significantly on their respective factors. Modification indices were consulted to ensure that no items loaded across factors (i.e., no complex items). Individual parameter estimates were inspected to ensure that none was of unreasonable magnitude (e.g., factor loading > 1.0) or direction (e.g., negative variance), and that standard errors for items within factors were not substantially larger relative to others within the same factor (Lei & Wu, 2007). This helped verify that solutions were not improper.

Next, fit indices were calculated to evaluate the fit of the model to data. There are a multitude of fit indices, with no universally accepted standard. It is customary, however, to report several statistics (Goffin, 1993). Historically, the most commonly used fit index is the *chi-square (χ^2) goodness-of-fit statistic* or *likelihood ratio*. It tests the null hypothesis that there is no difference between the actual covariance matrix and the

estimated covariance matrix based upon the model; that is, that the model fits perfectly in the population from which data are derived (MacCallum, Browne, & Sugarawa, 1996). Ideally, values should be non-significant, suggesting that the model fits the data perfectly. This criterion, however, is rarely met: As a result of sample-size sensitivity, small differences emerge as statistically significant with large samples (Bentler & Bonnet, 1980; Jöreskog & Sörbom, 1993). Moreover, the chi-square test may produce misleading results when data are not normally distributed (Russell, 2002). For these reasons, additional measures of model fit that are not adversely affected by sample size or non-normal data have been developed. Kline (2005) recommends using the following three fit indices in addition to the chi-square test.

The *Comparative Fit Index* (CFI) is the statistic of choice for assessing covariance models (Bentler, 1990). The CFI compares the fit of the hypothesized model to the fit of a model in which the variables are assumed to be uncorrelated (the null model). Specifically, the CFI is the ratio of the discrepancy of the hypothesized model to the discrepancy of the null model. Values range from 0 to 1, with a larger values indicating better model fit (i.e., the hypothesized model is better than the null model). Values of 0.90 or greater suggest acceptable model fit whereas values above .94 suggest good model fit (Hu & Bentler, 1999). A benefit of the CFI is that it adjusts for degrees of freedom and thus penalizes for model complexity; in other words, it favours parsimonious models.

The *Root Mean Square Error of Approximation* (RMSEA; Steiger & Lind, 1980) is another commonly reported fit index (Kenny, 2011). It reflects the size of the residuals that result when using the hypothesized model to explain the data. Values range from 0 to 1, with smaller values suggesting better model fit. Values of .05 and .08 correspond to good and mediocre model fit, respectively (Hu & Bentler, 1999; MacCallum et al.,

1996). Like the CFI, the RMSEA penalizes for model complexity. Another advantage is that a full 90% confidence interval can be computed around its value (MacCallum et al., 1996), thus providing information about the precision of the RMSEA estimate. Ideally, the lower limit of the RMSEA should be close to 0 and the upper limit should be .05 or less (Byrne, 2010); however, Hu and Bentler (1999) suggest that an upper limit .06 is acceptable, and Browne and Cudeck (1993) suggest that .08 is reasonable.

The *Standardized Root Mean Square Residual* (SRMR; Bentler, 1995; Jöreskog & Sörbom, 1996) is the standardized difference between the sample covariance matrix and the predicted covariance matrix. Values of .05 or lower indicate minimal discrepancy and thus good model fit (Byrne, 2009; Diamantopoulos & Siguaw, 2000), although values between .06 and .08 are deemed acceptable (Hu & Bentler, 1999). Unlike the CFI and RMSEA, the SRMR does not penalize for model complexity.

After examination of fit indices, modification indices (MIs) were requested to determine whether model fit could be improved by specifying correlations between error terms. These correlations suggest that the observed covariation between indicator variables has not been adequately explained by the factors postulated in the original model. The correlations may reflect a hidden factor or, more commonly, redundancy in item content, similar item wording, or common method variance, such as the use of the same Likert-type scale for all items (Byrne, 2009; Gerbing & Anderson, 1984). As per recommendations by Byrne (2010) and Jöreskog and Sörbom (1993), corrections were made only if they made substantive sense (i.e., corrections were not made for pairs of error terms belonging to conceptually unrelated variables) and only if they did not substantially alter structural parameter estimates. To maintain the independence of factors, I avoided making corrections for error terms originating from items in different

factors. Finally, to maintain model parsimony, correction was made only for correlated error terms that the MIs suggested would lead to substantially improved model fit (i.e., statistically significant increases in χ^2), and only up to the point that model fit statistics indicated good fit (i.e., no attempt was made to achieve perfect model fit). As MacCallum and colleagues (1996) warn, "When an initial model fits well, it is probably unwise to modify it to achieve even better fit because modifications may simply be fitting small idiosyncratic characteristics of the sample" (p. 501). In addition, corrections were favoured for correlated error terms that were present across both CFA subsamples. To demonstrate the degree of improvement in model fit after correction for correlated error terms, fit statistics were reported both before and after model respecifications (Byrne, 2009).

Invariance analysis. After final adjustment to the two CFA models, they were compared by way of invariance analysis (Byrne, 2009). The purpose of this comparison was to provide additional evidence for the validity of the model by demonstrating good fit to data across two independent samples.

Invariance analysis involves two steps. First, CFA models are compared to determine whether their overall factor structures are invariant, or equivalent—in other words, whether the same hierarchical latent structure of responses is viable across two CFA samples/groups. This type of invariance is called *configural* invariance (Horn, McArdle, & Mason, 1983). Next, the pattern of factor loadings—the strength of association between items and their respective factors, as well as between higher- and lower-order factors—was assessed to determine their equivalence across both CFA

samples. This type of invariance is called *metric invariance* (Bollen, 1878; Jöreskog & Sörbom, 1999) and entails, in effect, assessment of reliability of item responses.

To make these comparisons, the two CFA models were first estimated independently, then simultaneously, and a chi-square goodness-of-fit statistic (indicating model fit across both CFA samples) was reported; this statistic was the baseline value against which all subsequent comparisons were made. Next, the values of corresponding paths between models were fixed in a succession of steps. With the addition of each successive constraint, a change in the chi-square value and degrees of freedom were calculated. A comparative difference between specific components of the CFA models was demonstrated by statistically significant changes in chi-square values after constraining a given pair of corresponding paths. In other words, if a path was constrained to be identical between models but the data did not conform to this constraint, a decrease in model fit (i.e., an increase in chi-square) would be observed. Because the chi-square test may be biased with larger samples or more complex models (Cheung & Rensvold, 2002), change in model fit associated with each successive pairing of path coefficients was also examined using the CFI, RMSEA, and SRMR goodness-of-fit indices. Negligible changes in these indices were indicative of nonsubstantial model change (e.g., CFI ≤ .01; Cheung & Rensvold, 2002; Smolenski, Diamond, Ross, & Rosser, 2010; Wu, Li, & Zumbo, 2007).

Analysis of psychometric properties. After confirming the factor structure underlying responses to the attractiveness instrument, its psychometric properties were assessed using the fifth, independent subsample (n = 325). The means, standard deviations, skewness, and kurtosis of the total scale score as well as subscale scores were examined. Correlations between total/subscale scores and

demographic characteristics (age, ethnicity, geographic region, gender identity, preferred sexual position, community involvement, self-rated attractiveness, and impression management) were also examined.

Reliability was estimated by calculating three measures of the internal consistency of full scale and subscale responses (i.e., the overall extent to which scale and subscale items are intercorrelated and thus provide a consistent measure of the underlying factor). The *average inter-item correlation* (IIC) compares correlations between all pairs of items measuring the same factor by calculating the mean of all paired correlations. For measures of broad, higher-order constructs (e.g., general attractiveness), an IIC between .15-.20 is desirable; for narrower constructs (e.g., specific attractiveness dimensions), values between .15-.50 are desirable (Clark & Watson, 1995). It is recommended that individual inter-item correlations within each subscale be greater than .30; low inter-correlations suggest that a subscale may not be unidimensional (Clark & Watson, 1995). Individual inter-item correlations should not, however, be higher than .80-.85, as this may suggest item redundancy (Netemeyer, Bearden, & Sharma, 2003; Nunnally & Bernstein, 1994). The *average item-total correlation* (IT_{avg}) takes the sum of scores on a scale/subscale, computes the correlation between each item and this sum, and then finds the average of these correlations; desirable values are the same as those for IIC (Clark & Watson, 1995). Finally, *Cronbach's alpha* (α) is based on the split-half reliability coefficient which is derived by randomly dividing full scale/subscale items into two sets and then calculating the correlation coefficient between the two halves; alpha is an equivalent to the average of all possible split-half coefficients. Alpha coefficients between .70 and .80 indicate adequate internal consistency, whereas coefficients between .80 and .90 indicate good internal consistency (DeVellis, 2012; Nunnally & Bernstein, 1994). Coefficients above

.90, however, may suggest item redundancy and a scale/subscale that is likely too narrow in content (Clark & Watson, 1995).

The psychometric properties of responses to individual items were also examined, including the *corrected item-total correlation* (ITC) and the *squared multiple correlation* (SMC). ITC measures the content saturation of an item; the higher the ITC, the more discriminating the item relative to the target factor. The minimum ITC should be .30 (Nunnally & Bernstein, 1994; DeVellis, 2012); items with lower ITCs were targeted for review. The SMC is the correlation between a particular item and a linear composite of the remaining items in its respective subscale; values greater or equal to .50 are ideal (Nunnally & Bernstein, 1994). Items were also inspected to determine whether their removal would decrease alpha.

Test-retest reliability. To assess temporal stability of full scale and subscale scores, respondents who provided email addresses during the first wave of the study (n = 2,185) were asked to complete the briefer, 20-item attractiveness instrument. In addition, to help assess validity of demographic data reported at Time 1, respondents were asked for the same demographic information (e.g., date of birth) a second time.

The first request for test-retest data was sent mid-December, 2010, four months after initial data collection. To maximize the response rate, two subsequent reminders were sent, one in mid-January 2011 and another in mid-February. In total, 1,200 participants provided test-retest data. Fifteen questionnaires were discarded because they were incomplete (≥ 50% responses missing) or duplicates. Of the 1,185 total useable responses, 416 were from men under 50 years of age; this comprised the test-

retest sample for Study 1[14]. There were no statistically significant differences between participants who provided test-retest data and those who did not.

Before calculating test-retest reliability, full scale and subscale scores were screened for unusually large differences in scores between Time 1 and Time 2. Differences were considered to be outliers if they were between 1.5 times and 3 times the interquartile range (IQR) below the first quartile or above the third quartile. After removal of outliers (exact numbers reported in next chapter), the Pearson correlation between full scale/subscale scores at Time 1 and Time 2 was calculated[15]. A test-retest correlation coefficient of $.70 \leq r \leq .90$ was desired as this suggests stability of scale responses over time (DeVellis, 2012; Nunnally & Bernstein, 1994).

Invariance analysis of Time 1 and Time 2 responses. A confirmatory factor analytic model of test-retest responses (n = 416) was computed and then compared to one of the earlier CFA models (CFA #1, n = 624) by way of invariance analysis. As opposed to assessing the temporal stability of scale responses, the purpose of this additional analysis was to assess the temporal stability of the *underlying latent structure* of scale responses as well as the pattern of factor loadings.

[14] 816 men aged 49 and under provided test-retest data; however, as part of another study, about half of these (n = 400) completed a slightly different version of the scale and were thus not included in the current test-retest sample.
[15] Time 1 scores were based on data collected from the original 258-item attractiveness questionnaire, not the briefer 20-item instrument.

Study 2: Comparing the Latent Structure of Attractiveness Judgements Between Young and Older Gay Men

To assess for equivalence between the latent structure of attractiveness judgments among young and older gay men, a CFA model of older men's responses to the 20-item attractiveness scale (*n* = 827) was computed and then compared to one of the earlier CFA models (CFA #2, *n* = 624) by way of invariance analysis.

The decision to define the older cohort based on a minimum age of 50 was justified on historical grounds. Men aged 50+ came of age in the 1960s, 1970s, and 1980s, at the height of the gay liberation movement and the AIDS crisis. As discussed in Chapter II, these events are believed to have influenced standards of male same-sex physical attractiveness (e.g., the emergence of "Clone" culture). The younger men in this sample (mean age = 31), came of age in the mid- to late-1990s, when standards of beauty had changed somewhat (e.g., preference for leaner, more defined, athletic builds as opposed to hyper-mesomorphic ones). Determining whether the underlying latent structure of attractiveness judgements differed between two groups of men who were influenced by different cultural standards of beauty would help elucidate whether there is any universal, evolution-based foundation for gay men's physical attractiveness judgements.

CHAPTER IV: DATA ANALYSIS AND RESULTS

As discussed in Chapter III, the initial sample of 3,600 respondents was divided into two groups, one group comprising men under 50 years of age (*n* = 2,773), and another comprising men 50-88 years of age (*n* = 827). The first group was used for scale development and validation (Study 1) and the second group was used to examine age-invariance of scale responses (Study 2). Study 1 participants were randomly assigned to one of five sub-samples: one for exploratory factor analysis (EFA #1, *n* = 600); one for exploratory factor analysis replication (EFA #2, *n* = 600); one for confirmatory factor analysis (CFA #1, *n* = 624); one for confirmatory factor analysis replication as well as Study 2 age invariance analysis (CFA #2, *n* = 624); and one for calculation of psychometric properties (*n* = 325). Assigning participants in this fashion provided an opportunity to replicate analyses on multiple independent samples, thus allowing for greater confidence in study findings. For clarity, results of Study 1 and Study 2 are presented in separate sections.

Missing Cases

The attractiveness data were remarkably complete. Of the entire pool of 928,000 possible data points (258 attractiveness items x 3,600 respondents), fewer than 1% were missing. The pattern of these missing responses was random. They were replaced using the mid-point of the Likert scale (3, *neither important nor unimportant*) rather than imputation so that the responses could be included in analyses but not inadvertently increase average scores for the item and thus increase its likelihood of inclusion in the final scale.

The non-response rate (i.e., > 50% data missing) for the other questionnaires was higher: 4% (*n* = 144) for the Impression Management scale; 7.2% (*n* = 258) for the

Gender Identity Scale; 7.2% (*n* = 260) for the Involvement with Gay Community Scale; and 7.7% (*n* = 278) for the demographics questionnaire. In all instances, questionnaires were skipped entirely (all questions unanswered). One hundred and forty-four people (4%) skipped all but the attractiveness questionnaire; these respondents, however, did not differ significantly from others in terms of their scores on the final attractiveness scale chosen for this study, $t(3598) = .273$, $p = .79$; completers: $M = 67.86$, $SD = 11.79$; non-completers: $M = 67.59$, $SD = 11.52$. In other words, discontinuation was not due to the scale content itself; rather, respondents probably did not have enough time to complete the rest of the questionnaires.

The missing response rate for completed questionnaires (other than the attractiveness questionnaire) was less than 1%. Missing responses to these scale items were imputed using PRELIS 2 (Jöreskog & Sörbom, 1996). The exceptions were the Impression Management scale, for which missing responses were substituted with the (neutral) mid-point of the Likert scale (3). For birthdates, respondents who specified only year of birth but not month or day were assigned a birthdate of June 1 (the middle of the year).

Validity Checks

Validity checks on the entire working sample of 3,600 suggested that respondents were forthright in their responses to study questionnaires.

Expected response patterns. Responses to validity items pertaining to visible nose and ears hair both received high mean ratings, suggesting that respondents did, indeed, attend to question wording and were not responding randomly.

Consistency of demographic information. 1,185 respondents completed a test-retest questionnaire four to six months after the initial questionnaire (details to be described later). This questionnaire asked respondents for some of the same demographic information they provided during the first wave of data collection. Correspondence between these responses suggested participants' honesty in divulging personal demographic information (age, location), in turn suggesting the validity of responses to the other questionnaire items as well.

Of those respondents who reported their country of residence at Time 2 (n = 1,045), only 23 (2.2%) listed a country that did not match the country indicated by their IP address at Time 1. Given that the first questionnaire was completed during the summer holiday season, these discrepancies can be attributed to holiday travel or seasonal employment.

Of the respondents who indicated their date of birth at both Time 1 and Time 2 (n = 1,023), less than 1% reported a different date of birth. Where differences were noted, they were usually on the order of one or two months, suggesting that respondents were trying to protect their privacy by slightly fabricating their dates of birth (note that the demographics questionnaire asked for complete dates of birth, not simply ages).

Study 1: Scale Development and Validation

Preliminary item analyses. All items had mean values greater than their standard deviations. Responses to most items were broadly distributed across the five points of the response scale. Responses did not demonstrate excessive skewness (> |2.8|) or kurtosis (> |2.8|). A spot check of pairs of variables revealed few curvilinear relationships; even for pairs expected to be the worst-performing, such as *overall facial appearance* (with strong negative skew) and *presence/absence of chin cleft* (with strong

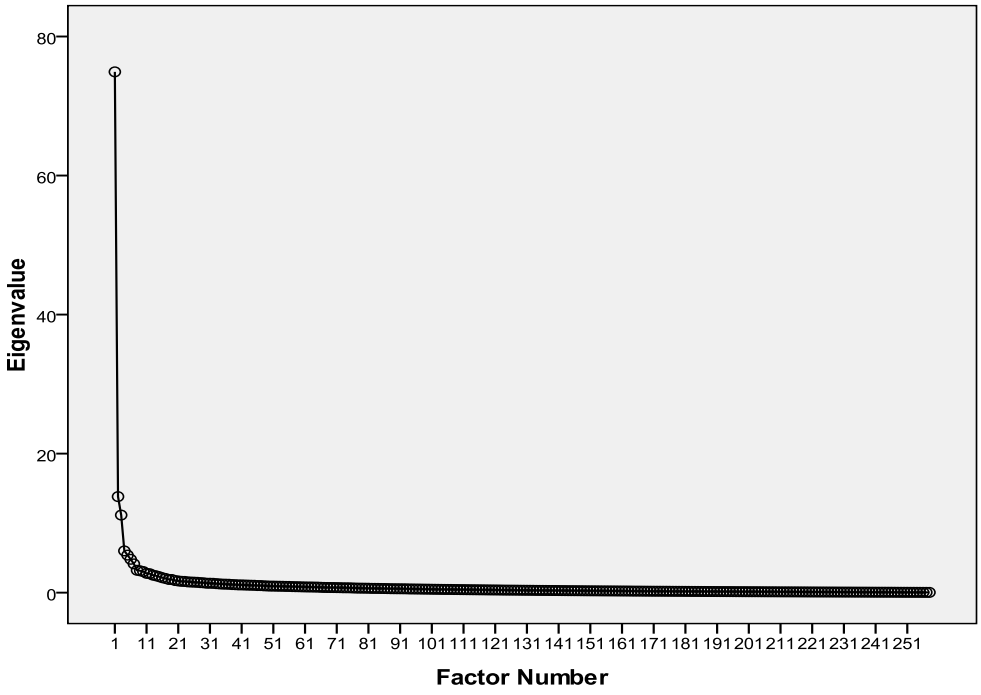
positive skew), a linear line fit the data better than a quadratic line. All items correlated at least moderately with the total attractiveness score (item-total correlation ≥ .30), except for the race/ethnicity item (ITC = .19) and the skin colour item (ITC = .27). The square multiple correlation (SMC) could not be assessed for the items because the determinant of the covariance matrix was zero or approximately zero, indicating some multicollinearity/singularity and thus item redundancy. On the basis of these initial results, all items were retained for further analyses. Appendix "I" lists descriptive statistics for all items.

Exploratory factor analysis. Exploratory factor analysis was performed on the first randomly assigned grouping of participants (EFA #1, n = 600). The Kaiser-Meyer-Olkin measure of sampling adequacy was large (KMO = .96), indicating a high degree of common variance among variables to be factor analyzed. Bartlett's test of sphericity was statistically significant, $\chi^2(33153, N = 600) = 135094.245$, $p < .01$, indicating that the correlation matrix was not an identity matrix.

Factor extraction and rotation. Because it was not known *a priori* whether factors would be correlated, exploratory factor analysis using principal axis factoring and promax (oblique) rotation was first conducted. Based on inspection of the scree plot and interpretability of factors, a 4-factor solution was tested. However, correlations between factors ranged from r = .05 to r = .64 and several items loaded across factors. A factor analysis with varimax (orthogonal) rotation was therefore considered more appropriate because this approach tends to minimize cross-loading items and identify "purer" indicators of latent constructs.

Results from this second EFA indicated 47 factors with eigenvalues > 1.0, which is not viable. Parallel analysis suggested an equally untenable 18-factor solution (18 factors had eigenvalues which exceeded their counterparts from a random dataset). In contrast, a 1-factor solution was the most viable according to the "percent of total variance" rule, since only the first factor accounted for more than 10% of variance (29.04%). Examination of the scree plot (Figure 4.1) revealed that eigenvalues leveled off after the fourth or fifth factors, suggesting a more viable 4- or 5-factor solution.

Figure 4.1: Scree plot (EFA #1)



Given the results of the scree test, 4- and 5-factor solutions were tested in the next round of factor analysis. The 4-factor solution was tested first. In this solution, the first factor accounted for 14.29% of total variance, and the second, third, and fourth factors explained 10.78%, 8.14%, and 6.95% of total variance, respectively. In total, the four factors accounted for 40.16% of total variance.

The 5-factor solution was tested next. The first factor accounted for 13.89% of total variance, and the second, third, and fourth factors accounted for 10.31%, 7.24%, and 6.84% of total variance, respectively. The fifth factor, however, explained a comparatively trivial amount of variance (3.77%) and comprised only eight items, each with comparatively low factor loadings (i.e., no items with loadings over .50). It was decided, therefore, that retaining the 4-factor solution was most appropriate at this juncture.

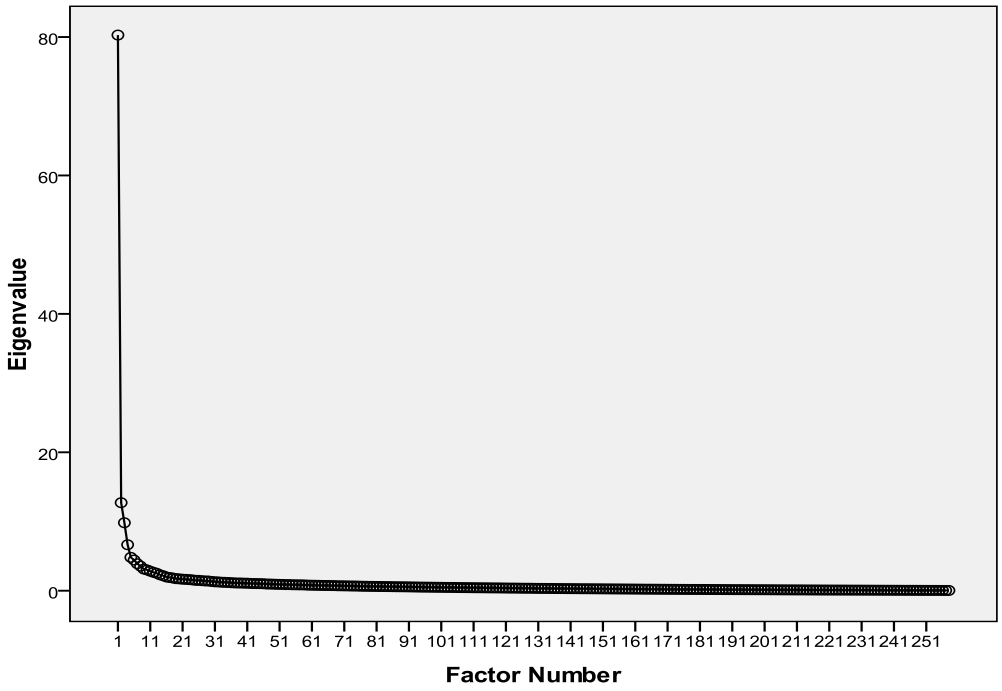
Examination of factor loadings and interpretation of item content confirmed the suitability of the 4-factor solution; each factor appeared to represent a conceptually distinct dimension of static physical attractiveness. Of note, these same four factors emerged using both oblique and orthogonal rotation. These factors were not labeled until examination of results from the second exploratory factor analysis, discussed next.

Exploratory factor analysis: Replication. Exploratory factor analysis was conducted a second time using a separate, independent sample (EFA # 2, n = 600). The Kaiser-Meyer-Olkin measure of sampling adequacy was once again large (KMO=.96), indicating a high degree of common variance among variables to be factor analyzed. Bartlett's test of sphericity was statistically significant, $\chi^2(33153, N = 600) = 136552.15$, $p < .01$.

Factor extraction and rotation. EFA with principal axis factoring and promax (oblique) rotation was conducted first. Based on inspection of the scree plot and interpretability of factors, a 4-factor solution was tested; however, because correlations between factors ranged from r = .11 to r = .66 and because several items loaded across factors, a factor analysis with varimax (orthogonal) rotation was once again considered more appropriate for scale development.

Results from this factor analysis suggested a 46-factor solution (46 factors with eigenvalues > 1.0). Results from parallel analysis once again suggested an 18-factor solution. In contrast, a 1-factor solution was the most viable according to the "percent of total variance" rule, since only the first factor accounted for more than 10% of total variance (31.18%). Examination of the scree plot (Figure 4.2) once again revealed that eigenvalues leveled off after the fourth or fifth factors, suggesting a more viable 4- or 5-factor solution.

Figure 4.2: Scree plot (EFA #2)



Given the results of the scree test, 4- and 5-factor solutions were tested. The 4-factor solution was tested first. The first factor accounted for 14.47% of total variance, and the second, third, and fourth factors explained 11.33%, 8.51%, and 7.26% of total variance, respectively. In total, the four factors accounted for 41.56% of total variance.

The 5-factor solution was tested next. The first factor accounted for 13.62% of total variance, and the second, third, and fourth factors accounted for 11.27%, 8.42%, and 7.42% of total variance, respectively. The fifth factor, however, explained a comparatively trivial amount of variance (2.51%) and comprised seven items, only one of which had a factor loading greater than .50. The meaning of the factor was also difficult to interpret. It was decided, therefore, that retaining the 4-factor solution was once again most appropriate. Inspection of factor loadings and item content confirmed the suitability of the 4-factor solution; each of the factors appeared to represent a distinct dimension of static physical attractiveness. As with the first EFA, it is noteworthy that these same four factors emerged using both oblique and orthogonal rotation.

Summary of findings from both EFAs and labeling of factors. Across two independent EFA subsamples, the same number of factors emerged and each accounted for virtually the same amount of total variance. In light of issues raised in the previous chapter concerning the appropriate sample size for EFA, it is also worth noting that the same 4-factor structure (along with percentages of variance accounted for) emerged during an earlier trial EFA using the *entire* sample of men under 50 (n = 2,773). Also of note was the similarity of factor loadings across both EFA samples: In many cases, loadings were nearly identical. These remarkable similarities provide strong support for the viability of the 4-factor solution identified thus far.

Table 4.1 lists items with similarly high loadings across both EFA samples, listed in order of highest to lowest average factor loading across both EFA samples. Loadings greater than .50 on the first three factors, or greater than .40 on the Intimate Regions factor, were considered high (the threshold was lowered for Intimate Regions because the loadings on this factor were generally lower than for the other three). Items with

cross-loadings of .40 or higher on any other factors in either of the EFA samples (i.e., complex items) were excluded from this list because they were not deemed “pure” exemplars of their respective factors and would not, therefore, be useful for inclusion in the final scale.

The meaning of the four factors was interpreted after inspecting the pattern of factor loadings and item content for each. In order of variance accounted for (average across both EFAs), the four factors were labeled as follows: *Facial Attractiveness* (14.38%); *Muscularity/Body Shape* (11.06%); *Body Fat/Overall Appearance* (7.73%); and *Intimate Regions* (7.70%). The fourth factor was labeled as such because it appeared to reflect a combination of genitalia, hair on the lower body, and other intimate regions.

Table 4.1: Items exhibiting high factor loadings across both exploratory factor analyses

Factor 1: Facial Attractiveness			
Item	**EFA1**	**EFA2**	**Average**
Overall appearance of forehead	.686	.663	.675
Overall size of forehead	.703	.642	.673
Shape of head	.651	.674	.663
Size of head	.642	.670	.656
Overall appearance of eyelids	.711	.584	.648
Shape of face	.614	.652	.633
Overall appearance of cheeks	.612	.652	.632
Length of chin	.630	.632	.631
Size of eyebrows	.640	.621	.631
Size of teeth	.680	.578	.629
Size of ears	.632	.621	.627
Shape of chin	.615	.637	.626
Shape of ears	.643	.607	.625
Vertical length of forehead	.665	.565	.615
Amount forehead lines/creases	.569	.648	.609
Size of nose	.627	.588	.608
Tooth-to-gum ratio	.607	.601	.604
Width of lips	.628	.574	.601
Facial skin texture	.579	.616	.598
Length of neck/throat	.616	.570	.593
Shape of nose	.600	.582	.591
Prominence of browline	.578	.603	.591
Usual colour of cheeks	.579	.592	.586
Overall height/fullness of lips	.617	.550	.584
Shape of teeth	.604	.555	.580
Overall appearance of eyelashes	.640	.514	.577
Size of eyes	.587	.555	.571
Prominence of cheekbones	.531	.608	.570
Overall shape of lips	.575	.558	.567
Size of chin	.531	.598	.565
Uniformity of facial colouration	.552	.571	.562
Clarity of whites of eyes	.569	.538	.554
Presence/absence of facial scars	.525	.576	.551
Prominence of facial features	.531	.566	.549

Factor 2: Muscularity/Body Shape			
Item	**EFA1**	**EFA2**	**Average**
Size of upper back	.734	.700	.717
Shape of upper back	.708	.709	.709
Overall appearance of upper back	.716	.688	.702
Muscularity of lower arms/forearms	.681	.720	.701
Muscularity of arms overall	.731	.669	.700
Overall muscularity of lower back	.636	.702	.669
Width of upper arms	.678	.653	.666
Muscularity of upper legs/thighs	.628	.692	.660
Overall appearance of lower arms	.641	.670	.656
Muscularity of lower legs/calves	.620	.689	.655
Muscularity of shoulders	.650	.628	.639
Overall appearance of shoulders	.649	.610	.630
Size of upper back rel to lower back	.645	.609	.627
Overall appearance of lower back	.634	.610	.622
Overall shape upper of legs/thighs	.561	.670	.616
Overall shape of lower legs/calves	.539	.668	.604
Overall shape of lower arms	.588	.613	.601
Muscularity of lower body	.558	.641	.600
Overall appearance lower legs/calves	.555	.625	.590
Width of lower arms/forearms	.562	.599	.581

Factor 3: Body Fat/Overall Appearance			
Item	**EFA1**	**EFA2**	**Average**
Overall body fat	.713	.689	.701
Amount of visible body fat	.706	.696	.701
Overall weight	.711	.651	.681
Fatness/leanness of waist	.662	.639	.651
How much belly sticks out	.665	.618	.642
Appearance of body overall	.635	.646	.641
Fatness/leanness of upper body	.603	.660	.632
Overall size of waist	.628	.629	.629
Overall shape entire body, excl. head	.590	.586	.588
Overall body build	.561	.600	.581
Overall shape of waist	.544	.612	.578
Overall shape entire body, incl. head	.543	.606	.575
Overall appearance of waist	.538	.582	.560
Overall healthy body appearance	.584	.534	.559

Factor 4: Intimate Regions			
Item	**EFA1**	**EFA2**	**Average**
Presence/absence of hair on taint	.708	.713	.711
Overall appearance of testicles	.612	.676	.644
Presence/absence of hair on buttocks	.622	.649	.636
How testicles hang	.598	.634	.616
Size of testicles	.580	.645	.613
Presence/absence of hair around anus	.597	.626	.612
Presence/absence of hair on scrotum	.585	.582	.584
Overall appearance of anus	.586	.580	.583
Overall appearance of scrotum	.522	.634	.578
Presence/absence of hair on feet	.619	.531	.575
Pres/abs of hair on upper legs/thighs	.607	.506	.557
Presence/absence of pubic hair	.534	.570	.552
Presence/absence of abdominal hair	.559	.533	.546
Presence/absence of underarm hair	.580	.488	.534
Length of penis, flaccid	.522	.523	.523
Presence/absence of hair on hands	.584	.455	.520
Overall appearance of armpits	.543	.462	.503
Pres/abs of hair on lower legs/calves	.552	.446	.499
Length of tongue	.476	.499	.488
Presence/absence of hair on forearms	.533	.424	.479
Size of feet	.512	.443	.478
Presence/absence of chest hair	.458	.457	.458
Presence/absence of body hair	.463	.444	.454
Penis girth	.427	.474	.451
Presence/absence of penis foreskin	.454	.445	.450

Preliminary selection of attractiveness scale items. Table 4.2 lists the items tentatively identified for inclusion in the attractiveness scale. They were chosen based on the results of the two independent EFA solutions. These items all had fairly high factor loadings (minimum mean loading of .45 or higher across both EFAs) and did not load highly on other factors (i.e., cross-loadings ≥ .40). They also reflected broad coverage of each factor, with minimal redundancy or exclusive focus on any one body feature/region. Some of the items were selected because existing literature suggested

they were particularly important for gay men. In keeping with the goal of developing a concise measure of male-to-male attractiveness, 20 items were chosen. Although the aim was to have about five items per factor (to maximize factorial stability; Costello & Osborne, 2005; O'Rourke et al., in press), six items were chosen for the last factor (Intimate Regions) to ensure adequate reliability.

Table 4.2: Items tentatively chosen for physical attractiveness scale

Factor	Item	Loading
Facial Attractiveness	Shape of face	.633
	Prominence of facial features	.549
	Length of chin	.631
	Facial skin texture	.598
	Overall appearance of cheeks	.632
Muscularity/Body Shape	Muscularity of arms overall	.700
	Muscularity of upper legs/thighs	.660
	Overall appearance of upper back	.702
	Size of upper back relative to size of lower back	.627
Body Fat/Overall Appearance	Appearance of body overall	.641
	Overall weight	.681
	Leanness/fatness of waist/stomach/abdomen	.651
	Overall body build	.581
	Overall body fat	.701
Intimate Regions	Penis girth	.451
	Presence/absence of hair on buttocks	.636
	Presence/absence of abdominal hair	.546
	Length of penis, flaccid	.523
	Size of feet	.478
	Overall appearance of testicles	.644

Note: Loading = average loading across EFA samples.

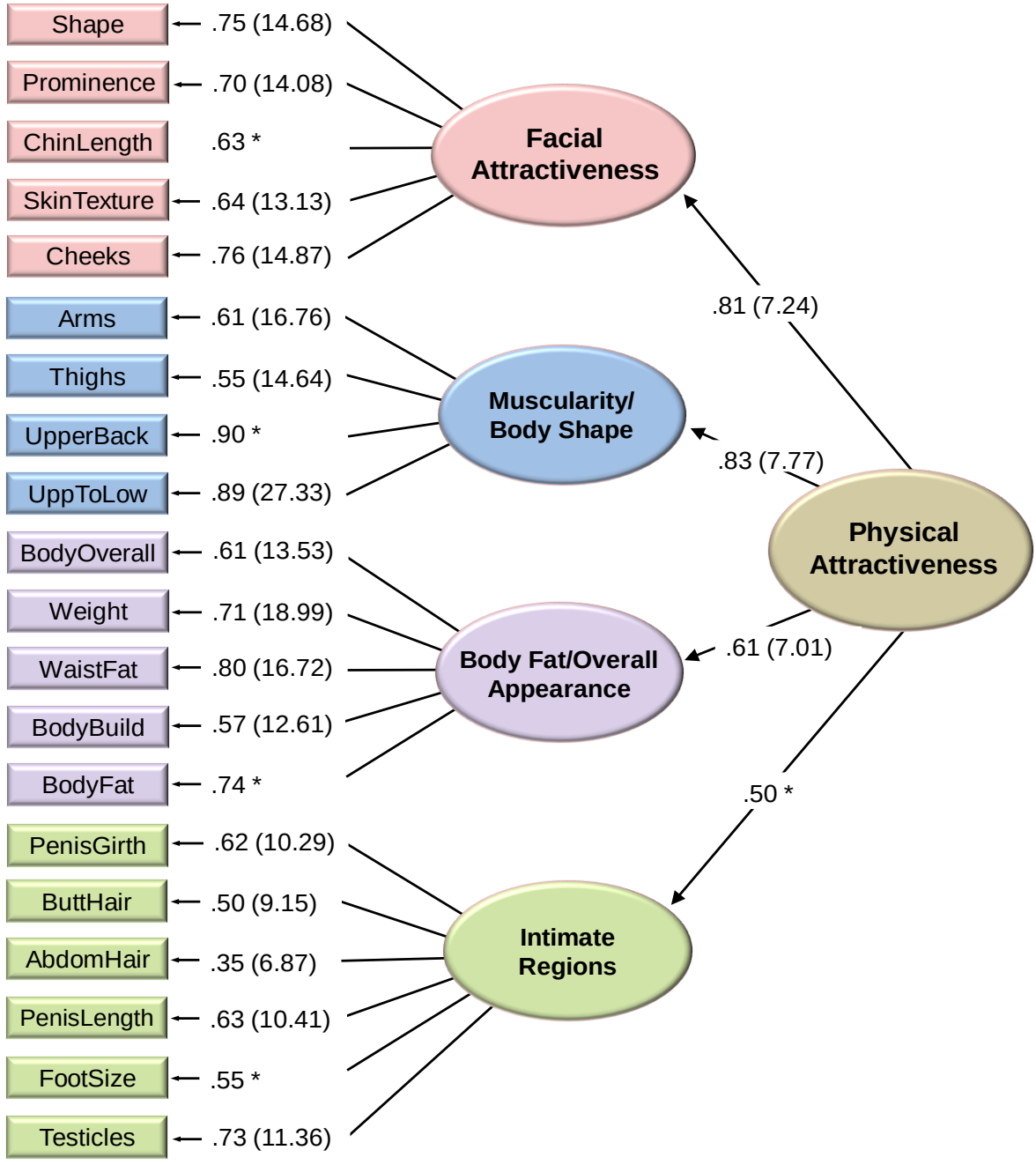
Confirmatory factor analysis. A confirmatory factor analytic (CFA) model was computed using the third independent subsample (CFA #1, n = 624). As evident from Figure 4.3, all items loaded significantly on their respective factors (i.e., t values ≥ 1.96), and modification indices revealed no items that loaded across factors (i.e., no complex items). Standardized loadings for all items were over the minimum threshold of .30, and most were in the moderate to high range, indicating stable factors. Moreover, all four factors contributed significantly to measurement of a higher-order latent attractiveness construct, thus providing strong evidence for the viability of the hierarchical, 4-factor structure of attractiveness previously identified using EFA.

Results suggested that the initial model approximated an acceptable, though not optimal, fit to the data (χ^2[df =166] = 613.76, p < .01). Although the Comparative Fit Index was within optimal range (i.e., CFI ≥ .95; CFI = .96), the Standardized Root Mean Residual was only within acceptable range (i.e., SRMR ≤ .08; SRMR = .062), as was the Root Mean Square Error of Approximation (i.e., RMSEA ≤ .08; RMSEA = .066) and the full 90% confidence interval for the RMSEA (i.e., .060 < RMSEA CL_{90}< .071). Although fit was not optimal, it was still good for an initial model with no post-hoc modifications.

To improve model fit, correction was made for correlated error between 7 out of 190 possible item pairs. Most of these correlated errors were for conceptually similar items within factors (e.g., *overall weight* and *overall body fat*). Some of the correlated errors were between the Body Fat/Overall Appearance factor and items that included the descriptor “overall” (i.e., common wording). Parameter estimates from the revised and unrevised models were highly correlated (r = .99), indicating that correction for correlated error terms had only a negligible effect on the estimation of individual parameters. The revised CFA model indicated good fit of data (χ^2[df =159] = 370.31, p < .01). The Comparative Fit Index was within optimal parameters (i.e., CFI ≥ .95; CFI = .96) as was

the Standardized Root Mean Residual (i.e., SRMR ≤ .05; SRMR = .050) and the Root Mean Square Error of Approximation (i.e., RMSEA ≤ .05; RMSEA = .046). Also of note, the full 90% confidence interval for the RMSEA was within ideal range (i.e., .040 < RMSEA CL_{90}< .052).

Figure 4.3: Confirmatory factor analytic model



Note: Parameters expressed as maximum likelihood estimates (standardized solution). Numbers in parentheses indicate *t* values for parameter estimates (statistically significant *t* values > | 1.96 |). Asterisks (*) denote parameters initially fixed to 1.0 for scaling and statistical identification, thus significance levels could not be computed for these five items.

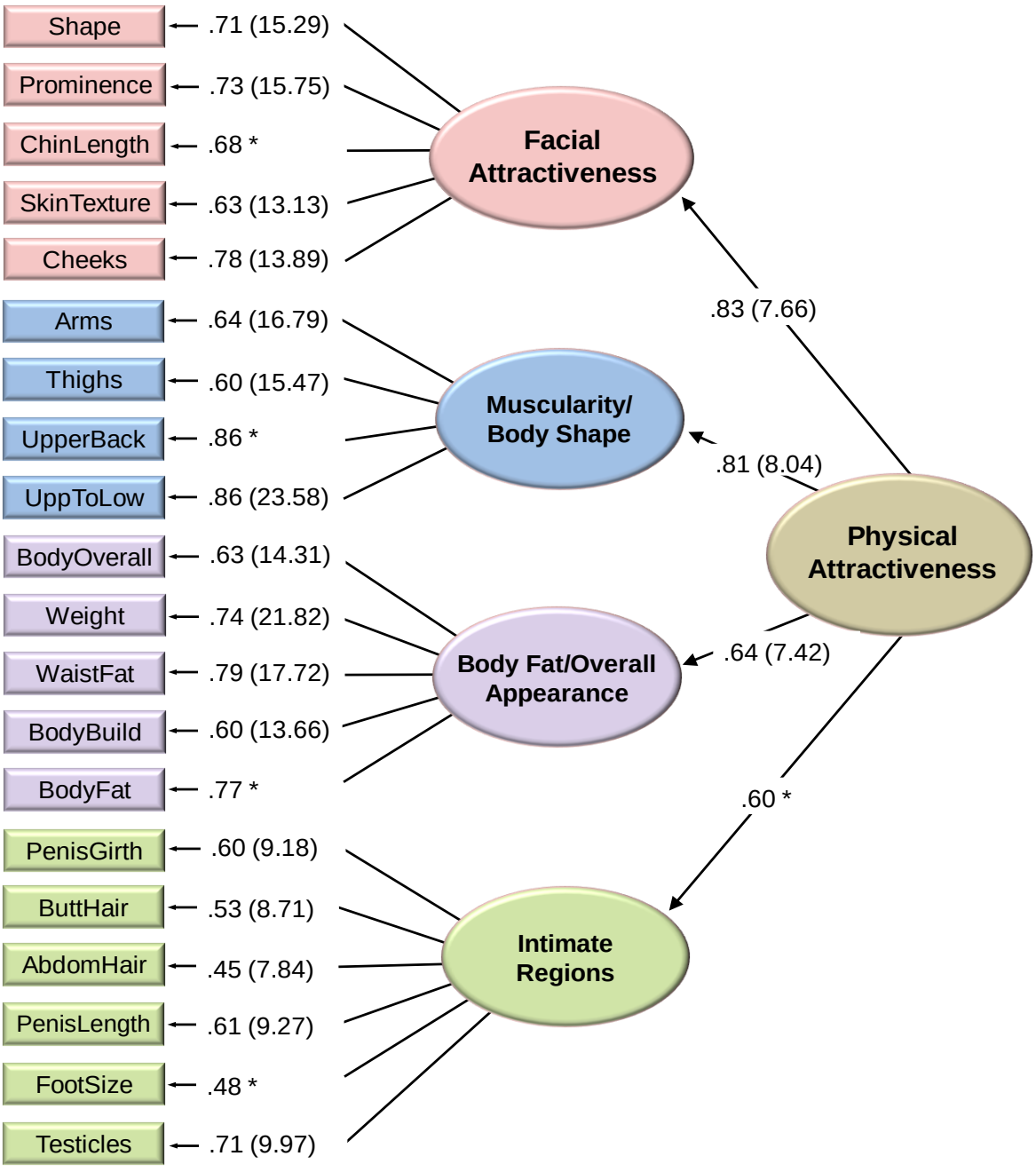
Confirmatory factor analysis: Replication. To corroborate the findings from the first CFA, a second CFA model was computed using the fourth independent subsample (CFA #2, n = 624). As evident from Figure 4.4, all items loaded significantly on their respective factors (i.e., t values ≥ 1.96), and modification indices revealed no items that loaded across factors (i.e., no complex items). Standardized loadings for all items were over the minimum threshold of .30, and most were in the moderate to high range, indicating stable factors. Moreover, all four factors once again contributed significantly to measurement of a higher-order latent attractiveness construct, providing yet more evidence for the viability of the hierarchical, 4-factor structure of attractiveness previously identified using EFA.

Results suggested that the initial model approximated an acceptable, though not optimal, fit to the data ($\chi^2[df = 166] = 613.76$, $p < .01$). The Comparative Fit Index was within acceptable parameters (i.e., CFI ≥ .90; CFI = .92) as was the Root Mean Square Error of Approximation (i.e., RMSEA ≤ .08; RMSEA = .061) and the full 90% confidence interval for the RMSEA (i.e., .056 < RMSEA CL_{90}< .067). Of note, the Standardized Root Mean Residual was within optimal range (i.e., SRMR ≤ .05; SRMR = .053). Although fit was not optimal, it was, once again, good for an initial model with no post-hoc modifications.

To improve model fit, correction was once again made for correlated error between 7 out of 190 possible item pairs. Of note, all 7 of these pairs were the same as those found in the previous CFA sample, meaning that they were not merely idiosyncratic characteristics of this particular sample. Parameter estimates from the revised and unrevised models were highly correlated (r = .97), indicating that correction for correlated error terms had only a negligible effect on the estimation of individual parameters. The revised CFA model indicated good fit of data ($\chi^2[df = 159] = 362.86$

p < .01). The Comparative Fit Index was once again within optimal parameters (i.e., CFI ≥ .95; CFI = .96) as was the Standardized Root Mean Residual (i.e., SRMR ≤ .05; SRMR = .046) and the Root Mean Square Error of Approximation (i.e., RMSEA ≤ .05; RMSEA = .045). Also of note, the full 90% confidence interval for the RMSEA was within ideal range (i.e., .039 < RMSEA CL_{90} < .052).

Figure 4.4: Confirmatory factor analytic model (replication)



Note: Parameters expressed as maximum likelihood estimates (standardized solution). Numbers in parentheses indicate *t* values for parameter estimates (statistically significant *t* values > | 1.96 |). Asterisks (*) denote parameters initially fixed to 1.0 for scaling and statistical identification, thus significance levels could not be computed for these five items.

Invariance analysis. Both CFA models were next compared to ascertain whether the 4-factor attractiveness structure, as well as the pattern of factor loadings, was invariant, or equivalent, across samples and not merely a chance finding specific to one sample.

The first finding of note was that the hierarchical structure of responses to the attractiveness scale was invariant between the two, $\chi^2(df = 318) = 733.17$, $p < .01$; CFI = .96; SRMR = .050; RMSEA = .032; .029 < RMSEA CL_{90}< .035. This result indicates that the hierarchical structure of scale responses, with four first-order factors mapping onto a higher-order latent construct, is valid across samples (i.e., evidence of configural invariance).

The pattern of factor loadings upon the higher-order Attractiveness factor was compared next (Table 4.3). The relative contribution of the Facial Attractiveness, Muscularity/Body Shape, and Body Fat/Overall Appearance factors to measurement of the higher-order Attractiveness factor emerged as statistically indistinguishable between the two CFA samples[16]. These findings provide more evidence for the validity of the 4-factor structure of male-to-male physical attractiveness and support the contention that gay men assess attractiveness using some type of fixed, innate template.

[16] Although results are not presented here, an invariance analysis was also conducted to assess the temporal stability of the Intimate Regions factor, which had been fixed for scaling purposes. As with the other three factors, the relative contribution of this factor to measurement of overall attractiveness did not differ significantly between CFA subsamples.

Table 4.3: Summary specifications and invariance analyses between CFA models

Successive Constraints Applied	χ^2	*df*	$\Delta\chi^2$	Δdf	CFI	RMSEA [90% CI]	SRMR
Unconstrained Baseline Model	733.17	318	--	--	.96	.032 [.029, .035]	.050
Facial Attractiveness:							
Shape of face	736.65	319	3.48	1	.96	.032 [.029, .035]	.050
Prominence of facial features	738.31	320	1.66	1	.96	.032 [.029, .035]	.050
Facial skin texture	738.60	321	0.29	1	.96	.032 [.029, .035]	.050
Appearance of cheeks	738.81	322	0.21	1	.96	.032 [.029, .035]	.050
Muscularity/Body Shape:							
Muscularity of arms overall	741.87	323	3.06	1	.96	.032 [.029, .035]	.050
Muscularity of upper legs/thighs	742.03	324	0.16	1	.96	.032 [.029, .035]	.050
Size upper back rel to low back	742.03	325	0.00	1	.96	.032 [.029, .035]	.050
Body Fat/Overall Appearance:							
Body overall	742.43	326	0.40	1	.96	.032 [.029, .035]	.050
Weight overall	742.44	327	0.01	1	.96	.032 [.029, .035]	.050
Fatness/leanness of waist	743.70	328	1.26	1	.96	.032 [.029, .035]	.050
Body build	743.71	329	0.01	1	.96	.032 [.029, .035]	.050
Intimate Regions:							
Penis girth	744.56	330	0.85	1	.96	.032 [.029, .035]	.050
Hair on buttocks	745.41	331	0.85	1	.96	.032 [.029, .035]	.050
Abdominal hair	749.23	332	3.82	1	.96	.032 [.029, .035]	.050
Penis length, flaccid	749.23	333	0.00	1	.96	.032 [.029, .035]	.050
Appearance of testicles	749.38	334	0.15	1	.96	.032 [.029, .035]	.050
Face → Attractiveness	749.97	335	0.59	1	.96	.032 [.029, .035]	.050
Muscularity/Shape → Attractiveness	752.02	336	2.05	1	.96	.032 [.029, .035]	.050
Body Fat/Overall → Attractiveness	752.03	337	0.01	1	.96	.031 [.028, .034]	.051

*$p < .05$ **$p < .01$

Note: χ^2 = chi-square. *df* = degrees of freedom. $\Delta\chi^2$ = change in chi-square. Δdf = change in degrees of freedom. CFI = Comparative Fit Index. RMSEA = Root mean Square Error of Approximation. CI: confidence interval. SRMR = Standardized Root Mean Square Residual.

Psychometric properties of the *Gay Men's Physical Attractiveness Scale*.

The findings above provide support for factorial validity of the 20-item physical attractiveness scale, henceforth named the *Gay Men's Physical Attractiveness Scale*. The scale is reproduced in Appendix "J."

Descriptive and psychometric properties of full scale and subscale responses were assessed independently using the fifth subsample (n = 325). These statistics are listed in Table 4.4. Responses to the full scale and subscales all demonstrated good internal consistency. The inter-item correlation coefficient was moderate for the full scale (IIC = .30) and moderate to high for the subscales (IIC = .37 -.57); according to Clark and Watson (1995), these values are ideal for broader constructs (e.g., overall attractiveness) and narrower constructs (e.g., facial attractiveness), respectively. Based on guidelines from Netemeyer et al. (2003), the range of inter-item correlations for each of the subscales was within acceptable limits (r = .44-.56 for Facial Attractiveness, r = .44-.79 for Muscularity/Body Shape, r = .46-.74 for Body Fat/Overall Appearance, and r = .21-.54 for Intimate Regions). The average item-total correlation for the full scale was moderate (ITC_{AVG} = .49); it was somewhat higher for the subscales.

Cronbach's alpha for the total scale was high (α = .89; 95% CI [.87, .91]). Alpha for the Facial Attractiveness subscale was within ideal range (α = .83; 95% CI [.80, .86]), as it was for the Muscularity/Body Shape subscale (α = .83; 95% CI [.80, .86]) and the Body Fat/Overall Appearance subscale (α = .87; 95% CI [.84, .89]). Because the last factor in any scale is usually the least reliable, alpha for the Intimate Regions subscale was somewhat lower, but still within acceptable range (α = .78; 95% CI [.73, .81]). All items contributed to internal consistency reliability (i.e., their removal would not increase Cronbach's alpha). Table 4.5 lists the correlation between factors.

There were no statistically significant relationships between full scale/subscale scores and any participant characteristics, including age, ethnicity, geographic region, geographic type, gender identity, preferred sexual position, community involvement, or self-rated attractiveness. There was a negative correlation between relationship duration and scores on the Body Fat/Overall Appearance subscale, but it was small (r = -.25, p <.01). Correlations between full scale/subscale scores and impression management were negligible (r = -.02-.11, p <.01).

Table 4.4: Descriptive and psychometric properties of final scale and subscales

Scale	IIC	IT_{avg}	α [95% CI]	*M*	*SD*	Skew	Kurt	Range
Physical Attractiveness (full)	.30	.49	.89 [.87, .91]	68.37	11.81	-.45	.86	29-100
Facial Attractiveness	.49	.63	.83 [.80, .86]	16.34	3.86	-.38	.61	5-25
Muscularity/Body Shape	.55	.66	.83 [.80, .86]	13.24	3.35	-.62	.44	4-20
Body Fat/Overall Appearance	.57	.69	.87 [.84, .89]	20.23	3.57	-.91	.96	7-25
Intimate Regions	.37	.52	.78 [.73, .81]	18.56	4.79	-.34	-.09	6-30

Note: IIC = average inter-item correlation. IT_{avg} = average item-total correlation. α = Cronbach's alpha. CI= confidence interval. *M* = mean scale total. *SD* = standard deviation. Kurt = kurtosis.

Table 4.5: Correlation matrix of full scale/subscale scores

	Face	Musc/Shape	Fat/Overall	Intimate
Face	-	.64	.49	.47
Musc/Shape		-	.50	.37
Fat/Overall			-	.21
Intimate				-

Test-retest reliability. To assess the temporal stability of scale responses vis-à-vis initial responses, 416 participants responded a second time (four to six months after initial data collection) to the 20 items comprising the *Gay Men's Physical Attractiveness Scale*. Before calculating the test-retest correlation, full scale and subscale scores were screened for unusually large differences between Time 1 and Time 2. Differences were considered to be outliers if they were between 1.5 times and 3 times the interquartile range below the first quartile or above the third quartile. Using this criterion, 29 outliers were identified. In most of these cases, Time 1 and Time 2 scores differed by more than 50%; in some cases, the difference was greater than 100%. These differences may have been due to participants' misunderstanding of the questionnaire instructions or, more likely, inattention. Participants with the most discrepant scores appear to have taken an unusually long time to complete one or both questionnaires, suggesting that they had started the questionnaires but then became distracted by other tasks.

With the exclusion of these 29 outliers, the test-retest correlation for the full scale was r = .72, suggesting good scale reliability over a median interval of 16 weeks (mean interval = 18 weeks, range = 16-26 weeks). Test-retest reliabilities were also good for all four subscales: r = .68 for Facial Attractiveness (excluding 21 outliers); r = .69 for Muscularity/Body Shape (excluding 34 outliers); r = .78 for Body Fat/Overall Appearance (excluding 40 outliers); and r = .70 for Intimate Regions (excluding 25 outliers).

The full scale test-retest correlation coefficient for respondents who completed the scale during the first third of the test-retest period (i.e., first 25 days, n = 240) was r = .74; for those who completed the scale during the final third of the test-retest period (i.e., last 25 days, n = 60) the test-retest correlation coefficient was r = .68. These statistics suggest good temporal reliability of scale responses, although with some variation over time.

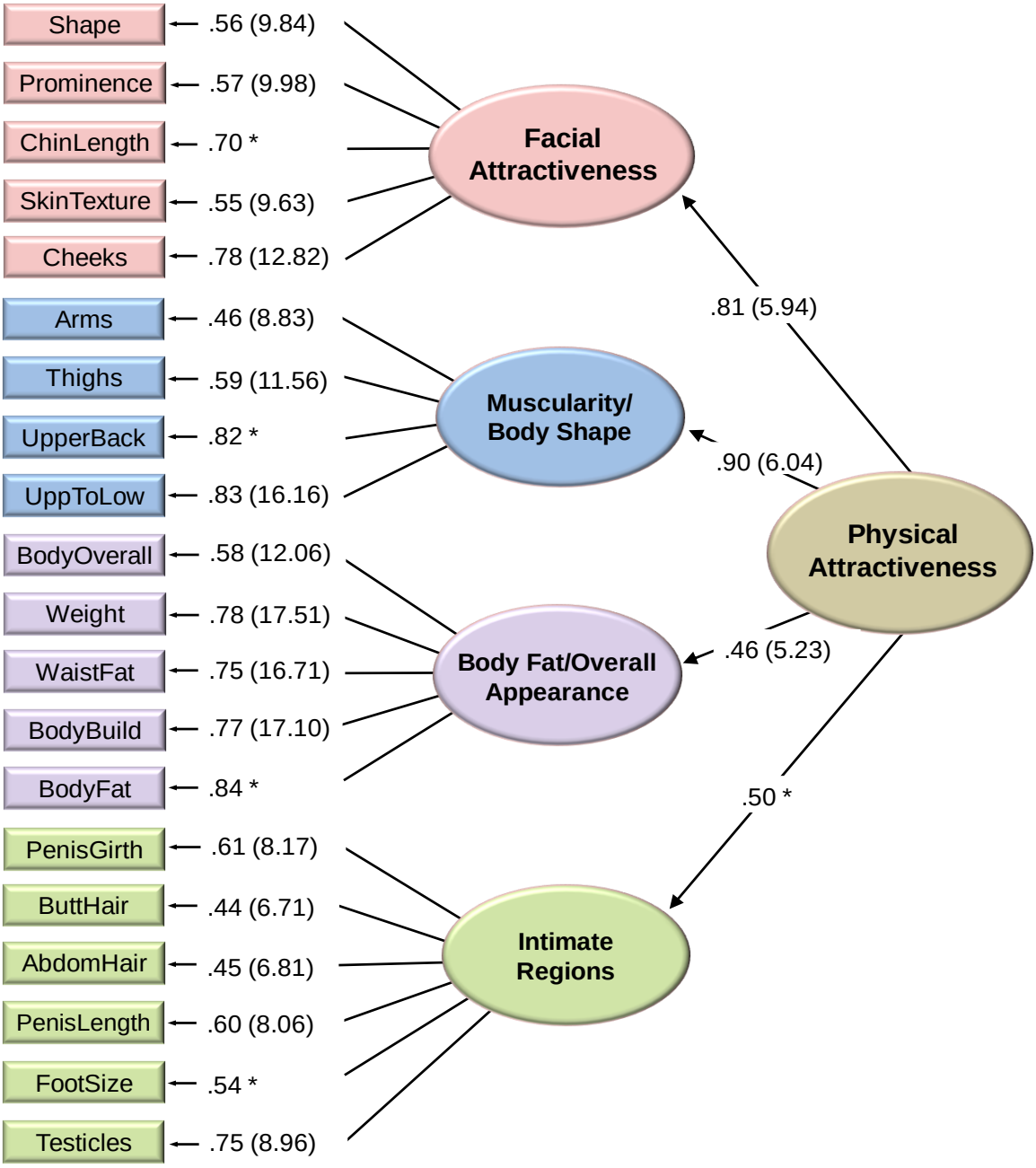
Confirmatory factor analysis of Time 2 responses. To assess the temporal stability of the underlying 4-factor structure of male-to-male physical attractiveness, a CFA model was computed using the test-retest subsample (n = 416). All items loaded significantly on their respective factors (i.e., t values ≥ 1.96), with modification indices indicating that no items loaded across factors (i.e., no complex items). Standardized loadings for all items were over the minimum threshold of .30, and most were in the moderate to high range, indicating stable factors. Moreover, each of the factors once again contributed significantly to measurement of the higher-order Attractiveness construct, thus demonstrating the temporal stability of the factor structure underlying gay men's physical attractiveness assessments (see Figure 4.5).

Results suggested that the initial model approximated an acceptable, though not optimal, fit to the data, $\chi^2(df = 166) = 400.63$, $p < .01$. The Comparative Fit Index was within acceptable parameters (i.e., CFI ≥ .90; CFI = .92) as was the Standardized Root Mean Residual (i.e., SRMR ≤ .08; SRMR = .060) and the Root Mean Square Error of Approximation (i.e., RMSEA ≤ .08; RMSEA = .060). The full 90% confidence interval for the RMSEA was also within acceptable range (i.e., .051 < RMSEA CL_{90}< .066).

Modification indices suggested that freeing error covariances might improve model fit. Correction was made for correlated error between 5 out of 190 possible item pairs. Of note, four of the correlated pairs were the same as those identified in the two CFA subsamples from Study 1, again suggesting that they were not merely idiosyncratic characteristics of one sample. Most of these correlated errors were for conceptually similar items within factors (e.g., *shape of face* and *prominence of facial features*). Some of the correlated errors were between items including the descriptor "overall" and the Body Fat/Overall Appearance factor (i.e., common wording). Parameter estimates from the revised and unrevised models were highly correlated (r = .98), indicating that

correction for correlated error terms had only a negligible effect on the estimation of individual parameters. The revised CFA model indicated good fit of data, $\chi^2(df = 160) = 296.69$, $p < .01$. The Comparative Fit Index was within optimal parameters (i.e., CFI ≥ .95; CFI = .95) as was the Standardized Root Mean Residual (i.e., SRMR ≤ .05; SRMR = .049) and the Root Mean Square Error of Approximation (i.e., RMSEA ≤ .05; RMSEA = .045). Also of note, the full 90% confidence interval for the RMSEA was within ideal range (i.e., .037 < RMSEA CL_{90} < .053).

Figure 4.5: Confirmatory factor analytic model of Time 2 responses



Note: Parameters expressed as maximum likelihood estimates (standardized solution). Numbers in parentheses indicate *t* values for parameter estimates (statistically significant *t* values > | 1.96 |). Asterisks (*) denote parameters initially fixed to 1.0 for scaling and statistical identification, thus significance levels could not be computed for these five items.

Invariance analysis between Time 1 and Time 2 responses. To ascertain the temporal stability of the latent structure of the 4-factor attractiveness model, the Time 2 CFA model was compared to one of the CFA models computed at Time 1 (CFA #1, n = 624). The first finding of note was that the hierarchical structure of responses to the attractiveness scale emerged as invariant between time points, $\chi^2(df = 319) = 660.26$; CFI = .96; SRMR = .050; RMSEA = .032; .029 < RMSEA CL_{90}< .036. This result indicates that the hierarchical structure with four first-order factors mapping onto a higher-order latent construct is viable at separate measurement points (i.e., evidence of configural invariance over time).

Next, the pattern of factor loadings upon the higher-order attractiveness construct was compared. The relative contribution of Facial Attractiveness, Muscularity/Body Shape, and Body Fat/Overall Appearance emerged as statistically indistinguishable between Time 1 and Time 2[17]. Only the importance of facial shape appeared to differ between time points, $\Delta\chi^2$ (Δdf = 1) = 10.55, p < .01; this difference, however, had only a negligible effect on model fit (ΔCFI ≤ .01) and was not of sufficient magnitude to cause statistically significant differences between age groups in the importance of the relative contribution of Facial Attractiveness to measurement of overall attractiveness. These findings provide evidence for the overall temporal stability of the underlying 4-factor structure of male-to-male attractiveness. In other words, how gay men assess physical attractiveness may be guided in part by a fixed, innate template that is fairly unaffected by fleeting situational or contextual effects.

[17] Although results are not presented here, an invariance analysis was also conducted to assess the temporal stability of the Intimate Regions factor, which had been fixed for scaling purposes. As with the other three factors, the relative contribution of this factor to measurement of overall attractiveness did not differ significantly over time.

Table 4.6: Summary specifications and invariance analyses between Time 1 and Time 2 responses

Successive Constraints Applied	χ^2	*df*	$\Delta\chi^2$	Δdf	CFI	RMSEA [90% CI]	SRMR
Unconstrained Baseline Model	660.26	319	--	--	.96	.032 [.029, .036]	.050
Facial Attractiveness:							
Shape of face	670.81	320	10.55**	1	.95	.033 [.029, .036]	.050
Prominence of facial features	671.03	321	0.22	1	.95	.033 [.029, .036]	.050
Facial skin texture	672.05	322	1.02	1	.95	.033 [.029, .036]	.050
Appearance of cheeks	674.63	323	2.58	1	.95	.033 [.029, .036]	.051
Muscularity/Body Shape:							
Muscularity of arms overall	676.54	324	1.91	1	.95	.033 [.029, .036]	.051
Muscularity of upper legs/thighs	679.79	325	3.25	1	.95	.033 [.029, .036]	.051
Size upper back rel to low back	681.23	326	1.44	1	.95	.033 [.029, .036]	.051
Body Fat/Overall Appearance:							
Body overall	681.91	327	0.68	1	.95	.033 [.029, .036]	.051
Weight overall	682.13	328	0.22	1	.95	.032 [.029, .036]	.051
Fatness/leanness of waist	692.23	329	10.10**	1	.95	.033 [.029, .036]	.051
Body Build	717.81	330	25.58**	1	.95	.034 [.030, .037]	.053
Intimate Regions:							
Penis girth	717.82	331	0.01	1	.95	.034 [.030, .037]	.053
Hair on buttocks	717.88	332	0.06	1	.95	.034 [.030, .037]	.053
Abdominal hair	723.79	333	5.91*	1	.95	.034 [.030, .037]	.053
Length of penis, flaccid	724.87	334	1.08	1	.95	.034 [.030, .037]	.053
Apperance of testicles	725.24	335	0.37	1	.95	.034 [.030, .037]	.053
Face → Attractiveness	725.25	336	0.01	1	.95	.034 [.030, .037]	.053
Muscularity/Shape → Attractiveness	725.63	337	0.38	1	.95	.034 [.030, .037]	.053
Body Fat/Overall → Attractiveness	727.19	338	1.56	1	.95	.034 [.030, .037]	.053

*$p < .05$ **$p < .01$

Note: χ^2 = chi-square. *df* = degrees of freedom. $\Delta\chi^2$ = change in chi-square. Δdf = change in degrees of freedom. CFI = Comparative Fit Index. RMSEA = Root mean Square Error of Approximation. CI: confidence interval. SRMR = Standardized Root Mean Square Residual.

Summary of Study 1 findings. An exploratory factor analysis of gay men's responses to 258 physical attractiveness features suggested the presence of four factors underlying gay men's physical attractiveness judgements: Facial Attractiveness; Muscularity/Body Shape; Body Fat/Overall Appearance; and Intimate Regions. A second exploratory factor analysis performed on a separate, independent subsample corroborated this finding. Based on these two EFA solutions, 20 candidate items representing each of the four factors were selected for the *Gay Men's Physical Attractiveness Scale*.

Responses to this scale underwent confirmatory factor analysis with another independent subsample; it confirmed the viability of a hierarchical model with four first-order attractiveness factors mapping onto a higher-order latent attractiveness construct. A second confirmatory factor analysis with yet another independent subsample, as well as an invariance analysis between the two CFA models, corroborated this finding.

Responses to the 20-item scale exhibited excellent psychometric properties, including strong internal consistency reliability. Test-retest reliability for scale responses was strong over an average period of 16 weeks. The hierarchical structure of responses also appeared to be invariant over time.

In all, results from analyses using five independent samples of gay and bisexual men provided strong and consistent support for the viability of a hierarchical, 4-factor structure of male same-sex physical attractiveness assessment. This suggests that how gay men assess physical attractiveness may be guided, in part, by a fairly fixed, overarching template that may have evolved through natural selection. As we will see from the Study 2 results, this template also appears to be relatively stable in the face of cultural- and cohort-specific influences on physical attractiveness.

Study 2: Structure of Attractiveness Judgements Between Young and Older Gay Men

Study 2 tested the hypothesis that the 4-factor structure of male same-sex physical attractiveness identified and confirmed in Study 1 would be viable for older gay men aged 50+. Support for this hypothesis would suggest that male same-sex physical attractiveness is assessed in the roughly the same manner by men of all ages, and that such assessment is partly based in biology and not determined merely by cultural or historical factors.

Response characteristics. Responses to the *Gay Men's Physical Attractiveness Scale* were first compared between young and older gay men. As can be seen in Table 4.7, mean response levels and scale reliabilities were similar for both age groups. A multivariate analysis of variance (MANOVA) was calculated to examine any differences in scale scores as a function of age group. The multivariate result was significant for age group, Pillai's Trace = .015, $F(4,1446) = 5.46$, $p = <.01$. Follow-up univariate ANOVAs using a Bonferroni-corrected alpha level of .01 revealed a significant difference between young and older men on Facial Attractiveness, $F(1,1449) = 9.32$, $p = .001$. This difference, however, was negligible, $\eta_p^2 = .006$.

Table 4.7: Comparison of response levels and scale reliability between young and older men

Scale	Young (*n* = 624)[18]				Older (*n* = 827)			
	Mean	*SD*	α [95% CI]	Test-Retest	Mean	*SD*	α [95% CI]	Test-Retest[19]
Attractiveness [Full Scale]	68.37	11.63	.89 [.87, .90]	.72	67.62	11.66	.90 [.89, .91]	.69
Facial Attractiveness	16.34	3.95	.83 [.81, .85]	.68	15.92*	3.67	.85 [.83, .86]	.64
Muscularity/Body Shape	13.19	3.35	.84 [.82, .86]	.69	13.33	3.25	.87 [.86, .89]	.64
Body Fat/Overall Appearance	20.25	3.47	.85 [.83, .87]	.78	19.93	3.57	.88 [.87, .89]	.67
Intimate Regions	18.47	4.64	.75 [.72, .78]	.70	18.44	4.77	.80 [.78, .82]	.73

* $p < .05$.

Note: *SD* = standard deviation. α = Cronbach's alpha. CI= confidence interval. Test-retest = Pearson's correlation coefficient between Time 1 and Time 2 responses.

[18] Based on CFA sample #2 from Study 1.

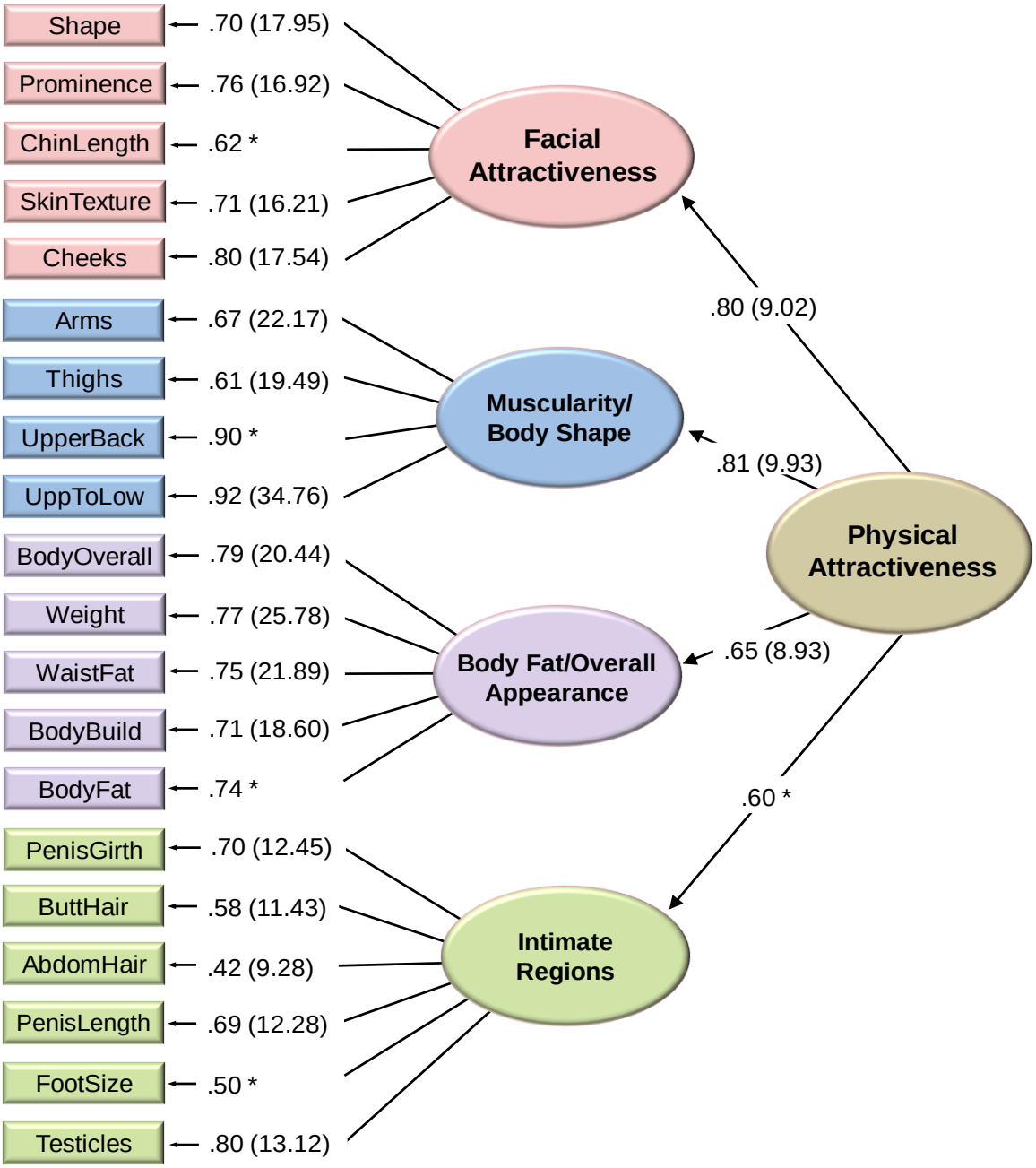
[19] 193 of Study 2 participants provided scale responses at Time 2. Test-retest reliability was calculated using these responses after exclusion of outliers (13 for the full scale, 11 for Facial Attractiveness, 15 for Muscularity/Body Shape, 11 for Body Fat/Overall Appearance, and 12 for Intimate Regions.)

Confirmatory factor analysis. A CFA model was computed to confirm the factor structure of older gay men's responses to the scale (n = 827). All items loaded significantly on their respective factors (i.e., t values ≥ 1.96), with no cross-loading items. Loading estimates were all over over the minimum threshold of .30. Once again, each factor contributed significantly to measurement of a higher-order latent Attractiveness factor (Figure 4.6).

The initial model approximated an acceptable, though not ideal, fit to the data, $\chi^2(df = 166) = 983.70$, $p < .01$. The Comparative Fit Index was within acceptable range (i.e., CFI ≥ .90; CFI = .90) as was the Standardized Root Mean Residual (i.e., SRMR ≤ .08; SRMR = .064). The Root Mean Square Error of Approximation indicated a mediocre fit (i.e., RMSEA ≤ .08; RMSEA = .077), as did the full 90% confidence interval (i.e., .073 < RMSEA CL_{90}< .082).

To improve model fit, correction was made for correlated error between 9 out of 190 possible item pairs. Six of these pairs were the same as those identified in the two CFA samples from Study 1 and were for conceptually similar items within factors (e.g., *shape of face* and *length of chin*). Parameter estimates from the revised and unrevised models were highly correlated (r = .96), indicating that correction for correlated error had a only negligible effect on the estimation of individual parameters. The revised model indicated good fit of data, $\chi^2(df=157) = 460.09$, $p < .01$. The Comparative Fit Index was within optimal parameters (i.e., CFI ≥ .95; CFI = .96) as was the Standardized Root Mean Residual (i.e., SRMR ≤ .05; SRMR = .048) and the Root Mean Square Error of Approximation (i.e., RMSEA ≤ .05; RMSEA = .048). The full 90% confidence interval for the RMSEA was within ideal range (i.e., .043 < RMSEA CL_{90}< .054).

Figure 4.6: Confirmatory factor analytic model of older men's responses



Note: Parameters expressed as maximum likelihood estimates (standardized solution). Numbers in parentheses indicate *t* values for parameter estimates (statistically significant *t* values > | 1.96 |). Asterisks (*) denote parameters initially fixed to 1.0 for scaling and statistical identification, thus significance levels could not be computed for these five items.

Invariance analysis. To ascertain if patterns of association were invariant, or equivalent, between young and older gay men, the CFA model for older men's responses was compared to one of the Study 1 CFA subsamples (CFA #2, *n* = 624). A pattern of invariance would support the contention that both young and older gay men assess physical attractiveness in the same way even though they have been exposed to different cultural and historical influences from an early age.

The first finding of note was that the hierarchical structure of responses to the attractiveness scale was equivalent between the two age groups, χ^2(*df* = 316) = 822.95; CFI = .96; SRMR = .048; RMSEA = .033; 030 < RMSEA CL_{90}< .036. This result indicates that the hierarchical structure with four first-order factors mapping onto a higher-order latent construct is viable for both young and older gay men (i.e., evidence of configural invariance between age groups).

Next, the pattern of factor loadings upon the higher-order Attractiveness construct was compared. The relative contribution of the Facial Attractiveness, Muscularity/Body Shape, and Body Fat/Overall Attractiveness factors emerged as statistically indistinguishable between young and older gay men[20]. The importance of facial skin texture was significantly more important for older than younger gay men ($\Delta\chi^2$ [Δdf = 1] = 4.08, $p < .05$; CFI = .96; SRMR = .048; RMSEA =.033, .030 < RMSEA CL_{90}< .036), as was overall body appearance ($\Delta\chi^2$ [Δdf = 1] = 12.41, $p < .01$; CFI = .96; SRMR = .049; RMSEA =.033, .030 < RMSEA CL_{90}< .036) and body build ($\Delta\chi^2$ [Δdf = 1] = 7.10, $p < .05$; CFI = .96; SRMR = .050; RMSEA =.033, .031 < RMSEA CL_{90}< .036). These

[20] Although results are not presented here, an invariance analysis was also conducted to assess the age-invariance of the Intimate Regions factor, which had been fixed for scaling purposes. As with the other three factors, the relative contribution of this factor to measurement of overall attractiveness did not differ significantly between age groups.

differences, however, had only a negligible effect on model fit (ΔCFI $\leq$ .01) and were not of sufficient magnitude to cause statistically significant differences between age groups in the importance of muscularity/body shape or body fat/overall appearance to the measurement of overall attractiveness. These findings provide support for the contention that how gay men assess physical attractiveness may be partly innate and thus biological in origin.

Table 4.8: Summary specifications and invariance analyses between young and older gay men's responses

Successive Constraints Applied	χ^2	*df*	$\Delta\chi^2$	Δdf	CFI	RMSEA [90% CI]	SRMR
Unconstrained Baseline Model	822.95	316	--	--	.96	.033 [.032, .037]	.048
Facial Attractiveness:							
Shape of face	823.92	317	0.97	1	.96	.033 [.030, .036]	.048
Prominence of facial features	824.21	318	0.29	1	.96	.033 [.030, .036]	.048
Facial skin texture	828.29	319	4.08*	1	.96	.033 [.030, .036]	.048
Appearance of cheeks	828.57	320	0.28	1	.96	.033 [.030, .035]	.048
Muscularity/Body Shape:							
Muscularity of arms overall	828.64	321	0.07	1	.96	.033 [.030, .036]	.048
Muscularity of upper legs/thighs	828.92	322	0.28	1	.96	.033 [.030, .036]	.048
Size upper back rel low back	829.16	323	0.24	1	.96	.033 [.030, .036]	.048
Body Fat/Overall Appearance:							
Body overall	841.57	324	12.41**	1	.96	.033 [.030, .036]	.049
Weight overall	843.02	325	1.45	1	.96	.033 [.030, .036]	.049
Fatness/leanness of waist	853.06	326	10.04**	1	.96	.033 [.031, .036]	.049
Body Build	860.16	327	7.10**	1	.96	.034 [.031, .036]	.049
Intimate Regions:							
Penis girth	861.62	328	1.46	1	.96	.034 [.031, .036]	.049
Hair on buttocks	861.76	329	0.14	1	.96	.033 [.031, .036]	.049
Abdominal hair	862.82	330	1.06	1	.96	.033 [.031, .036]	.048
Length of penis, flaccid	863.47	331	0.65	1	.96	.033 [.031, .036]	.049
Appearance of testicles	864.08	332	0.61	1	.96	.033 [.031, .036]	.049
Face → Attractiveness	866.79	334	2.71	1	.96	.033 [.031, .036]	.050
Muscularity/Shape → Attractiveness	867.16	335	0.37	1	.96	.033 [.030, .036]	.049
Body Fat/Overall → Attractiveness	867.80	336	0.62	1	.96	.033 [.030, .036]	.049

*$p < .05$ **$p < .01$

Note: χ^2 = chi-square. *df* = degrees of freedom. $\Delta\chi^2$ = change in chi-square. Δdf = change in degrees of freedom. CFI = Comparative Fit Index. RMSEA = Root mean Square Error of Approximation. CI: confidence interval. SRMR = Standardized Root Mean Square Residual.

Overall Summary of Findings

The results of Studies 1 and 2 support all three hypotheses as set out in this thesis. Multiple exploratory and confirmatory factor analyses using large, independent samples suggested that male same-sex physical attractiveness is a multi-dimensional construct comprising four latent factors: Facial Attractiveness; Muscularity/Body Shape; Body Fat/Overall Appearance; and Intimate Regions. Multiple fit indices suggest that this 4-factor model is an accurate representation of the architecture underlying male same-sex attractiveness judgements. Moreover, the structure appears to be remarkably consistent over time. It is also invariant across cohorts, with young and older gay men placing statistically indistinguishable emphasis on each of these dimensions when assessing other men's attractiveness. These findings provide support for the existence of a fixed, biologically based template used by gay men to assess physical attractiveness.

CHAPTER V: DISCUSSION

As described in Chapters I and II, physical attractiveness has a ubiquitous influence across interpersonal contexts, making a first and lasting impression on our perceptions of others. Decades of research have confirmed that physically attractive people are perceived more favourably than their less attractiveness counterparts and that they are consequently treated more favourably and enjoy more positive outcomes in a variety of life domains. This is one of the most robust findings in all of social psychology (Langlois et al., 2000).

A more recent line of research has tried to understand what specifically makes faces and bodies attractive and why we respond so positively to them. As discussed in Chapter II, there is remarkable agreement between people about the attractiveness of specific physical features, as well as overall levels of attractiveness: Irrespective of sex, age, race, geographic location, or socioeconomic status, people tend to agree on who and what is physically attractive (Cunningham et al., 1995; Langlois et al., 2000; Maret & Harling, 1985; Perrett et al., 1994). Even infants as young as a few days respond positively to faces that adults have judged as physically attractive (Geldart, Maurer, & Carney, 1999; Kramer et al., 1995; Langlois et al., 1987, 1991; Rubenstein et al., 1999; Samuels & Ewy, 1985; Samuels et al., 1994; Slater et al., 1998; van Duuren et al., 2003). This suggests that our aesthetic judgements are not simply dictated by culture—that there are universal physical qualities to which people respond consistently. Research has suggested that these qualities include facial and body symmetry, averageness (i.e., prototypicality), and sexual dimorphism (i.e., masculinity/femininity) (Gangestad & Scheyd, 2005; Grammer et al., 2003; Little, Jones, & DeBruine, 2011;

Rhodes, 2005; Rhodes, Simmons, & Peters, 2005; Symons, 1979; Thornhill & Gangestad, 1993, 1999, 2006; Thornhill & Grammer, 1999).

Cognitive theorists have suggested that faces and bodies possessing these qualities are attractive because they are processed more fluently by the brain; attractiveness, in other words, is merely a by-product of the way the brain processes visual stimuli (Enquist & Arak 1994; Enquist & Ghirlanda, 1998; Enquist & Johnstone 1997; Winkielman et al., 2006). Evolutionary theorists, on the other hand, have suggested that these traits are attractive because they are honest indicators of health, current fertility, future reproductive value, strength, and other qualities that our ancestors considered valuable in prospective mating and coalitional partners and that we may still (subconsciously) consider important today (Barber, 1995; Buss, 1994, 2003; Grammer et al., 2003; Sugiyama, 2005; Symons, 1979, 1995).

Because of their evolved tendency to mate with as many healthy and fertile females as possible, men have, across time and culture, placed greater importance on the physical attractiveness of partners than women have. Although gay men's relationships do not yield offspring, they, too, appear to emphasize short-term mating and the physical attractiveness of partners, suggesting that they have inherited many of the same predispositions as their heterosexual counterparts. Indeed, it would have been difficult to recruit 3,600 gay men for this study in just 10 days if physical attractiveness were not important to them.

Although physical attractiveness plays as much of a role in gay men's lives as that of their heterosexual male counterparts (if not more so), very little research has been undertaken to understand the nature of male same-sex physical attractiveness or to measure it reliably. A handful of studies have examined the specific features that gay men find attractive (e.g., Glassenberg et al., 2010; Kaminski et al., 2005; Levesque & Vichesky, 2006; Swami & Tovée, 2008; Tiggemann et al., 2007; Yelland & Tiggemann,

2003), but they have been limited in scope (e.g., focusing on a small number of body features and ignoring the different attributes of each feature, such as size or shape). They have also assumed that physical attractiveness comprises only one or two dimensions (e.g., face and body), thus preventing comprehensive measurement of finer-grained dimensions of attractiveness. To redress these limitations, this thesis sought to identify the primary dimensions of static male-to-male attractiveness (i.e., relatively fixed physical features that may be indices of genotypic and phenotypic quality) and to develop an instrument to measure them. It was envisioned that such an instrument would provide a comprehensive yet convenient way to gauge the relative importance that gay men in general, and specific subgroups of gay men in particular, place on specific dimensions of male physical attractiveness, as well as to measure the actual physical attractiveness of gay men (i.e., a rating scale).

Three hypotheses were proposed. First, it was hypothesized that male same-sex attractiveness is a hierarchical, multidimensional construct comprising several latent factors, each contributing to assessment of one superordinate attractiveness factor. Second, it was hypothesized that this latent factor structure would be invariant, or equivalent, across age cohorts (i.e. young and older gay men), suggesting that male same-sex attractiveness is assessed along the same basic dimensions by all gay men. Finally, it was hypothesized that the relative emphasis placed on each dimension would be the same among both young and older gay men, thus supporting the contention that gay men's physical attractiveness assessments are partly innate and not merely the product of generational differences or cultural conditioning.

Four Dimensions Underlying Male-to-Male Attractiveness

Exploratory and confirmatory factor analyses using four large, independent samples supported the first hypothesis that male same-sex physical attractiveness is a hierarchical, multidimensional construct. Four latent factors contribute to measurement of a higher-order general attractiveness construct. It appears that facial attractiveness and muscularity/body shape are about equally important to the assessment of physical attractiveness among gay men, surpassing body fat/overall appearance and, contrary to popular stereotypes, genitalia.

Facial Attractiveness. It is not surprising that the face contributes very strongly to measurement of overall attractiveness. From an evolutionary perspective, it is a rich source of information about the quality of prospective mating and coalitional partners. As discussed earlier, symmetry, averageness, and sexual dimorphism are all reliable indicators of genetic quality and overall health, including a robust immune system. All of these qualities are readily advertised by the face, leading Barber (1995) to describe it as an "arena for sexual selection" (p. 435). This is likely one of the primary reasons that the face is recognized more quickly, accurately, and efficiently than other types of visual information (Yin, 1969); that facial beauty tends to be assessed within a fraction of a second (Olson & Marshuetz, 2005); and that there is a special neural machinery for face perception across both primate and non-primate species (Kanwisher, 2010; Leopold & Rhodes, 2010; Moscovitch, Wincour, & Behrmann, 1997; Tsao & Livingstone, 2008).

Currie and colleagues (2009) suggest that the face is a very honest indicator of genetic quality because the multitude of physical features located within close proximity makes it much easier to detect slight developmental imperfections such as bilateral

asymmetry. Peters and colleagues (2007) suggest that the face is an honest indicator of phenotypic quality because, unlike the body, its appearance is not easily changed by lifestyle factors such as exercise. Even cosmetics cannot hide developmental imperfections like asymmetrical or disproportionate facial features. Moreover, because the face is located prominently at the top of the body, and because it is not usually covered by clothing, it is typically the first feature noticed by others.

Muscularity/Body Shape. This dimension, comprising the muscularity, shape, and definition of specific body regions, appears to be as important as the face to assessment of overall attractiveness among gay men. From an evolutionary perspective, muscularity may be subconsciously perceived as an index of genetic quality, health status, and the physical fitness of prospective mating and coalitional partners. For example, because muscularity is a testosterone-dependent characteristic, and because testosterone is an immunosuppressant, muscular men may be perceived to have a sufficiently robust immune system (and hence good genes) to be able to generate this costly trait (*immunocompetence handicap theory*; Folstad & Karter, 1992). Muscularity also provides information about a man's physical strength and prowess, which would have afforded him a competitive advantage in acquiring resources and protecting mates and offspring in the ancestral environment.

Body Fat/Overall Appearance. This dimension comprises three types of features: fatness/leanness of specific body regions, especially the waist; overall body fat; and overall body appearance. Body fat and overall appearance are likely linked because body fat (or the relative the absence of it) often affects multiple body regions

simultaneously (e.g., waist, arms, thighs) whereas qualities like muscularity may be restricted to specific regions (e.g., the upper arms).

It is noteworthy that this dimension appears to contribute somewhat less to assessment of overall physical attractiveness among gay men than either facial attractiveness or muscularity/body shape, which is consistent with previous studies (e.g., Levesque & Vichesky, 2006; Tiggemann et al., 2007). This factor, however, also comprises items pertaining to overall appearance, which have lower loadings on this factor than body fat items. Because the multidimensional model identified in this thesis suggests that gay men assess appearance in an additive rather than holistic fashion, the overall appearance items might attenuate this factor's relative contribution to physical attractiveness. This finding begs the question, of course, why gay men—indeed men in general—assess appearance additively rather than holistically. From an evolutionary perspective, it is likely because individual body features and regions provide specific types of information about mate quality. Alternatively, it might simply be a by-product of men's evolutionary history as hunter-gatherers, given that hunting requires precise, visual focus.

Intimate Regions. The dimension contributes less to measurement of overall attractiveness than muscularity and facial attractiveness, but is still quite important. It appears to be a combination of three types of body features: genitalia; body hair, especially in the genital and lower body region; and somewhat more obscure yet commonly sexualized features such as feet.

Genitalia. From an evolutionary perspective, attention to genitalia may reflect sensitivity to levels of testosterone in prospective mates. The testes, for example, produce most of the testosterone in the male body; the appearance of the testes, including size, may thus reflect testosterone levels in mating partners. In support, one of the unwelcome side effects of steroids taken for muscle enhancement is testicular atrophy, because the testes produce less testosterone in response to increases in exogenous testosterone (Maravelias, Dona, Stefanidou, & Spiliopoulou, 2005). Testes size may also be correlated with overall sperm production (Møller, 1989), thus perhaps advertising virility to prospective mates.

Some evidence suggests that penis length[21] may also be under the influence of testosterone. Choi and colleagues (2011) found that the length of the index finger relative to the length of the ring finger (the *2D:4D ratio*) is positively associated with penis length. Men whose index finger is longer than their ring finger tend to have longer penises. Given that digit ratio is influenced by prenatal testosterone (McIntyre, 2006), it is plausible that penis length is similarly influenced and is thus an additional indicator of a prospective mate's overall level of testosterone.

Although genitalia play an obvious role in homosexual relations, and although attending to genitalia may provide some information about mate quality, it is interesting that gay men do not seem to over-emphasize this feature when evaluating attractiveness. Indeed, even though three of the six items in the Intimate Regions factor are genital items (penis girth, penis length, and overall appearance of testicles), the factor contributes

[21] It is interesting that flaccid penis length was more strongly correlated with the Intimate Regions factor than erect penis length (i.e., substantially higher factor loadings in both exploratory factor analyses). This may be because the penis in its flaccid state is usually visible only in sexual situations and not in most other evaluative contexts (e.g., in the gym or other locations where men congregate). This certainly would have been the case in ancestral times, when men did not cover genitalia with clothing. The greater visibility of the flaccid penis may also explain why Morrison and colleagues (2005) found that flaccid penis length is a greater source of men's body image dissatisfaction than erect penis length.

markedly less to evaluation of overall attractiveness than either the Muscularity/Body Shape or Facial Attractiveness factors. This finding runs counter to stereotypes that gay men are preoccupied with genitalia. What may account for this finding is that genitalia are not as visible as facial appearance, muscularity, or body fat because we typically cover genitalia with clothing. Genitalia were likely more important in the assessment of mate quality in ancestral environments, when they were more frequently exposed. Some have argued that the emphasis on genitalia has decreased since the AIDS epidemic of the 1980s due to the association of genitalia with anal sex (e.g., Mann, 1998). Yet this thesis shows that the relative contribution of the Intimate Regions factor to assessment of overall attractiveness is statistically indistinguishable between cohorts, arguing against AIDS as a factor in the comparatively lower emphasis placed on this dimension.

Body hair. The role of body hair in attractiveness is poorly understood (Dixson et al., 2003). It is often cited as a testosterone-dependent characteristic (Dixson, 1998; Mooradian et al., 1987; Randall, 2008). Because body hair tends to increase at puberty, it may have provided information about circulating testosterone and hence sexual maturity in ancestral environments (Dixson et al., 2003; Pagel & Bodmer, 2003). Conversely, absence of body hair may have signaled youthfulness (Barber, 1995). Research has shown, however, that individual variations in body hair are not associated with variations in testosterone (see Rantala et al., 2010). Although there may be individual, cultural, and historical variations in body hair preferences (Dixson et al., 2003, 2007b, 2010), the results of this study indicate that the relative importance of this feature to perceptions of male same-sex attractiveness is cohort-invariant. Moreover, studies with women have demonstrated systematic shifts in preferences for male body hair as a function of menstrual phase, pregnancy, and menopause (Rantata et al., 2010). Taken together, these findings suggest that male body hair was at some point, and perhaps still is, an index of reproductive value.

Other intimate regions. Although most of the features loading highly on the Intimate Regions factor pertain to genitalia and body hair, there are some other "intimate" features that may also convey information about reproductive potential. Foot size, for example, is a sexually dimorphic characteristic that is visibly larger in men than women (Fessler et al., 2005a, 2005b) and may thus convey information about underlying endocrine condition. It is also considered a sign of youthfulness, since younger people tend to have smaller feet (Barber, 1995). Among men, feet also tend to be one of the most sexualized aspects of the human body (Scorolli et al., 2007).

Physical Attractiveness and Race/Ethnicity

It is notable that neither race/ethnicity nor skin colour account for much variability in gay men's attractive judgements. These items did not load on any of the four attractiveness factors, nor did they form their own factor. This is consistent with results from a recent study using 1,205 Black, White, and mixed-race facial images taken from Facebook (Lewis, 2009); in that study, race accounted for just 4% of variance in attractiveness ratings.

These findings are interesting because several studies of both heterosexual and homosexual adults adults indicate marked preferences for same-race partners (e.g., Fisman, Iyengar, Kamenica, & Simonson, 2008; Hitsch, Hortaçsu, & Ariely, 2010; Kurzban & Weeden; Phua & Kaufman, 2003) and that these preferences are are formed as early as three months of age based on exposure to the prototypical faces in one's environment (Bar-Haim, Ziv, Lamy, & Hodes, 2006). Given the importance of facial prototypicality in attractiveness judgements (Langlois & Roggman, 1990; Rhodes &

Tremewan, 1996; Rhodes et al., 1999), it would be expected that race/ethnicity and skin colour would also play a role in physical attractiveness.

Considering the politically sensitive nature of these items, it is possible that respondents may have been reluctant to indicate how important they consider them when judging physical attractiveness. This possibility can, however, be ruled out for four reasons. First, the mean importance scores given to these items were not unusually low (race/ethnicity: M = 3.16, SD = 1.34; skin colour: M = 3.06, SD = 1.45) or excessively skewed (race/ethnicity: skewness = -.22; skin colour: skewness = -.15). Second, these items were rated as significantly more important by respondents from countries where racial preferences might be expected to be particularly pronounced (e.g., South Africa) than by respondents in other countries. Third, there was only a negligible correlation between the items and impression management (r = .08). Finally, respondents completed the study anonymously.

Perhaps our greater exposure to a variety of faces, especially in large metropolitan areas, make race and skin color poor indicators of prototypicality. Or perhaps race and skin colour prototypicality simply do not correlate very highly with the perceived health and genetic quality of prospective mates and coalitional partners. In fact, some studies have found that found that *mixed-race* faces are rated as more attractive than same-race faces, perhaps because they advertise heterozygosity (i.e., cross-breeding), a moderate degree of which may increase the genetic quality of offspring (Miller, 2009; Rhodes et al., 2005).

Multiple Signals

The finding that male same-sex attractiveness comprises four underlying dimensions is in accord with the *multiple signals hypothesis* (Johnstone, 1996; Møller & Pomiankowski, 1993), which suggests that different dimensions of attractiveness index different mate qualities (e.g., fertility, reproductive potential, immunocompetence). Alternatively, the *backup signal hypothesis* (Johnstone, 1996; Møller & Pomiankowski, 1993) suggests that multiple signals evolved to advertise a single aspect of mate quality (e.g., overall health) because one signal by itself may not always be an accurate, reliable index of mate quality. Multiple traits may also signal the same aspect of mate quality but be more useful in certain contexts, such as viewing people carefully at close range versus fleetingly from a distance (Candolin, 2003). Finally, *receiver psychology* suggests that different signals may simply be alternate versions of the same underlying signal (Rowe, 1999); broadcasting several versions of this signal may aid reception and thus elicit a stronger response from prospective mates (Candolin, 2003).

The Evolution of the 4-Factor Structure of Male-to-Male Attractiveness

Results from Study 2 supported the hypothesis that older gay men's physical attractiveness judgments reflect the same basic structure as younger gay men's. Not only do both age groups appear to assess attractiveness along the same four dimensions, but they also appear to be similar in the relative weight they place on these dimensions. The remarkable consistency of the hierarchical 4-factor structure of attractiveness across six separate samples suggests that there may be some type of universal, evolution-based mechanism by which men with same-sex attractions assess the value of prospective mating and coalitional partners.

The alternate explanation for these findings is sociocultural. By this account, not only do cultural factors like ever-abundant pornography, gay men's magazines, and Internet applications like Manhunt and Grindr influence the degree to which gay men focus on physical attractiveness as well as the specific qualities they find appealing (e.g., Harris, 1997; Saucier & Caron, 2008; Signorile, 1997; Wright, 1997), they also dictate which features should be considered *most important* when assessing attractiveness in other men. Ubiquitous pornography, for example, is blamed for over-emphasizing the importance of muscularity and genitalia in sexual attraction. Such an explanation is plausible, especially since the most common request received from participants in this study was for a copy of all 258 body features ranked in order of most to least important. Many of the respondents said they wanted to know which features other gay men consider important so that they could figure out which areas of their bodies they should try to improve through exercise, diet, hair removal, or even cosmetic surgery. The implication here is that outside forces, rather than innate processes, largely determine which features gay men consider when judging attractiveness.

Yet the findings of this study suggest that gay men are actually quite aware of the features they personally consider when assessing same-sex attractiveness. If they were not, 3,600 of them would not have eagerly participated in this study. Moreover, if gay men did not already come equipped with some kind of innate template by which to judge appearance, then different age groups would not be expected to place statistically indistinguishable emphasis on specific body regions, which is what this study found. Indeed, one of the key pieces of evidence needed to deem a particular phenomenon an evolution-based adaptation is to demonstrate that it is "transgenerationally stable"

(Singh, 1993, p. 302). Young and older gay men came of age during historical periods with different beauty standards and different degrees of emphasis on specific elements of attractiveness (e.g., the comparatively greater focus on muscularity in contemporary gay erotica). That a stable, cohort-independent model of attractiveness assessment can exist within the backdrop of this historical variation is consistent with the evolutionary theory of evoked culture (Gangestad et al., 2006; Nettle, 2009; Symons, 1995; Tooby & Cosmides, 1992) and suggests that assessing attractiveness along specific dimensions is to some extent an innate adaptation that had been useful in ancestral environments (and may still be useful today to the extent that the dimensions continue to provide information about mate value). Moreover, from a historical standpoint, gay men's tendency to assess men's appearance in a systematic, calculated fashion had been apparent long before the advent of cultural inventions like gay magazines, Manhunt, and Grindr, as the following excerpt, written nearly four decades ago, demonstrates:

> All [gay men] carry in their heads a computer system/switchboard in which they weigh each other. On the grid we process such factors as height, penis size, ass shape, eyes, clothing, personality, smile, weight, age, skin/hair color, virility, education, intelligence, sun sign, birthplace and so forth. The inexorable computer says 'Meet my Fantasy or be gone. What do you think this is, some kind of charity?' (Shively, 1974, cited in Bereznai 2006, p. 83).

The question arises, however, why gay men's attractiveness judgements would have any innate, evolutionary basis if gay men have no conscious reproductive interests. The simple answer is that men are men. Although gay men prefer same-sex partners, they have evolved under the same selection pressures as all other men (Hayes, 1995; Symons, 1979). While some may criticize the "evident absurdity of applying claims of

reproductive fitness to attractions between men" (Adam, 2000, p. 416), it is important to remember that even though "homosexual [men] may not be *consciously* concerned with reproductive outcomes, evolutionary mechanisms concerning partner preferences should operate similarly for all humans" (Howard et al., 1987, p. 195; italics added). As Regan and colleagues (2001) write,

> Although [evolutionary] models give primacy to the act and genetic consequences of ancestral reproduction (and, by inference, to heterosexuality), they also can be applied usefully to the mating preferences and choices of homosexual men and women. That is, evolutionary models assume that the reproductive decisions made by our ancestors (and the outcomes of those decisions) contributed to the evolution of a mating psychology that is the legacy of all contemporary humans, irrespective of their sexual orientation (pp. 625-626).

Consistent with these explanations is that gay men resemble their heterosexual male counterparts in their relative disinterest in a partner's status; in their high interest in youth, physical attractiveness, visual sexual stimuli, and uncommitted sex; and in their mate retention behaviours (Bailey et al., 1994; Jankowiak et al., 1992; Kenrick et al., 1995a; Legenbauer, 1999; Lippa, 2007; Teuscher & Teuscher, 2007; VanderLaan & Vasey, 2008).

The fact that gay men can resemble heterosexual men in these respects yet also resemble heterosexual women not only in the preferred sex of their partners but also in their preferences for specific physical features (e.g., muscularity) can be explained by the concept of *modularity* described in Chapter II. The different components of sexuality—orientation, age preferences, desired physical qualities, and behaviour—can all be considered specific adaptive modules (Kenrick et al., 1995a; Quinsey & Lalumière, 1995; Silverthorne & Quinsey, 2000). If there are critical developmental periods for the sexual differentiation of these modules, then modules that differentiate earlier or later may not be affected by the same developmental influences, such as prenatal cerebral testosterone exposure (Ellis & Ames, 1987; Pillard & Weinrich, 1987). Thus,

some modules, like those determining emphasis on appearance, may be unaffected by developmental anomalies in testosterone exposure and may thus promote masculine characteristics (e.g., emphasis on judging mates primarily on appearance and along specific dimensions). Other modules, like those determining sexual orientation, might be markedly affected by deficiencies in circulating testosterone, thus promoting more feminine characteristics such as attraction to men and sensitivity to muscularity as cues to mate quality. As Kenrick and Keefe (1997) write, "[a]spects of male homosexual choice, including the strong attraction for physical beauty and their lack of attraction for status…are consistent with the argument that mate preference, like language or the colour perception system, is under the control of a number of independent mechanisms and not simply one switch that controls 'mating like a male' versus 'mating like a female'" (p. 142). The four dimensions of attractiveness identified in this thesis may well be examples of these mechanisms.

None of this is to say, however, that culture plays no role in the perception of male same-sex attractiveness. As discussed in Chapter II, there are, indeed, cultural and historical variations in attractiveness preferences. This variation, however, can be understood as the result of sensitivity to ecological changes (e.g., varying weight preferences in response to resource scarcity and socioeconomic conditions), an evolved tendency we have inherited from our distant ancestors. Moreover, to the extent that they exist, even arbitrary cultural trends are likely to be constrained by architecture of the 4-factor model of attractiveness identified in this research. For example, gay men in the 1970s preferred hirsute bodies whereas today they prefer smoother, shaved bodies (Bergling, 2007; Drummond, 2005), but the amount of attention they pay to body hair as an essential feature of attractiveness remains the same.

Study Strengths and Limitations

This study had both strengths and weaknesses. First, the initial item pool was exhaustive, in contrast to previous studies that have used a small number of items. Effort was made to include nearly every aspect of static physical attractiveness, as well as multiple attributes of each item, such as its size, shape, leanness/fatness, muscularity, masculinity/femininity, and overall appearance. Items were also reviewed by 20 gay and bisexual men (young and older alike) who provided extensive feedback about appropriateness and breadth. The 24 men in the pilot study provided similar feedback. Content validity was thus built into the instrument right from the beginning.

Social media (i.e., Facebook) allowed for the quick, anonymous, and cost-effective recruitment of a large, demographically diverse sample of men from 40 countries and various types of communities (e.g., major metropolitan areas, cities, towns). This is notable because only about 3.5% of men identify as gay or bisexual (Gates, 2011; Gates & Newport, 2012; Laumann et al., 1994). Descriptive statistics indicated that the sample was more diverse than those typically recruited in attractiveness studies (i.e., young, Caucasian, middle- to upper-class university students; Filiault & Drummond, 2009). Among the men in the study sample were a mechanic, an aeronautical engineer, a farmer, a railroad conductor, a crochet artist, a mortician, a female impersonator, a plumber, and an Episcopal priest. One participant indicated his pleasure that we were "open to comments from the 60+ whereas most studies focus mainly on the youngsters." Considering that Facebook has over one billion worldwide users, it is likely that the study sample also included gay men who may not have been heavily involved in the gay community/culture, which is uncommon in many studies on this topic (Filiault & Drummond, 2009). In sum, this sample probably

captured the widest possible variation in responses from gay men, which tends to be more important than representativeness when conducting scale development research (Worthington & Whittaker, 2006). It is noted, however, that the respondents were primarily English-speaking and, because all had Internet access, did not include people of particularly low socioeconomic status.

Other benefits of online data collection included the use of pop-up boxes which prompted participants to complete unintentionally skipped items. Anonymity, which is especially important when doing research with historically stigmatized groups (Peplau et al., 2009), was another important feature; it likely minimized socially desirable responding (as supported by correlational analyses) and encouraged greater disclosure and more honest responding ("I answered as truthfully as I could without overthinking the questions," wrote one gay man). The direct measurement of biased responding was a strength in itself, since this variable tends to be ignored in most scale development studies. Another strength was the use of multiple procedures to check the validity of responses, such as inclusion of validity items (e.g., visible ear and nose hairs) and cross-validation of demographic information (e.g., comparing reported country of residence to IP addresses, or dates of birth as provided at two time points).

From a statistical standpoint, the use of exploratory factor analysis was an improvement over previous studies that have inappropriately relied on principal components analysis, which models error variance in addition to common variance and thus tends to overestimate the precision of an instrument by inflating factor loadings. The selection of preliminary items based on two independent (and nearly identical) EFA solutions was another strength, as was the replication of findings using confirmatory factor analysis with two additional independent samples. Unfortunately, most studies on

this topic use EFA only, with few using CFA. Those that do use CFA usually do not replicate results using additional independent samples. The size of the CFA sample sizes in this study were also a strength because they provided high statistical power assuming large to medium effect sizes (i.e., power = .99, α = .05; MacCallum, Browne, & Sugawara, 1996).

Another strength was the assessment of psychometric properties using a separate, independent sample of respondents rather than one of the existing samples. The examination of test-retest reliability was also of note, with a response rate of 30% and 45% for Study 1 and Study 2 participants, respectively. These rates are high compared to other scale development research using LGBT and older adult populations and afforded large enough samples to assess both the temporal stability of scale responses (i.e., the reliability of the scale itself) as well as the temporal stability of the factor structure underlying attractiveness judgements (i.e., the stability of the construct being measured).

The *Gay Men's Physical Attractiveness Scale* itself has a number of strengths. First, the scale is multidimensional, meaning that it can assess physical attractiveness more comprehensively than simply asking respondents to indicate someone's attractiveness using one question. Second, the equivalence of the factor structure underlying young and older gay men's responses means that this scale can reliably be used by gay men of all ages. Most attractiveness scales have been validated with samples of young people only and thus it is not known whether those scales can be used by older adults without the risk of introducing measurement bias. Third, the scale is fairly reliable, with high test-retest coefficients and evidence of factorial stability over an extended period (16 weeks).

One important limitation is that many of the body features included in this study may not necessarily be perceived consciously (e.g., facial symmetry) even though research shows that they do, indeed, predict overall attractiveness ratings. As one respondent wrote, "I found it hard to respond to questions asking specifically about ratios of one part of body or face to another. I know that's the way humans process physical beauty, but it seems to me to be quite an unconscious, visceral process." However, several of the items in the final attractiveness scale (e.g., facial shape) may well reflect these more abstract, subtle qualities, suggesting that respondents do, indeed, have some conscious awareness of their importance. Furthermore, many of the respondents indicated that they grew increasingly self-aware of their attractiveness preferences as the study progressed:

> I never realised just how much I look at specific parts of the human body. (31-year-old gay male, Maryland)
>
> This was an interesting survey and made me think a lot about what I am actually attracted to in a man, some of which I wasn't fully conscious of. (28-year-old gay male, New York)
>
> This was a good opportunity for me to be a bit self-reflective. (59-year-old gay male, New York)
>
> Now I am more aware of what's important to me physically. (29-year old male, United Arab Emirates)
>
> This was a very thorough survey. It asked questions that I never consciously considered when thinking about who I like or not. And it caused me to rethink some things I'd previously considered as to how important they are or aren't. (47-year-old gay male, Seattle)
>
> This survey was surprisingly thorough. It encouraged me to solidify my ideas about what attracts me to other men. (20-year-old gay male, Florida)
>
> I had not realized how specific my sexual preferences are. (25-year-old gay male, Oregon)

Even if people *are* able to consciously articulate which features they consider important in assessing attractiveness, this does not necessarily mean that there is always a correspondence between what people *say* is important to them and what actually *is* important to them in more realistic settings. People may, indeed, lack introspective awareness of what influences their judgments (Nisbett & Wilson, 1977a). Several recent studies examining mate selection criteria in speed-dating contexts have identified a disjunction between stated and actual preferences. Most commonly, these studies have found that men and women equally value physical attractiveness when selecting mates in real-life contexts (Eastwick and Finkel, 2008; Fisman et al., 2006; Kurzban & Weeden, 2005; Luo & Zhang, 2009; Sprecher, 1989; Todd, Penke, Fasolo, & Lenton, 2007). Many have taken these studies as evidence against the sex differences identified in research relying exclusively on stated preferences.

These studies, however, have several limitations. First, some have used fairly small samples, limiting power to find statistically significant effects. Second, participants have often been young undergraduate students who may be especially egalitarian, thus limiting the generalizability of findings. Third, as Wood and Brumbaugh (2009) indicate, the studies often ask respondents to judge a small number of targets, thus limiting the ability to create reliable estimates of revealed preferences (Wood & Brumbaugh, 2009). Fourth, although mate choices made within the context of speed-dating may be more realistic than hypothetical choices made in the abstract, speed-dating is still a relatively artificial context that may not generalize to most mating contexts. It may also appeal primarily to a younger, more egalitarian demographic. Most importantly, speed dating may not give participants sufficient time to evaluate prospective mates based on criteria that may take more time to reveal (e.g., intelligence, personality). Thus, the finding that

both male and female participants select mates based on appearance may simply be a function of the fact that appearance is the only variable that can be reliably assessed in a very short period of time.

More recently, Hitsch, Hortascu, and Ariely (2010) studied mate preferences in an Internet dating context, which is more realistic and appeals to a wider range of people than speed dating. In their sample of over 6,500 men and women, they found evidence for evolutionarily-relevant sex differences in actual mate preferences (e.g., men valuing physical attractiveness more than women), which is in line with previous research on stated preferences. The results of this study were consistent with an earlier meta-analysis by Feingold (1990), who found sex differences in both stated and actual preferences for physical attractiveness in a partner, albeit stronger differences for stated versus actual preferences. In another study of 4,000 respondents, Wood and Brumbaugh (2009) found modest correlations between stated and revealed preferences for actual physical features like weight and body shape. It is important to note, however, that studies like this have focussed on heterosexual men and women only; more research is needed to understand whether gay men's stated preferences (or, in the case of this thesis, the importance they say they place on certain body dimensions) are consistent with how they *actually* assess appearance in more realistic contexts. Until then, the results of the current study should be interpreted with some caution.

Another limitation of this thesis was that the response options for each body feature may have been somewhat confusing. Indeed, it is often difficult to specify precisely how much one does *not* care about a particular body feature, rather than specifying how much ones *does* care. Although a few respondents did complain about

this, they appeared to be in the minority. Moreover, the strong psychometric properties of the items suggest that item wording was not an overly problematic issue.

A final limitation is that this study did not examine the structure of women's physical attractiveness preferences. There were three reasons for this. First, as reviewed in Chapter II, women in general, and lesbians in particular, place less emphasis on the physical attractiveness of prospective partners (e.g., Atkins, 1998; Bailey et al., 1994; Kozee & Tylka, 2006). Second, women are more likely to assess attractiveness based on perceived personality traits (e.g., judging a man's good looks in terms of how happy, smart, or funny he looks; Jankowiak et al., 1992). Third, to the extent that women do attend to objective physical features, research shows that contextual factors (e.g., menstrual phase, relationship status) influence the features and regions to which they attend, as do psychological factors like self-perceived attractiveness and gender-nonconformity (Cellerino, 2003; Johnston et al., 2001; Little et al., 2008). This is underscored by findings that women, compared to men, are less likely to demonstrate consensus in their attractiveness judgements of other people (Wood & Brumbaugh, 2009). In sum, this suggests that it would be difficult to identify a stable factor structure underlying women's physical attractiveness judgements; other researchers may wish to tackle this issue.

Future Directions

To further establish the validity and reliability of the *Gay Men's Physical Attractiveness Scale*, future studies should attempt to replicate the current results using new samples of young and older gay men. To verify the age-invariance of the 4-factor structure of attractiveness assessment, it will be important to replicate the results using a sample of men who are older than those used in the current study (i.e., 75+). The

factorial structure should also be compared on the basis of other demographic characteristics. In addition to results from the current study revealing no statistically significant differences between demographic groups based on scale responses, findings of factorial invariance between gay men of different races, ethnicities, and geographic regions would lend further support to an evolutionary account of male same-sex physical attractiveness. (To facilitate these comparisons, it will also be important to develop and validate different versions of the scale for use with non-English-speaking gay men.) Comparisons might also be made between gay and bisexual men; self-identified tops and bottoms; and men who are high versus low on sociosexuality (i.e., individual differences in the willingness to have sex outside of a committed relationship), masculinity/femininity, self-rated attractiveness, internalized homophobia, or exposure to pornography. It might also be informative to examine any differences between men seeking, or currently involved in, short-term versus long-term relationships[22].

It will be important to obtain evidence of concurrent validity for the *Gay Men's Physical Attractiveness Scale*, especially when used as a rating scale. In particular, the relationship between scale scores and global ratings of a target's attractiveness should be assessed to determine, for example, whether Facial Attractiveness subscale scores predict facial attractiveness ratings as well as overall attractiveness ratings as assigned by intimate partners or third party observers.

The *Gay Men's Physical Attractiveness Scale* could also be used in relationship studies to examine the degree to which each partner's attractiveness (measured by either the partners or third-party observers) affects the other's relationship satisfaction, and whether any such effects change over the life course (i.e., does physical

[22] Preliminary analyses have revealed structural invariance of responses between men in Canada, the US, the UK, and Australasia; urban and suburban men; tops and bottoms; feminine and masculine men; and men with high and low levels of involvement in gay culture.

attractiveness still affect relationship satisfaction, and to what extent, among older gay couples?). The scale could also be used to examine the effect of discrepancies in physical attractiveness between partners (i.e., is relationship satisfaction affected when one partner is significantly more attractive than the other?).

It might be interesting to examine whether the *Gay Men's Physical Attractiveness Scale* could be used to measure *self-rated* attractiveness and whether the same 4-factor latent structure applies to measurement of this construct. If evidence of factorial invariance were found, then the application of this scale could be expanded. One could, for example, assess whether and how gay men's self-perceptions of attractiveness are associated with ratings given by their partners or third-party observers, or whether there is any correspondence between self-ratings on specific dimensions and the importance one places on those dimensions when rating others (e.g., Varangis et al., 2012). Finally, the scale could be used in research on body image dissatisfaction, which, as discussed in Chapter II, is a significant issue for gay men over the life course. Studies could examine, for example, whether body image dissatisfaction increases over the life course and whether there are any factors that buffer gay men from this as they age. If the scale were administered to representative samples, population norms for body image ratings could also be obtained. These could be useful in tracking secular changes in body image dissatisfaction within and between cultures.

Whatever its uses, it is hoped that *The Gay Men's Physical Attractiveness Scale* will encourage and add methodological rigor to the study of physical attractiveness, a topic that, based on the number of participants in the current study, appears to be very important to many gay men.

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APPENDIX A:
FACEBOOK CLICK AD

APPENDIX B:

WEBSITE SPLASH PAGE

Men's Sexuality Study

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What Makes That Guy Hot or Not?

Are you 20+ years of age and sexually attracted to other men? If so, your participation in the following research study would be greatly appreciated!

This study aims to see how men assess the physical attractiveness of other men. The following pages ask you to rate the components of a man's body and to provide general descriptive information (e.g., sexual orientation, age). It is our hope that this study will enable researchers to study gay and bisexual men's relationships more effectively.

Completion of these questionnaires will require about 20 minutes of your time. Participation in this study poses no risks to you. After completion, a summary of findings will be made available (please e-mail for receipt).

We do not ask you to provide your name. No individual responses will be disclosed; only combined data will be reported. Please note that for added security, your responses will be electronically encrypted (similar to credit card purchases). Although these steps have been taken to provide a very high level of security, it is not possible to provide an absolute guarantee of confidentiality when data are transmitted over the Internet; nevertheless, we believe that the risk of a breach of confidentiality is very low given that your responses will be encrypted.

Participation in this study is strictly voluntary. You are not required to answer questions that make you uncomfortable and you are free to discontinue at any time. Completion of these questionnaires will be seen as agreement to take part in this study.

If you have any concerns about this study, please contact Dr. Hal Weinberg, Director, Office of Research Ethics, at [redacted] (refer to study 2010s0447). If you have concerns about your rights as a research participant, contact the SFU Office of Research Ethics at +1.778.782-6593.

Thank you for taking the time to consider participating in this study. If, however, you live in a country where homosexuality remains illegal, please do not proceed or participate in this study.

With many thanks,

Eddy Elmer, MA Student

Click here to proceed

No, I do not wish to Participate

APPENDIX C:

PHYSICAL ATTRACTIVENESS QUESTIONNAIRE

A man's physical appeal is often assessed as a whole. Specific physical features, however, also contribute to overall physical attractiveness. Please indicate how important each of the following items is to you when assessing the attractiveness of another man, gay or straight. Although several items are similar, please respond to each. Be as honest as you can, keeping in mind that different men use different criteria in judging physical attractiveness; there are no right or wrong answers.

1 = Very unimportant
2 = Somewhat unimportant
3 = Neither important nor unimportant
4 = Somewhat important
5 = Very important

1. overall appearance of nose _____
2. overall appearance of waist/stomach/abdomen _____
3. muscularity of chest/pecs _____
4. overall appearance of upper legs/thighs _____
5. facial skin type (oily, normal, dry, etc.) _____
6. overall appearance of buttocks/bum _____
7. shape of jaw (round, square, etc.) _____
8. presence/absence of head hair _____
9. race/ethnicity _____
10. alignment of teeth (well-aligned, crooked, etc.) _____
11. muscularity/firmness of buttocks/bum _____
12. overall appearance of upper arms _____

13. overall appearance of body (slender, defined, average _____
muscular, bulky, stocky, fat, etc.)

14. overall appearance of eyes _____

15. overall appearance of smile _____
(not whether he smiles or not, but what his smile *looks like*)

16. presence/absence of hair on lower legs/calves _____

17. presence/absence of chest hair _____

18. degree of facial masculinity/femininity _____

19. leanness/fatness of buttocks/bum _____

20. presence/absence of dimple/cleft in chin _____

21. muscularity of upper arms/biceps/triceps _____

22. width of upper legs/thighs (skinny, medium, thick) _____

23. presence/absence of hair on upper back _____

24. size of buttocks/bum relative to rest of body _____
(small for his body, normal for his body, big for his body)

25. fullness of hair on head (full, thinning, bald, shaved off) _____

26. muscularity of upper back _____

27. shape of eyes (round, wide, narrow, etc.) _____

28. presence/absence of hair on scrotum/balls _____

29. presence/absence of abdominal hair _____

30. height of cheekbones _____

31. overall shape of upper body (from waist up) _____

(e.g., v-shaped, with wide shoulders/chest and narrow waist; pillar-shaped, with shoulders/chest and waist all the same width)

32. overall appearance of lower body (from hips down) _____

33. muscularity of lower body (from hips down) _____

34. overall length of arms _____

35. size of face relative to size of head _____

(small for his head, normal for his head, large for his head)

36. presence/absence of hair on lower back _____

37. size of feet _____

38. overall size of shoulders _____

39. overall size of body relative to height _____

40. appearance of fingers, excluding fingernails _____

(size, shape, length, etc.)

41. length of penis, erect _____

42. width of lower arms/forearms (skinny, medium, thick) _____

43. presence/absence of facial hair _____

44. waist-to-chest ratio _____

(width of the waist relative to width of the chest)

45. overall appearance of ears _____

46. presence/absence of hair around anus/asshole _____

47. muscularity of shoulders _____

48. appearance of face overall _____

49. shape of buttocks/bum (flat, curvy, ‘bubble butt’, etc.) _____

50. appearance of dental bite (normal bite, overbite, underbite) _____

51. appearance of toes, excluding toenails _____

(size, shape, length, etc.)

52. overall length of legs _____

53. overall appearance of upper body (from waist up) _____

54. waist-to-shoulder ratio _____

(width of waist relative to width of shoulders)

55. overall appearance of lips _____

56. facial symmetry _____

(how similar the left and right sides of the face look)

57. presence/absence of body hair overall, excluding facial hair _____

58. girth (width) of penis _____

59. overall shape of upper arms _____

60. thickness of body skin, excluding face _____

(degree to which the skin is translucent and you can see

the underlying bones, veins, etc.)

61. alignment/curvature of legs (crooked, not crooked) _____

62. overall size of lower body (from hips down) _____

63. fatness/leanness of upper body (from waist up) _____

64. appearance of body overall _____

65. facial ‘baby-facedness’/‘boyishness’ _____

66. presence/absence of penis foreskin _____
(circumcised/uncircumcised)

67. facial proportionality _____
(degree to which the size of most facial features are proportionate to one another)

68. appearance of face relative to age _____
(face looks his age, looks younger than his age, looks older than his age)

69. how testicles/balls hang (hang low, snug to body, etc.) _____

70. presence/absence of visible gaps in teeth _____

71. presence/absence of hair on forearms _____

72. overall shape of waist/stomach/abdomen _____

73. length of face from head to chin (short, normal, long) _____

74. length of arms relative to rest of body _____
(short for his body, normal for his body, long for his body)

75. overall shape of upper legs/thighs _____

76. presence/absence of hair on buttocks/bum, excluding hair directly around anus/asshole _____

77. overall appearance of armpits, excluding underarm hair _____

78. overall shape of lower arms/forearms _____

79. overall appearance of teeth _____

80. overall appearance of shoulders _____

81. shape of nose (round, pointy/beakish, narrow, flat, thick) _____

82. presence/absence of hair in region between penis and anus/asshole (‘taint’) _____

83. overall appearance of chest _____

84. width of legs relative to width of rest of body (proportionate, disproportionate) _____

85. length of penis, unerect _____

86. leanness/fatness of lower back _____

87. overall appearance of ankles _____

88. size (width) of arms relative to size of rest of body _____

89. shape of eyebrows (flat, curvy, etc.) _____

90. overall appearance of anus/asshole _____

91. skin colour (white, black, etc.) _____

92. skin tone (pale, fair, tan, dark, etc.) _____

93. presence/absence of hair on lower legs _____

94. proportionality of body, excluding face (degree to which size of most body parts are proportionate to one another) _____

95. width of lower legs/calves (skinny, medium, thick) _____

96. thickness of facial skin (degree to which the skin is translucent and you can see the underlying bones, veins, etc.) _____

97. overall appearance of testicles/balls _____

98. presence/absence of dimples in corner(s) of mouth _____

99. overall shape of lower back _____

100. presence/absence of hair on hands _____

101. body skin type, excluding face (oily, normal, dry, etc.) _____

102. fatness/leanness of lower arms/forearms _____

103. overall healthy appearance of face _____

104. presence/absence of pubic hair _____

105. muscularity of upper legs/thighs _____

106. presence/absence of hair on feet _____

107. size of cheeks (small, normal, large, chubby, etc.) _____

108. overall shape of lower legs/calves _____

109. presence/absence of hair on upper legs _____

110. size of chin (barely visible, small, normal, large, etc.) _____

111. overall appearance of wrists _____

112. fatness/leanness of waist/stomach/abdomen _____

113. appearance of body relative to age, excluding face _____

(body looks his age, younger than his age, older than his age)

114. presence/absence of underarm hair _____

115. visibility/size of Adam's apple _____

116. presence/absence of 'love handles' _____

(fat along sides of abdomen)

117. presence/absence of body disfigurements (excluding face), _____

other than body scars

118. leanness/fatness of upper legs/thighs _____

119. leanness/fatness of upper back _____

120. shape of teeth (narrow, pointy, etc.) _____

121. tautness of neck skin (tight, saggy, ‘turkey wattle’, etc.) _____

122. ‘straight’ or ‘gay’ appearance of face overall _____

123. body skin texture, excluding face and hands _____
(smooth, leathery, rough, etc.)

124. size of jaw _____

125. ‘distinctiveness’ of facial appearance _____
(degree to which face looks unique or unusual
compared to the population average)

126. overall size of lower back _____

127. overall appearance of penis _____

128. amount of ‘boney-ness’ of body, excluding face _____
(degree to which ribs, backbone, and other bones _____
visibly protrude)

129. size of eyes _____

130. overall muscularity of lower back _____

131. waist-to-hip ratio _____
(size of the waist relative to the size of the hips) _____

132. visible nose hairs _____

133. length of chin _____

134. shape of hands (slender, wide, etc.) _____

135. prominence of cheekbones _____

136. tooth-to-gum ratio _____

(amount of teeth visible relative to amount of gums visible)

137. muscularity of body overall _____

138. leanness/fatness of lower legs _____

139. shape of chin (wide, narrow, pointy, etc.) _____

140. overall appearance of navel/bellybutton _____

141. overall appearance of knees _____

142. presence/absence of permanent or semi-permanent tattoos _____

143. overall shape of lips (straight, curvy, etc.) _____

144. colour of hair on head _____

145. size of testicles/balls _____

146. amount/prominence of 'laugh lines' or 'frown lines' _____

(lines or creases around mouth: none, some, lots)

147. 'distinctiveness' of body, excluding face _____

(degree to which the body looks unique or unusual

compared to the population average)

148. overall size of chest _____

149. overall appearance of elbows _____

150. degree of visible of 'veiny-ness' of body, excluding face _____

(prominent veins on arms, neck, legs, etc.)

151. facial maturity _____

152. overall shape of lower body from hips down _____

(rectangular, curvy, etc.)

153. presence of all/most teeth, either natural or unnatural _____

154. shape of entire body overall, excluding head _____

155. length of tongue _____

156. size of hands (small, medium, large) _____

157. width of upper arms (skinny, medium, thick) _____

158. amount of body covered by tattoos (little, some, lots) _____

159. overall appearance of lower legs/calves _____

160. overall appearance of feet, excluding toenails _____

161. facial youthfulness _____

162. overall height/fullness of lips (thin, normal, thick, etc.) _____

163. texture of skin on hands (smooth, leathery, rough, etc.) _____

164. shape of entire body overall, head and body together _____

165. muscularity of lower legs/calves _____

166. size of smile relative to size of face _____

167. muscularity of arms overall _____

168. presence/absence of dimples on cheeks _____

169. 'gay' or 'straight' appearance of body, excluding face _____

170. overall appearance of lower back _____

171. uniformity of facial skin coloration _____

(even, uneven, blotchy, etc.)

172. muscularity of neck _____

173. vertical length of forehead _____

174. size of teeth _____

175. muscularity of lower arms/forearms _____

176. clarity of whites of eyes (clear, yellowish, etc.) _____

177. length of neck/throat _____

178. overall appearance of tongue _____

179. tautness of facial skin, excluding neck _____

(tight, loose, sagging, etc.)

180. overall size of waist/stomach/abdomen _____

181. leanness/fatness of upper arms _____

182. usual colour of cheeks (normal, rosy, etc.) _____

183. amount of body wrinkles, excluding face (none, some, lots) _____

184. muscularity of waist/stomach/abdomen _____

185. prominence of facial features (soft, chiseled/angular, etc.) _____

186. shape of upper back _____

187. amount/prominence of ‘crow’s feet’ _____

(lines/wrinkles in corners of eyes; none, some, lots)

188. overall appearance of forehead _____

189. height _____

190. masculinity/femininity of body, excluding face _____

191. prominence of browline (soft, heavy/prominent, etc.) _____

192. overall healthy appearance of body, excluding face _____

193. width of hips _____

194. overall appearance of nipples _____

195. size of nose _____

196. amount of facial wrinkles (none, some, lots) _____

197. overall body fat (lean, average, obese, etc.) _____

198. appearance of side profile, excluding head and neck _____

199. appearance of side profile of head and neck _____

200. how much belly sticks out (not at all, somewhat, a lot) _____

201. facial skin texture (smooth, leathery, rough, etc.) _____

202. amount of forehead lines/creases (none, some, lots) _____

203. body symmetry, excluding face _____
(how similar the left and right sides of the body look)

204. overall weight (underweight, normal weight, overweight) _____

205. uniformity of body skin coloration, excluding face _____
(even, uneven, blotchy, etc.)

206. overall appearance of scrotum/'ball sack' _____

207. overall shape of shoulders (round, angular, pointy, etc.) _____

208. size of ears _____

209. amount visible fat around face/neck/throat _____
(none, some, lots)

210. presence/absence of facial disfigurements, other than _____
facial scars

211. presence/absence body freckles, excluding facial freckles _____

212. texture of hair on head (thick, fine, etc.) _____

213. size of buttocks/bum _____

214. fatness/leanness of lower body overall (from hips down) _____

215. ‘fullness’ of face (thin, gaunt, average, chubby, etc.) _____

216. overall appearance of lower arms (forearms) _____

217. tautness of skin under upper arms (tight, loose, sagging) _____

218. usual body posture (upright, stooped/slumped, etc.) _____

219. facial ‘cuteness’ _____

220. presence/absence of visible abdominal muscles/‘abs’ _____
(none, some, ‘six-pack’, etc.)

221. size of upper back _____

222. shape/curvature of penis (uncurved, curved, etc.) _____

223. colour of eyes _____

224. amount of visible body fat, excluding face/neck/throat _____
(none, some, lots)

225. thickness/width of neck/throat _____

226. type of head hair (normal, wavy, curly, shaved, etc.) _____

227. width of lips (wide, narrow, etc.) _____

228. tautness of body skin (tight, loose, sagging, etc.) _____

229. overall appearance of upper back _____

230. size of upper back relative to size of lower back _____

231. overall size of forehead _____

232. presence/absence of bodily scars, excluding facial scars _____

233. overall size of upper body (from waist up) _____

234. size of eyebrows _____

235. overall appearance of hips _____

236. shape of smile _____

237. overall appearance of cheeks _____

238. overall body size (petite, medium, large) _____

239. presence/absence of calluses on hands _____

240. presence/absence of calluses on feet _____

241. shape of ears _____

242. overall appearance of eyelids (normal, droopy, etc.) _____

243. overall muscularity of upper body (from waist up) _____

244. presence/absence of facial freckles _____

245. presence/absence of facial birthmarks or moles _____

246. length of legs relative to overall body height _____
(legs short for his height, normal for his height, long for his height)

247. facial complexion (clarity of facial skin) _____

248. shape of face (round, square, etc.) _____

249. colour of teeth (white, stained, etc.) _____

250. shape of feet _____

251. presence/absence of body birthmarks or moles, excluding face _____

252. overall appearance of neck/throat _____

253. presence/absence of facial scars _____

254. size of head _____

255. shape of head (round, oval, square, rectangular, etc.) _____

256. body complexion (clarity of body skin, excluding face) _____

257. overall appearance of eyelashes _____

258. visible hair in ears _____

259. overall appearance of hands, excluding fingernails _____

Please answer the next two questions as honestly as possible, using the following 10-point scale:

1	2	3	4	5	6	7	8	9	10

Unattractive **Average** **Very Attractive**

260. How physically attractive do you think you are? _____

261. How sexually appealing do you think you are? _____

APPENDIX D:

IMPRESSION MANAGEMENT SUBSCALE OF THE *PAULHUS DECEPTION SCALES*

Please read each statement and circle the number that best describes you, from *Not True* to *Very True* about you.

		1	**2**	**3**	**4**	**5**				
		Not True				**Very True**				
1.	I sometimes tell lies if I have to.*	**1**	**2**	**3**	**4**	**5**				
2.	I never cover up my mistakes.	**1**	**2**	**3**	**4**	**5**				
3.	There have been occasions when I have taken advantage of someone.*	**1**	**2**	**3**	**4**	**5**				
4.	I never swear.	**1**	**2**	**3**	**4**	**5**				
5.	I sometimes try to get even rather than forgive and forget.*	**1**	**2**	**3**	**4**	**5**				
6.	I always obey laws, even when I'm unlikely to get caught.	**1**	**2**	**3**	**4**	**5**				
7.	I have said something bad about a friend behind his or her back.*	**1**	**2**	**3**	**4**	**5**				
8.	When I hear people talking privately, I avoid listening.	**1**	**2**	**3**	**4**	**5**				
9.	I have received too much change from a salesperson without telling him or her.*	**1**	**2**	**3**	**4**	**5**				
10.	I always declare everything at customs.	**1**	**2**	**3**	**4**	**5**				
11.	When I was young, I sometimes stole things.*	**1**	**2**	**3**	**4**	**5**				
12.	I have never dropped litter on the street.	**1**	**2**	**3**	**4**	**5**				
13.	I sometimes drive faster than the speed limit.*	**1**	**2**	**3**	**4**	**5**				

	1	2	3	4	5
	Not True				**Very True**
14. I never read sexy books or magazines.	**1**	**2**	**3**	**4**	**5**
15. I have done things that I don't tell other people about.*	**1**	**2**	**3**	**4**	**5**
16. I never take things that don't belong to me.	**1**	**2**	**3**	**4**	**5**
17. I have taken sick-leave from work or school even though I wasn't really sick.*	**1**	**2**	**3**	**4**	**5**
18. I have never damaged a library book or store merchandise without reporting it.	**1**	**2**	**3**	**4**	**5**
19. I have some pretty awful habits.*	**1**	**2**	**3**	**4**	**5**
20. I don't gossip about other people's business.	**1**	**2**	**3**	**4**	**5**

Note: *Reverse-keyed.

APPENDIX E:

SEXUAL IDENTITY SCALE (SIS)

For each of the following, indicate how masculine or feminine you consider yourself:

	Very masculine	Masculine	Neither masculine nor feminine	Feminine	Very feminine
a. I FEEL as though I am…	__	__	__	__	__
b. I LOOK as though I am…	__	__	__	__	__
c. I DO most things in a manner typical of someone who is…	__	__	__	__	__
d. My PERSONALITY is typical of someone who is…	__	__	__	__	__
e. My INTERESTS are mostly those of a person who is…	__	__	__	__	__

APPENDIX F:

INVOLVEMENT WITH GAY COMMUNITY SCALE (GCS)

On a scale ranging from 1 (*not at all true of me*) to 7 (*extremely true of me*), please indicate your agreement with the following statements:

a.	I have many lesbian/gay/bisexual/transgendered (LGBT) friends	**1**	**2**	**3**	**4**	**5**	**6**	**7**
b.	I am actively involved in the LGBT community	**1**	**2**	**3**	**4**	**5**	**6**	**7**
c.	I generally spend time in venues that are LGBT hangouts (e.g., LGBT bars, coffee houses, etc.)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
d.	I am a member of an LGBT community group or organization	**1**	**2**	**3**	**4**	**5**	**6**	**7**
e.	My closest friends are straight*	**1**	**2**	**3**	**4**	**5**	**6**	**7**
f.	I strongly identify with the LGBT subculture	**1**	**2**	**3**	**4**	**5**	**6**	**7**
g.	When I go out, I generally spend time in venues not specifically aimed at LGBT individuals*	**1**	**2**	**3**	**4**	**5**	**6**	**7**
h.	I often read LGBT publications	**1**	**2**	**3**	**4**	**5**	**6**	**7**
i.	I often visit LGBT websites	**1**	**2**	**3**	**4**	**5**	**6**	**7**

Note: *Reverse-keyed.

APPENDIX G: SOCIO-DEMOGRAPHICS QUESTIONNAIRE

1. Please indicate your date of birth (mm/dd/yyyy): ___/___/_____

2. Please indicate your ethnicity (select one):
   - □ Aboriginal/Native/First Nations
   - □ African/African American/Black
   - □ Asian/Pacific Islander
   - □ Latino
   - □ Middle Eastern/North African
   - □ White/Caucasian/European
   - □ Mixed/Multi
   - □ Other (please specify): _____

3. Please indicate your biological sex (select one):

   - □ Male
   - □ Female
   - □ Other (please specify): _____

4. Which point along the following continuum best describes your usual sexual behaviour (with whom you usually have sex)? (select one)

   - □ Men only
   - □ Men mostly
   - □ Men somewhat more
   - □ Both men and women equally
   - □ Women somewhat more
   - □ Women mostly
   - □ Women only
   - □ I do not like sex/I am asexual

5. Which of the following best describes how you see yourself or self-identify? (select one)

   - □ Homosexual/gay
   - □ Bisexual
   - □ Transgendered
   - □ Heterosexual/straight
   - □ Asexual
   - □ Other (please specify): _____

6. If you selected homosexual, bisexual, or transgendered above, which point along the following continuum best describes how you see yourself or self-identify? (select one)

- □ Homosexual only
- □ Homosexual mostly
- □ Homosexual somewhat more
- □ Heterosexual/homosexual equally
- □ Heterosexual somewhat more
- □ Heterosexual mostly
- □ Heterosexual only

7. Please indicate your relationship status (select one):

- □ Single
- □ Partnered
- □ Common law
- □ Legal domestic partnership
- □ Civil union
- □ Married
- □ Separated
- □ Divorced
- □ Widowed
- □ Other (please specify): _____

8. If you are in a relationship, please indicate how long you have been in that relationsip: _____ years, _____ months

9. How many **years** of school have you completed, including elementary, secondary, and post-secondary? _____

10. What is your work or occupation (e.g., carpenter, accountant, salesperson, student)? Please describe fully.

_____

11. What is your current employment status (e.g., full-time, part-time, sick-leave, unemployed, retired)?

12. If retired, year you left the paid work force: _____

13. What is your typical average individual income (all sources)?

□ $ 0 - 19,999	□ $ 60,000 - 69,999
□ $ 20,000 - 29,999	□ $ 70,000 - 79,999
□ $ 30,000 - 39,999	□ $ 80,000 - 89,000
□ $ 40,000 - 49,999	□ $ 90,000 - 99,000
□ $ 50,000 - 59,999	□ $ 100,000+

Can we contact you in future and ask you to respond to other further questions? If yes, please provide your email address: _____

Do you have any comments you would like to share?

_____

_____

_____

_____

_____

_____

Thank you for taking the time to contribute to research on an under-studied population.

APPENDIX H:

LGBT FACTS/MILESTONES

1. Did you know that homosexuality was removed from the American Psychiatric Association's list of mental disorders in 1973?

2. Did you know that on June 26, 2003, the United States Supreme Court overturned the Texas same-sex sodomy law, ruling that this type of private sexual conduct between consenting adults is protected by the rights to liberty under the Constitution? The ruling invalidated all state laws criminalizing sodomy.

3. Did you know that homosexual acts between consenting adults are illegal in 85 countries? In about half of these, only male-male sex is outlawed.

4. Did you know that Israel, Jordan, Turkey, and Cyprus are the only countries in the Middle East where homosexuality is not illegal and homosexuals are not persecuted under law? In most other Middle Eastern countries, homosexuality is illegal and is often punishable by imprisonment, flogging, or even hanging.

5. Did you know that the first U.S. city to hold a gay pride parade was New York? The parade commemorated the first anniversary of the Stonewall Riots.

6. Did you know that nearly one in four same-sex couples includes a partner over 55, and nearly one in five includes two partners over 55?

7. Did you know that over the next 25 years, gay, lesbian, bisexual, and transgendered individuals will comprise 7-10% of seniors in North America?

8. Did you know that same-sex marriage is legal in only twelve countries? They are, by date of legalization, the Netherlands (2001), Belgium (2003), Spain (2005), Canada (2005), South Africa (2006), Nepal (2008), Norway (2009), Sweden (2009), Portugal (2010), Iceland (2010), Argentina (2010), Denmark (2012), In the United States, same-sex partners can currently marry only in Massachusetts, New Hampshire, Vermont, Connecticut, New York, Maryland, Washington, D.C., Iowa, and Washington State.

9. Did you know that in 1991 Stanford became the first major American university to allow same-sex couples to hold commitment ceremonies in the school's chapel? Harvard University followed in 1997.

10. Did you know that adoption by same-sex couples is legal in Argentina, Brazil, Belgium, Iceland, the Netherlands, Norway, Sweden, Spain, Andorra, Uruguay, the United Kingdom (not including Northern Ireland), Guam, and South Africa? It is also legal in most of Canada, some parts of the United States, and two Australian states.

11. Did you know that on March 4, 1998, the U.S. Supreme Court ruled unanimously that federal law prohibiting sexual harassment covers cases of same-sex sexual harassment?

APPENDIX I:

ANALYSES OF ITEMS USED FOR STUDY 1

(IN ORDER OF MEAN IMPORTANCE RATING)

Item	Mean	SD	Skew	Kurtosis	ITC
Overall appearance of face	4.31	.836	-1.421	2.532	.363
Healthy appearance of face	4.21	.852	-1.279	2.090	.462
Appearance of body overall	4.18	.780	-1.184	2.576	.452
Overall body build	4.15	.836	-1.054	1.412	.289
Overall healthy body appearance	4.15	.898	-1.248	1.904	.480
Presence/absence of most teeth	4.10	1.039	-1.233	1.135	.429
Overall app of waist/stomach/abdomen	4.05	.826	-1.051	1.680	.294
Overall weight	4.05	.933	-1.091	1.227	.450
Overall appearance of smile	4.03	.941	-1.012	.935	.288
Facial cuteness	4.01	1.040	-1.159	1.014	.420
Overall body fat	4.01	.955	-1.007	.900	.450
Overall shape of entire body, with head	4.01	.943	-1.057	1.217	.519
How much belly sticks out	3.97	.978	-1.020	.874	.457
Overall appearance of eyes	3.95	1.040	-.901	.310	.286
Overall body size rel to height	3.95	.922	-.940	.997	.436
Overall shape of entire body, w/o head	3.95	.914	-1.000	1.264	.515
Overall app of upper body (waist up)	3.92	.852	-1.005	1.699	.475
Overall appearance of chest	3.90	.864	-.881	1.154	.515
Overall appearance of penis	3.89	1.054	-.993	.614	.490
Overall appearance of teeth	3.87	.929	-.840	.734	.478
Fatness/leanness of waist/stom/abdom	3.86	.973	-.903	.781	.519
Colour of teeth	3.84	1.016	-.896	.521	.490
Masculinity/femininity of body	3.84	1.086	-.922	.333	.484
Overall appearance of buttocks	3.84	.941	-.716	.268	.307
Fatness/leanness upper body (waist up)	3.82	.895	-.822	.916	.520
Amount of visible body fat	3.81	1.003	-.830	.421	.517
Usual body posture	3.81	.981	-.893	.711	.537
Overall body size (petite/medium/large)	3.80	1.023	-.937	.652	.473
Overall size of waist/stom/abdomen	3.80	.974	-.829	.567	.549
Facial masculinity/femininity	3.79	1.053	-.776	.183	.311
Overall shape of waist/stom/abdomen	3.79	.907	-.845	.910	.517

Item	Mean	SD	Skew	Kurtosis	ITC
Muscularity of body overall	3.74	.975	-.716	.358	.521
Muscularity of chest/pecs	3.73	.946	-.675	.303	.296
Overall appearance of lips	3.73	.964	-.673	.300	.494
Alignment of teeth	3.72	.983	-.658	.091	.364
Presence/absence facial disfigurements	3.72	1.084	-.689	-.063	.492
Visible hair in ears	3.72	1.202	-.768	-.290	.407
Overall shape of upper body (waist up)	3.71	.981	-.779	.456	.486
Presence/absence of hair on upper back	3.69	1.262	-.681	-.551	.377
Tautness of neck skin	3.69	1.061	-.798	.235	.606
Appearance of body relative to age	3.68	.987	-.841	.651	.540
Amount of fat around face/neck	3.66	1.020	-.730	.244	.578
Overall appearance of upper arms	3.66	.893	-.590	.391	.416
Visible nose hairs	3.66	1.258	-.687	-.532	.371
Muscularity of waist/stom/abdomen	3.63	1.024	-.629	.100	.549
Overall musc of upper body (waist up)	3.63	1.023	-.711	.242	.549
Shape of buttocks	3.62	1.029	-.634	.014	.484
Facial complexion	3.61	1.038	-.737	.209	.601
Height	3.61	1.152	-.731	-.175	.403
Muscularity/firmness of buttocks	3.61	.985	-.517	-.129	.409
Tautness of body skin	3.61	1.003	-.746	.343	.625
Facial proportionality	3.60	.971	-.652	.341	.543
Proportionality of body	3.60	.977	-.715	.467	.594
Presence/absence of love handles	3.59	1.072	-.573	-.130	.497
Fullness of face	3.58	.948	-.729	.527	.627
Prominence of facial features	3.58	.995	-.703	.355	.634
Length of penis, erect	3.55	1.081	-.611	-.199	.386
Uniformity facial colouration	3.55	1.046	-.654	.062	.591
Shape of smile	3.54	1.083	-.670	-.025	.517
Tautness of facial skin	3.54	1.025	-.724	.236	.638
Penis girth	3.53	1.107	-.603	-.249	.431
Presence/absence of body hair	3.53	1.110	-.589	-.235	.406
Facial symmetry	3.52	1.070	-.613	-.055	.487
Amount of body wrinkles	3.51	1.058	-.609	-.016	.580
Apperance of face relative to age	3.51	1.041	-.648	.075	.482
Muscularity of upper arms	3.51	.983	-.611	.139	.432
Presence/absence of visible abs	3.51	1.105	-.538	-.257	.485

Item	Mean	SD	Skew	Kurtosis	ITC
Muscularity of arms overall	3.50	1.015	-.544	-.017	.573
Presence/absence of head hair	3.50	1.266	-.496	-.737	.280
Clarity of whites of eyes	3.49	1.123	-.597	-.292	.558
Leanness/fatness of buttocks	3.49	.989	-.450	-.104	.463
Overall appearance of shoulders	3.49	.967	-.590	.249	.581
Size of buttocks relative to size of body	3.49	1.008	-.493	-.029	.469
Size of buttocks	3.49	1.068	-.531	-.225	.552
Amount of body tattooing	3.48	1.210	-.577	-.492	.351
Uniformity of body skin colour	3.48	1.035	-.597	-.030	.624
Facial skin texture	3.47	1.040	-.542	-.093	.635
Overall app of upper legs/thighs	3.47	.954	-.382	-.199	.352
Straight/gay facial appearance	3.47	1.263	-.573	-.620	.400
Amount of body boneyness	3.46	1.041	-.545	-.060	.495
Body skin texture	3.46	1.026	-.577	.022	.624
Overall appearance of nipples	3.46	1.090	-.527	-.266	.535
Overall size of upper body (waist up)	3.46	1.017	-.648	.135	.624
Presence/absence body disfigurements	3.46	1.129	-.475	-.404	.452
Facial skin type	3.45	1.082	-.442	-.358	.340
Overall shape of upper arms	3.45	.945	-.608	.289	.579
Shape of jaw	3.45	1.010	-.475	-.081	.389
Body symmetry	3.44	1.068	-.506	-.202	.611
Distinctiveness of face	3.43	1.062	-.558	-.093	.520
Overall app of lower body (hips down)	3.43	.977	-.470	-.126	.534
Overall size of chest	3.43	.967	-.528	.143	.558
Body complexion	3.42	1.033	-.576	-.031	.635
Facial maturity	3.42	.982	-.526	.085	.461
Fatness/leanness of lower body	3.42	1.044	-.492	-.187	.647
Side profile of head and neck	3.42	1.044	-.539	-.100	.627
Straight/gay body appearance	3.42	1.243	-.530	-.616	.411
Tautness of skin under arms	3.42	1.044	-.589	-.039	.650
Muscularity of shoulders	3.41	.987	-.500	-.025	.524
Overall shape of lips	3.40	1.076	-.524	-.201	.561
Side profile, w/o head & neck	3.40	1.027	-.525	-.094	.627
Waist-to-chest ratio	3.39	.976	-.566	.158	.549
Tooth-to-gum ratio	3.38	1.166	-.471	-.482	.519
Waist-to-shoulder ratio	3.37	.972	-.520	.069	.563

Item	Mean	SD	Skew	Kurtosis	ITC
Facial youthfulness	3.36	1.108	-.465	-.340	.470
Overall height/fullness of lips	3.35	1.057	-.479	-.180	.597
Size of smile relative to size of face	3.35	1.024	-.533	-.060	.573
Amount of facial wrinkles	3.34	1.046	-.449	-.195	.578
Size of face relative to size of head	3.34	1.037	-.476	-.140	.504
Leanness/fatness of upper arms	3.33	1.011	-.512	-.072	.655
Muscularity of upper legs/thighs	3.33	.998	-.427	-.163	.580
Overall shape of shoulders	3.33	1.039	-.470	-.173	.639
Presence/absence visible gaps in teeth	3.33	1.156	-.360	-.582	.437
Presence/absence of pubic hair	3.32	1.227	-.412	-.700	.414
Fullness of hair on head	3.29	1.259	-.398	-.786	.362
Size of chin	3.29	1.027	-.522	-.127	.603
Presence/absence of facial hair	3.28	1.179	-.343	-.575	.338
Overall appearance of nose	3.27	.911	-.404	-.091	.359
Shape of nose	3.27	1.022	-.420	-.186	.554
Width of upper legs/thighs	3.27	.973	-.415	-.131	.466
Overall size of shoulders	3.26	1.051	-.556	-.198	.479
Shape of teeth	3.26	1.132	-.377	-.528	.556
Shape/curvature of penis	3.26	1.271	-.358	-.876	.477
Waist-to-hip ratio	3.26	1.027	-.445	-.203	.643
Overall shape of upper legs/thighs	3.25	.992	-.425	-.146	.621
Leanness/fatness of upper back	3.24	1.028	-.455	-.210	.659
Leanness/fatness of upper legs	3.23	1.021	-.387	-.237	.644
Muscularity of lower body (hips down)	3.23	.979	-.285	-.311	.538
Presence/absence of tattoos	3.23	1.255	-.327	-.806	.314
Shape of face	3.23	1.090	-.435	-.337	.636
Baby-face/boyishness	3.22	1.198	-.307	-.724	.328
Width legs relative to width of body	3.22	1.005	-.432	-.159	.639
Width of upper arms	3.22	1.045	-.443	-.270	.641
Leanness/fatness of lower back	3.21	1.049	-.375	-.344	.617
Overall appearance of testicles	3.21	1.168	-.380	-.648	.524
Presence/absence of hair on lower back	3.21	1.261	-.219	-.898	.427
Shape of upper back	3.21	1.050	-.359	-.321	.652
Size of head	3.21	1.055	-.463	-.196	.665
Overall size of lower body (hips down)	3.20	.964	-.376	-.110	.641
Size of nose	3.20	1.060	-.391	-.373	.569

Item	Mean	SD	Skew	Kurtosis	ITC
Overall appearance of upper back	3.19	1.067	-.409	-.386	.663
Overall shape of lower body (hips down)	3.18	1.011	-.327	-.275	.668
Prominence of browline	3.18	1.022	-.385	-.202	.656
Size upper back relative to size low back	3.18	1.073	-.412	-.376	.661
Width of lips	3.18	1.083	-.360	-.433	.611
Appearance of dental bite	3.17	1.130	-.283	-.574	.461
Muscularity of upper back	3.17	1.049	-.366	-.373	.478
Muscularity of lower legs/calves	3.16	1.049	-.226	-.482	.609
Overall appearance of cheeks	3.16	.999	-.381	-.108	.670
Presence/absence of hair on buttocks	3.16	1.189	-.252	-.757	.497
Presence/absence of chest hair	3.16	1.249	-.230	-.881	.297
Race/ethnicity	3.16	1.335	-.219	-1.087	.190
Width of hips	3.16	1.043	-.304	-.338	.630
Overall appearance of lower legs/calves	3.15	1.069	-.251	-.518	.615
Overall appearance of scrotum	3.15	1.211	-.269	-.832	.544
Size of eyes	3.15	1.045	-.372	-.209	.568
Texture of skin on hands	3.15	1.099	-.336	-.487	.612
Alignment/curvature of legs	3.14	1.081	-.297	-.468	.566
Length of legs relative to height	3.14	1.064	-.353	-.377	.664
Overall appearance of hips	3.14	1.019	-.333	-.243	.676
Thickness/width of neck/throat	3.14	1.013	-.299	-.245	.681
Overall shape of lower legs/calves	3.13	1.051	-.275	-.453	.617
Thickness of body skin	3.13	1.120	-.325	-.556	.498
Size of jaw	3.12	1.025	-.415	-.252	.631
Size of upper back	3.12	1.059	-.294	-.405	.643
Veiny-ness of body	3.12	1.095	-.242	-.537	.543
Shape of head	3.11	1.088	-.347	-.436	.656
Size of eyebrows	3.11	1.087	-.299	-.506	.583
Leanness/fatness of lower legs	3.10	1.050	-.281	-.425	.656
Overall appearance of neck/throat	3.10	1.029	-.383	-.307	.688
Size of cheeks	3.10	1.025	-.378	-.211	.620
Thickness of facial skin	3.10	1.100	-.305	-.493	.574
Overall appearance of eyelids	3.09	1.092	-.349	-.517	.612
Size of teeth	3.09	1.088	-.272	-.474	.567
Width of arms relative to body size	3.09	1.020	-.422	-.274	.637
Width of lower legs/calves	3.09	1.066	-.268	-.486	.616

Item	Mean	SD	Skew	Kurtosis	ITC
Amount/prominence of crow's feet	3.08	1.072	-.252	-.439	.566
Muscularity of lower arms/forearms	3.08	1.042	-.291	-.417	.629
Overall appearance of lower arms	3.08	1.032	-.280	-.379	.662
Amount of forehead lines/creases	3.07	1.037	-.289	-.340	.644
Overall muscularity of lower back	3.07	1.008	-.289	-.311	.663
Width of lower arms/forearms	3.07	1.011	-.311	-.347	.570
Body skin type	3.06	1.112	-.226	-.584	.562
Distinctiveness of body	3.06	1.051	-.289	-.365	.576
Overall size of forehead	3.06	1.033	-.338	-.365	.676
Presence/absence of abdominal hair	3.06	1.165	-.227	-.671	.392
Skin colour	3.06	1.484	-.150	-1.373	.269
Overall appearance of forehead	3.04	1.024	-.322	-.315	.691
Presence/absence of facial birthmarks	3.04	1.174	-.173	-.745	.514
Usual colour of cheeks	3.04	1.009	-.316	-.219	.632
Presence/absence of facial scars	3.03	1.136	-.209	-.638	.540
Skin tone	3.03	1.283	-.258	-1.004	.410
Colour of eyes	3.02	1.315	-.187	-1.052	.385
Length of face	3.02	1.011	-.360	-.242	.615
Shape of chin	3.02	1.016	-.335	-.345	.670
Shape of eyebrows	3.01	1.154	-.235	-.695	.552
Shape of eyes	3.01	1.179	-.191	-.745	.426
Fatness/leanness of lower arms	3.00	1.038	-.266	-.450	.677
Shape of hands	3.00	1.136	-.203	-.658	.610
Fingers	2.99	1.218	-.131	-.893	.492
Overall shape of lower arms	2.99	1.047	-.247	-.464	.623
Overall shape of lower back	2.99	1.048	-.256	-.479	.646
Prominence of cheekbones	2.98	1.017	-.293	-.280	.639
Type of head hair	2.98	1.194	-.204	-.806	.542
Size of hands	2.97	1.154	-.197	-.733	.584
Texture of hair on head	2.97	1.171	-.201	-.764	.560
Overall appearance of lower back	2.96	1.042	-.229	-.527	.662
Overall appearance of anus	2.96	1.299	-.098	-1.077	.441
Size of testicles	2.96	1.217	-.140	-.897	.496
Vertical length of forehead	2.96	1.061	-.262	-.470	.644
Amount/prominence of laugh lines	2.94	1.053	-.247	-.436	.582
Length of chin	2.93	1.016	-.233	-.341	.643

Item	Mean	SD	Skew	Kurtosis	ITC
Muscularity of neck	2.93	1.064	-.214	-.497	.607
Presence/absence of underarm hair	2.93	1.288	-.071	-1.009	.435
Length of neck/throat	2.92	1.002	-.245	-.335	.676
Overall size of lower back	2.92	1.017	-.171	-.341	.664
Length of arms relative to body	2.91	1.037	-.241	-.453	.622
Size of ears	2.91	1.083	-.179	-.636	.599
Presence/absence of calluses on hands	2.90	1.219	-.019	-.881	.489
Overall appearance of eyelashes	2.89	1.166	-.139	-.787	.560
Overall appearance of feet	2.89	1.214	-.028	-.895	.571
Overall appearance of navel	2.88	1.231	-.099	-.946	.521
Presence/absence of hair around anus	2.88	1.254	-.025	-.964	.415
Presence/absence of penis foreskin	2.88	1.407	.014	-1.227	.306
Presence/absence of hair on scrotum	2.87	1.251	-.030	-.972	.394
Presence/absence of hair on upper legs	2.83	1.145	-.071	-.728	.512
Presence/absence of calluses on feet	2.83	1.284	.055	-1.014	.479
Colour of hair on head	2.82	1.292	-.070	-1.126	.412
Overall appearance of tongue	2.82	1.162	-.060	-.790	.554
Presence/absence of body scars	2.81	1.117	-.031	-.656	.521
How testicles hang	2.78	1.238	-.002	-.981	.447
Presence/absence of body freckles	2.78	1.157	-.025	-.771	.522
Overall length of legs	2.77	1.059	-.157	-.661	.568
Presence/absence of hair on taint	2.77	1.259	.045	-.989	.476
Length of penis, flaccid/unerect	2.76	1.250	.053	-1.019	.411
Presence/absence of hair on forearms	2.76	1.173	.001	-.801	.420
Shape of ears	2.76	1.097	-.050	-.697	.605
Presence/absence of facial freckles	2.74	1.153	.017	-.765	.533
Overall appearance of ears	2.73	1.071	-.015	-.649	.509
Presence/absence hair lower legs/calves	2.73	1.244	.071	-.979	.423
Height of cheekbones	2.71	1.038	-.131	-.549	.488
Overall appearance of armpits	2.71	1.229	.094	-.924	.493
Presence/absence hair on hands	2.70	1.179	.048	-.846	.484
Pres/ abs hair lower legs/calves (Repeat)	2.69	1.282	.128	-1.067	.314
Visibility/size of Adam's apple	2.69	1.146	-.010	-.790	.530
Presence/absence of body birthmarks	2.62	1.127	.116	-.724	.542
Overall appearance of toes	2.62	1.226	.173	-.949	.468
Shape of feet	2.61	1.189	.191	-.810	.571

Item	Mean	SD	Skew	Kurtosis	ITC
Presence/absence of dimples on cheeks	2.59	1.115	.045	-.769	.525
Presence/absence dimples mouth corner	2.58	1.143	.060	-.854	.463
Overall appearance of wrists	2.56	1.121	.079	-.790	.566
Presence/absence of hair on feet	2.56	1.198	.218	-.822	.489
Overall appearance of knees	2.54	1.087	.093	-.741	.605
Overall length of arms	2.54	1.028	-.035	-.697	.505
Length of tongue	2.48	1.164	.218	-.859	.469
Overall appearance of ankles	2.37	1.184	.349	-.857	.502
Size of feet	2.37	1.161	.266	-.914	.444
Overall appearance of elbows	2.29	1.074	.301	-.731	.541
Presence/absence of chin cleft	2.27	1.153	.422	-.745	.342

Note: SD = standard deviation. ITC: corrected item-total correlation.

APPENDIX J:

GAY MEN'S PHYSICAL ATTRACTIVENESS SCALE

A man's physical appeal is often assessed as a whole. Specific physical features, however, also contribute to overall physical attractiveness. Please indicate how important each of the following items is to you when assessing the attractiveness of another man, gay or straight. Although several items are similar, please respond to each. Be as honest as you can, keeping in mind that different men use different criteria in judging physical attractiveness; there are no right or wrong answers. (**Note**: If instrument is used to rate the appearance of other men, such as one's partner, the third sentence should be amended to read as follows: "Please indicate how physically attractive you consider your partner in terms of the following body features.")

1 = Very unimportant
2 = Somewhat unimportant
3 = Neither important nor unimportant
4 = Somewhat important
5 = Very important

1. appearance of body overall _____
2. shape of face (round, square, etc.) _____
3. overall weight (underweight, normal weight, overweight) _____
4. leanness/fatness of waist/stomach/abdomen _____
5. girth (width) of penis _____
6. overall body build _____
   (slender, defined, average, muscular, bulky, stocky, fat)
7. muscularity of arms overall _____
8. presence/absence of hair on buttocks/bum _____
9. prominence of facial features (soft, chiseled/angular, etc.) _____
10. presence/absence of abdominal hair _____

1 = Very unimportant
2 = Somewhat unimportant
3 = Neither important nor unimportant
4 = Somewhat important
5 = Very important

11. muscularity of upper legs/thighs _____
12. length of penis, flacid _____
13. length of chin _____
14. facial skin texture (smooth, leathery, rough, etc.) _____
15. overall appearance of upper back _____
16. size of feet _____
17. overall body fat (lean, average, obese, etc.) _____
18. overall appearance of cheeks _____
19. overall appearance of testicles/balls _____
20. size of upper back relative to size of lower back _____